Liquid End Sheet

LE-20PBA/ LE-66PBA/ LE-76PBA/ LE-86PBA

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE

1. The purpose of the injection check valve is to prevent backflow from the treated line.
2. A ½" NPT female fitting with sufficient depth will accept the injection check valve.
3. To insure correct seating of the ball inside the injection check valve, the injection check valve should be installed upwards (vertically) into bottom of the pipe.

B. CONNECTING DISCHARGE TUBING

NOTE: *Cut tubing to length needed for discharge line.*

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Slide the small end of the coupling nut onto tubing.
3. Push tubing on the valve housing nozzle so that tubing flares out and butts up against valve housing and will not go any further.
4. Slide the coupling nut to the threads and engage. While pushing the tubing onto the valve housing nozzle, tighten the coupling nut by hand until tubing is held securely in place.

Excessive force will crack or distort fittings.
DO NOT USE PIPE WRENCH.

C. CONNECTING SUCTION TUBING

Flooded Section (Preferred Method)

1. Mount pump 12" above the floor with the head extending beyond mounting surface so the suction tubing curves gently away from the pump to prevent kinking.
2. Install ½" or ¾" NPT shut off valve, with at least ¾" clear way through the valve, into reservoir. This is necessary to stop flow from reservoir while servicing the pump.
3. Install barbed connector (one of two supplied) into the valve. Attach $^{15}/_{16}$" O.D. Vinyl tubing to the barbed connector. Secure with the hose clamp provided (use shortest length of suction tubing necessary).
4. Connect the other end of the suction fitting at the pump and secure with the hose clamp provided.

D. CONNECTING SUCTION TUBING

Suction Lift (Pump Sitting on a Barrel: Maximum Lift 3.5 ft)

1. Connect the suction tubing to the barbed suction fitting on the pump. Secure with the hose clamp provided.
2. Cut tubing so it will only reach within 1"of the bottom of the barrel.
3. If tubing curl is a problem, fabricate a 1" Polypropylene or PVC pipe as a tubing straightener (pipe should be slightly longer than the depth of the barrel for ease of removal).
4. Place the tubing straightener over the suction tubing and lower into the barrel.

E. PRIMING

1. Temporarily remove tubing from the injection check valve and hold the end of tubing so it is above the level of the pump.
2. Start pump. Set at 80% speed and 100% stroke.
3. As soon as solution is visible through translucent discharge tubing, just past the discharge valve, stop the pump.
4. The pump is now primed.
5. Reconnect tubing to the injection check valve.

NOTE:

(a) Pump is normally self-priming if suction lift is not more than 5 ft (1.5 m), valves in the pump are wet with water (pump is shipped from factory with water in pump head) and the above steps ***(D. Priming)*** *are followed.*

(b) If the pump does not self prime, remove discharge valve housing and ball and pour water or solution slowly into discharge port until head is filled. Follow step ***D. Priming*** *thereafter.*

6. If difficulty is experienced on the initial prime, apply vacuum to discharge tubing by suitable means, such as a hand suction pump. Difficulty should not reoccur after pump is primed with a viscous liquid.

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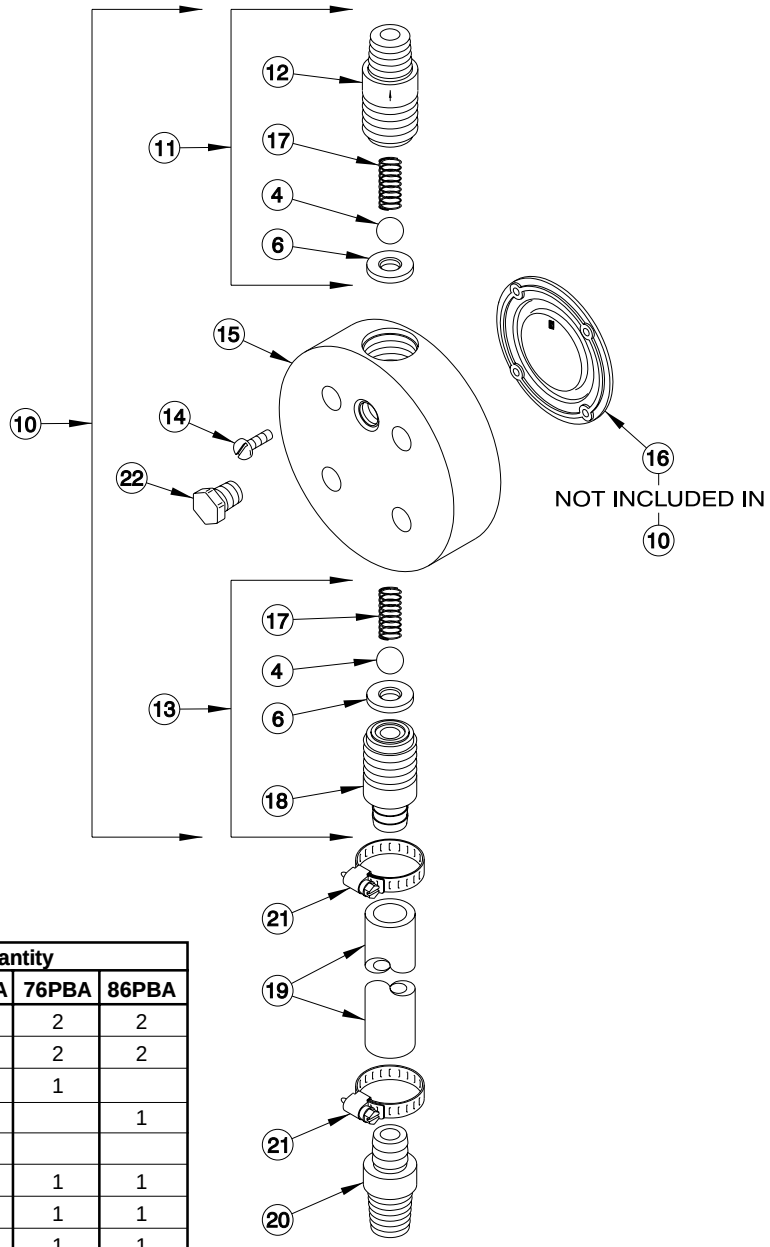
http://www.lmipumps.com

ISO9001 REGISTERED COMPANY

Replaces same of Rev. A 11/95
1766.A 10/97



NOTE:
Threaded connections into pump head are 1"-12 straight threads. **DO NOT USE TEFLON® TAPE.** These joints are sealed by seal ring valve seats (item 6 on exploded view).

KEY NO.	PART NO.	DESCRIPTION	Quantity 20PBA	66PBA	76PBA	86PBA
4	25042	Ball, Stainless Steel	2	2	2	2
6	25128	Seal Ring, PTFE	2	2	2	2
10	35150a	Head Assembly, LE-66PBA, 76PBA		1	1	
	35151	Head Assembly, LE-86PBA				1
	35152	Head Assembly, LE-20PBA	1			
11	30481	Discharge Valve Assembly	1	1	1	1
12	26024	Valve Housing, PVC, ½" NPT	1	1	1	1
13	27053	Suction Valve Assembly	1	1	1	1
14	10340	Screw, 10-24 x ¾" SS	4	4	4	4
15	10524-4	Head, 3.0 High Viscosity Acrylic	1			
	25540-1	Head, 1.8 High Viscosity Acrylic		1	1	
	25550-1	Head, 0.9 High Viscosity Acrylic				1
16	31419	Liquifram™, 3.0 SI Fluorofilm™	1			
	31420	Liquifram™, 1.8 SI Fluorofilm™		1	1	
	30917	Liquifram™, 0.9 SI Fluorofilm™				1
17	25558	Spring, Stainless Steel	2	2	2	2
18	25649	Valve Seat, Polypropylene, Barbed	1	1	1	1
19	25651-3.5	Tubing, Vinyl, .938" O.D.	1	1	1	1
20	25650	Connector, Barbed, ½" NPT	1	1	1	1
21	25652	Hose Clamp	2	2	2	2
22	26558	Pipe Plug	1	1	1	1

Liquid End Sheet

LE-217/LE-257/LE-277/LE-297

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE

1. The purpose of the injection check valve is to prevent backflow from the treated line.
2. A ¼" NPT female fitting with sufficient depth will accept the injection check valve.
3. To insure correct seating of the ball inside the injection check valve, the injection check valve should be installed upwards (vertically) into bottom of the pipe.

B. CONNECTING DISCHARGE PIPE

NOTE: *Corrosion resistant ¼" Schedule 80 or Schedule 120 should be used. DO NOT USE SMALLER PIPE SIZES.*

1. Discharge valve has a ¼" NPT male outlet. A short ¼" NPT union should be connected to both discharge and suction valves so that the metering pump may be removed without disturbing piping.
2. It is recommended that Teflon® tape be used on tapered pipe threads so that there is a leakproof seal without overtightening of fittings.

Excessive force will crack or distort fittings.
DO NOT OVERTIGHTEN.

C. CONNECTING SUCTION PIPE

1. Using the same size and material pipe as used on the discharge line, cut the suction pipe to length so that the foot valve is positioned just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5 m).
2. It is recommended that Teflon® tape be used on tapered pipe threads so that there is a leakproof seal without overtightening of fittings. Suction side leaks are invisible, but if present will cause pump to suck in air during each pump stroke.

D. PRIMING

1. Temporarily disconnect the union at the end of the discharge pipe run.

NOTE: *Stroke cannot be adjusted until pump is operating electrically. Turn lower knob while unit is stroking.*

2. Start pump. Set at 80% speed and 100% stroke.
3. As soon as solution begins to enter the discharge pipe, stop the pump.
4. The pump is now primed.
5. Reconnect union at the end of the discharge pipe.

NOTE:

(a) Pump is normally self-priming if suction lift is not more than 5 ft (1.5 m), valves in the pump are wet with water (pump is shipped from factory with water in pump head) and the above steps ***(D. Priming)*** *are followed.*

(b) If the pump does not self prime, remove discharge valve housing and ball, and pour water or solution slowly into discharge port until head is filled. Follow step ***D. Priming*** *thereafter.*

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Replaces same of Rev. D 12/96
1613.D 7/97

KEY NO.	PART NO.	DESCRIPTION	LE-217 (3.0 SI)	LE-257 (0.5 SI)	LE-277 (1.8 SI)	LE-297 (0.9 SI)
1 *	32514	Inection Check Valve Asm.	(1)	(1)	(1)	(1)
2	32519	Head Asm., LE-217	1	-	-	-
	32516	Head Asm., LE-257	-	1	-	-
	32518	Head Asm., LE-277	-	-	1	-
	32517	Head Asm., LE-297	-	-	-	1
3	32509	Head, 3.0 SI, 316 SS	1	-	-	-
	32506	Head, 0.5 SI, 316 SS	-	1	-	-
	32508	Head, 1.8 SI, 316 SS	-	-	1	-
	32507	Head, 0.9 SI, 316 SS	-	-	-	1
4 *	32515	Check Valve Asm., 316 SS	2 (1)	2 (1)	2 (1)	2 (1)
5	31419	Liquifram™, 3.0 SI, Fluorofilm™	1	-	-	-
	30916	Liquifram™, 3.0 SI, Fluorofilm™	-	1	-	-
	31420	Liquifram™, 3.0 SI, Fluorofilm™	-	-	1	-
	30917	Liquifram™, 3.0 SI, Fluorofilm™	-	-	-	1
6 †	10340	Screw, 10-24 x .75 PH SS	4	4	4	4

* Quantities shown in ( ) indicate optional valve assemblies not included with standard Liquid Handling Assemblies.

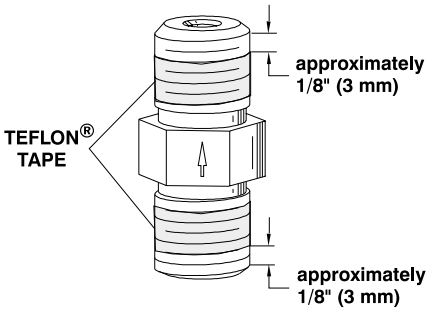
† For use with LMI Series M Metering Pumps, order part number 30856, Screw, 10-24 x 1.5 PH SS, 4 each.

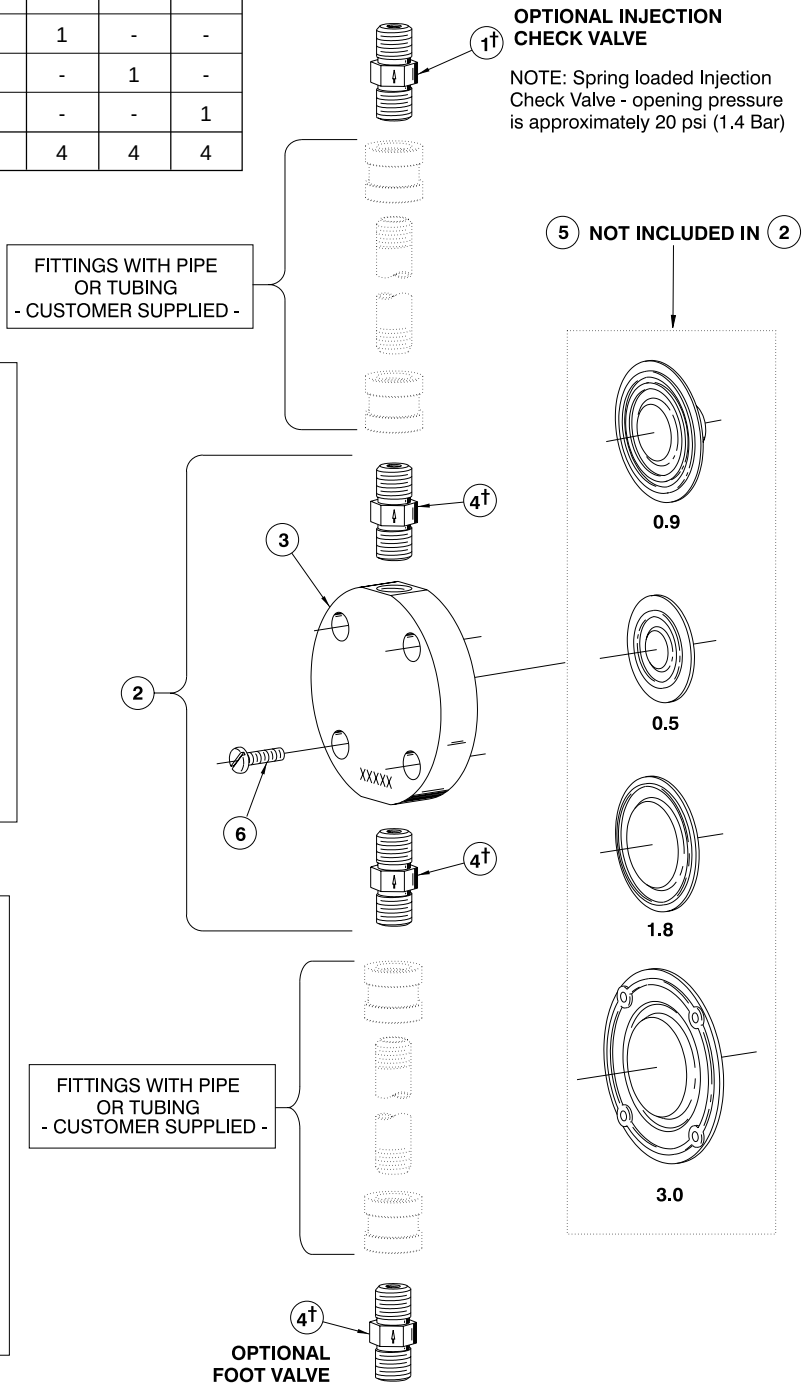
† All connections are 1/4" NTP M.

Teflon® tape is required on all 1/4" NPT M fittings to insure a tight seal.

All valves must be installed so that the flow direction arrow points upward.

APPLY TEFLON® TAPE AS SHOWN HERE





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Liquid End Sheet

LE-281TT

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

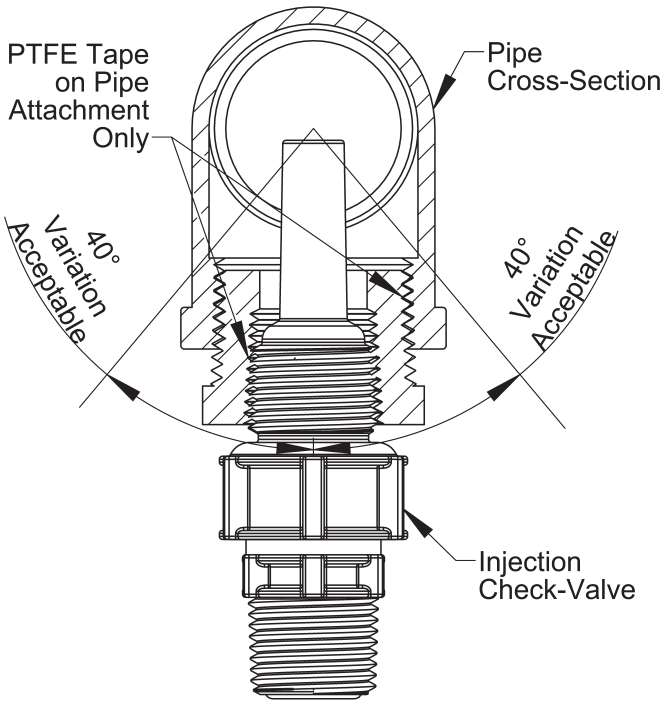

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

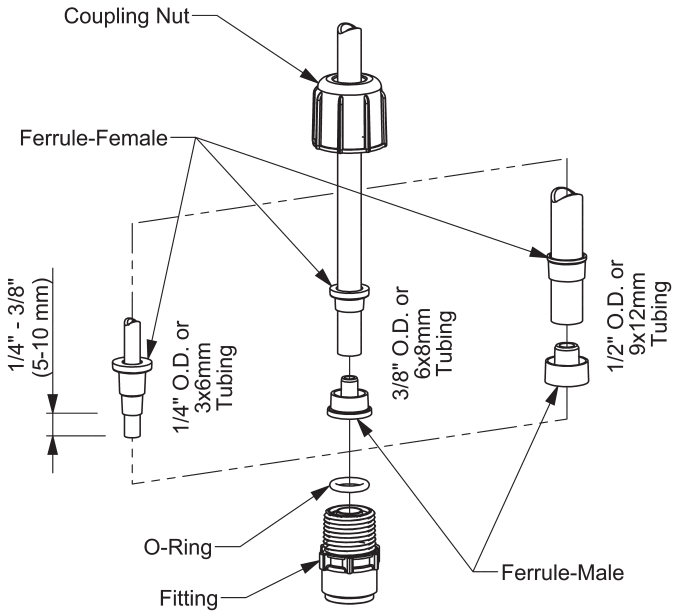

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection on the suction side.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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D. PRIMING WITH 3-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port. Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

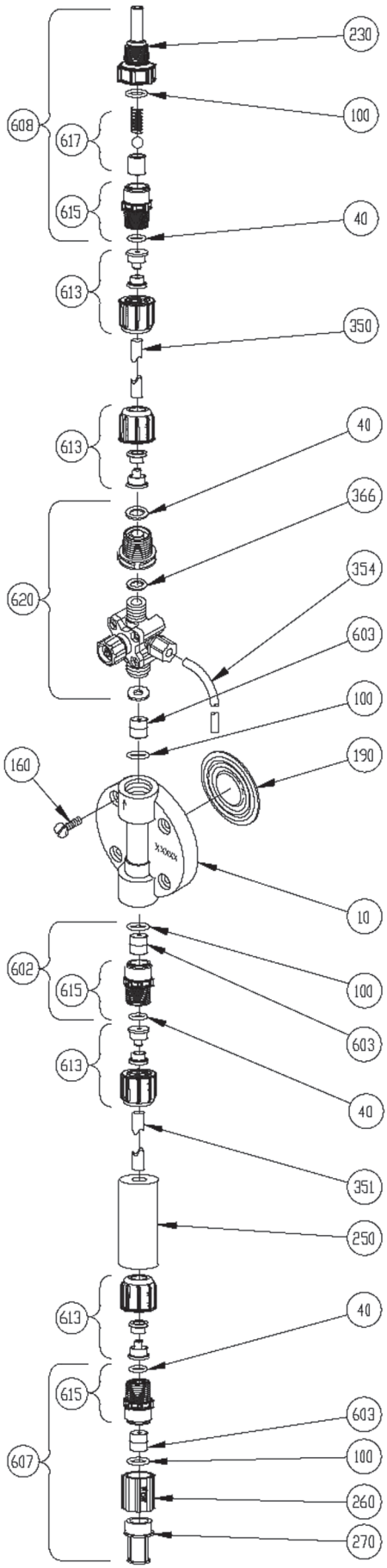
2. Turn black knob about ¼ turn CCW to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 3-function valve and cartridge and slowly pour water or solution into the pump head until it is filled. Replace cartridge and 3-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

LE-281TT



Key Number	Description	Part Number	QTY
10	Head, 0.9 Molded PVC	37752	1
40	O-Ring, Polyprel	48349	4
100	O-Ring, Polyprel	36103	4
160	Screw, Head	10340	4
190	Liquifram™, 0.9 Fluorofilm	30917	1
230	Injection Fitting, PVC	48617	1
250	Weight, Ceramic	10322	1
260	Coupling, Foot Valve	36204	1
270	Strainer, Foot Valve	10123	1
350	Tubing, .375 x .062 Black PE	27342-10	1
351	Tubing, .375 x .062 Vinyl	10469-06	1
366	O-Ring, Polyprel	49138	1
354	Tubing, .250 x .062 PE	25636-06	1
602	Valve Asm, Suction PVC/Polyprel	49088	1
603	Cartridge Asm, PVDF/Polyprel	37338	3
607	Valve Asm, Foot PVC/Polyprel	49100	1
608	Valve Asm, Injection PVC/Polyprel	48728	1
613	Tubing Connection Kit , 3/8”	77383	4
615	Fitting, Single Ball PVC	48787	3
617	Cartridge Asm, Injection	48795	1
620	Valve Asm, 3FV	49148	1

Liquid End Sheet

LE-281TU

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

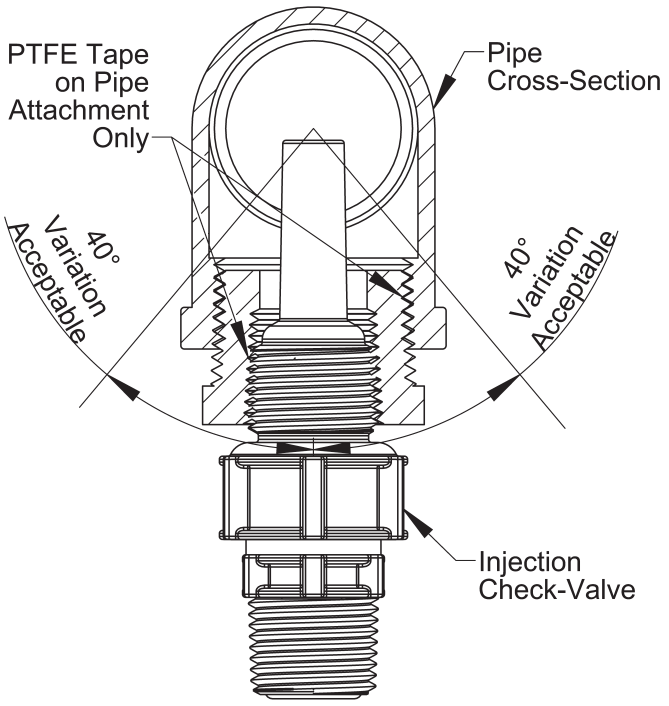


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

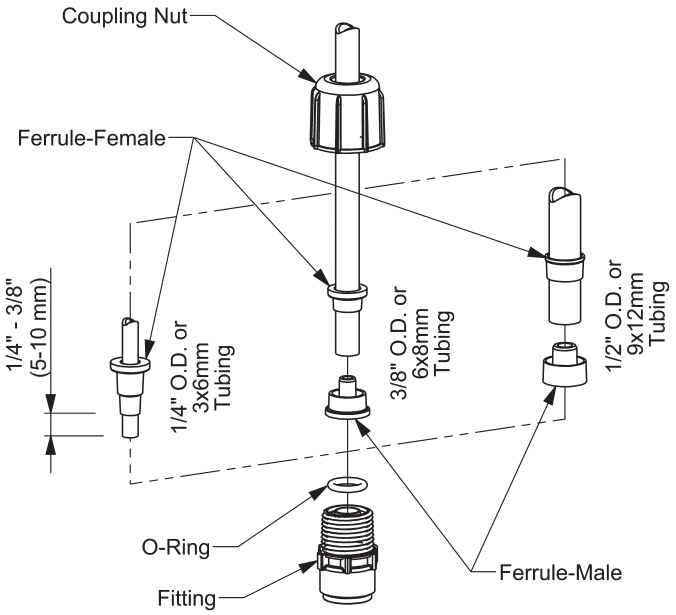


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection on the suction side.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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D. PRIMING WITH 3-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port. Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

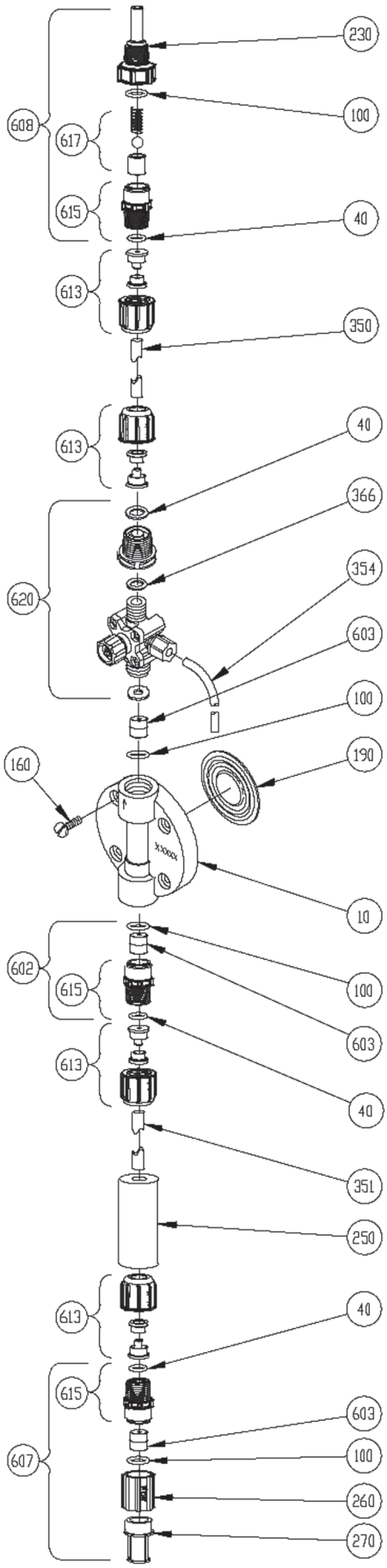
2. Turn black knob about ¼ turn CCW to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 3-function valve and cartridge and slowly pour water or solution into the pump head until it is filled. Replace cartridge and 3-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

LE-281TU



Key Number	Description	Part Number	QTY
10	Head, 0.9 Molded PVC	37752	1
40	O-Ring, Polyprel	48349	4
100	O-Ring, Polyprel	36103	4
160	Screw, Head	10340	4
190	Liquifram™, 0.9 Fluorofilm	30917	1
230	Injection Fitting, PVC	48617	1
250	Weight, Ceramic	10322	1
260	Coupling, Foot Valve	36204	1
270	Strainer, Foot Valve	10123	1
350	Tubing, .375 x .062 Black PE	27342-10	1
351	Tubing, .375 x .062 Vinyl	10469-06	1
366	O-Ring, Polyprel	49138	1
354	Tubing, .250 x .062 PE	25636-06	1
602	Valve Asm, Suction PVC/Polyprel	49088	1
603	Cartridge Asm, PVDF/Polyprel	37338	3
607	Valve Asm, Foot PVC/Polyprel	49100	1
608	Valve Asm, Injection PVC/Polyprel	48728	1
613	Tubing Connection Kit , 3/8”	77383	4
615	Fitting, Single Ball PVC	48787	3
617	Cartridge Asm, Injection	48795	1
620	Valve Asm, 3FV	49148	1

Liquid End Sheet

LE-3X2NX, 3X8NX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

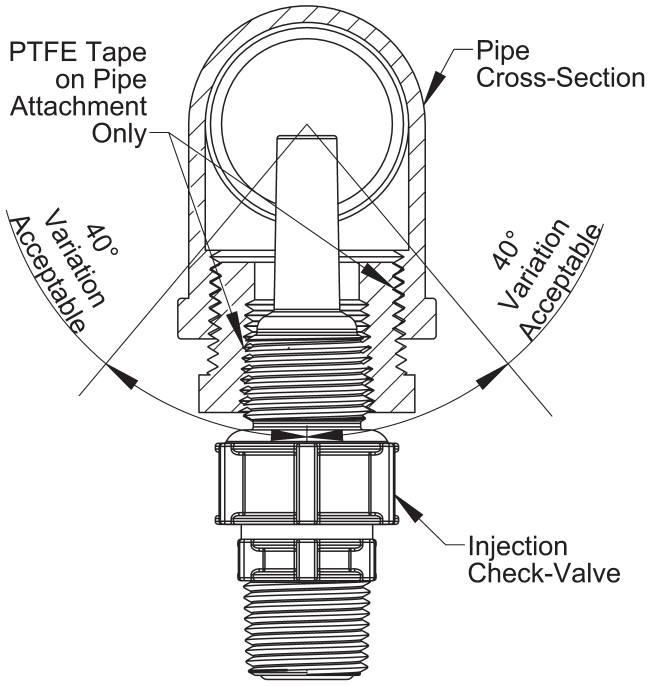


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

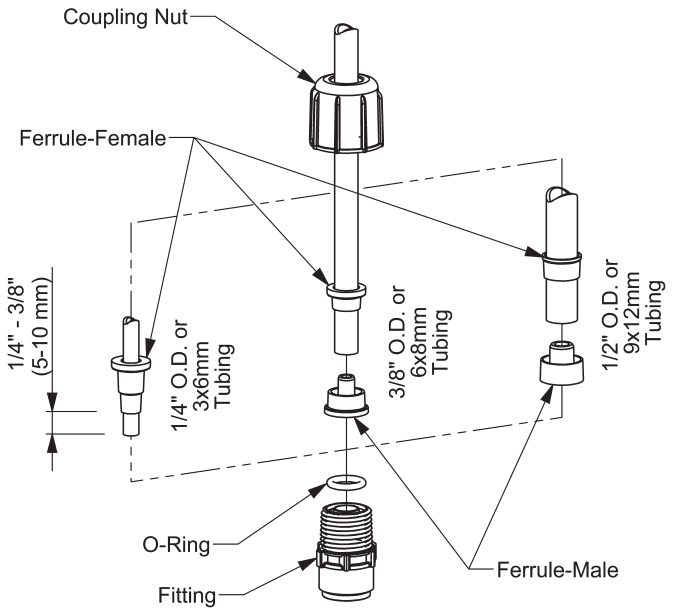


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for suction connections on certain liquid ends.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS. USE ONLY LMI TUBING—ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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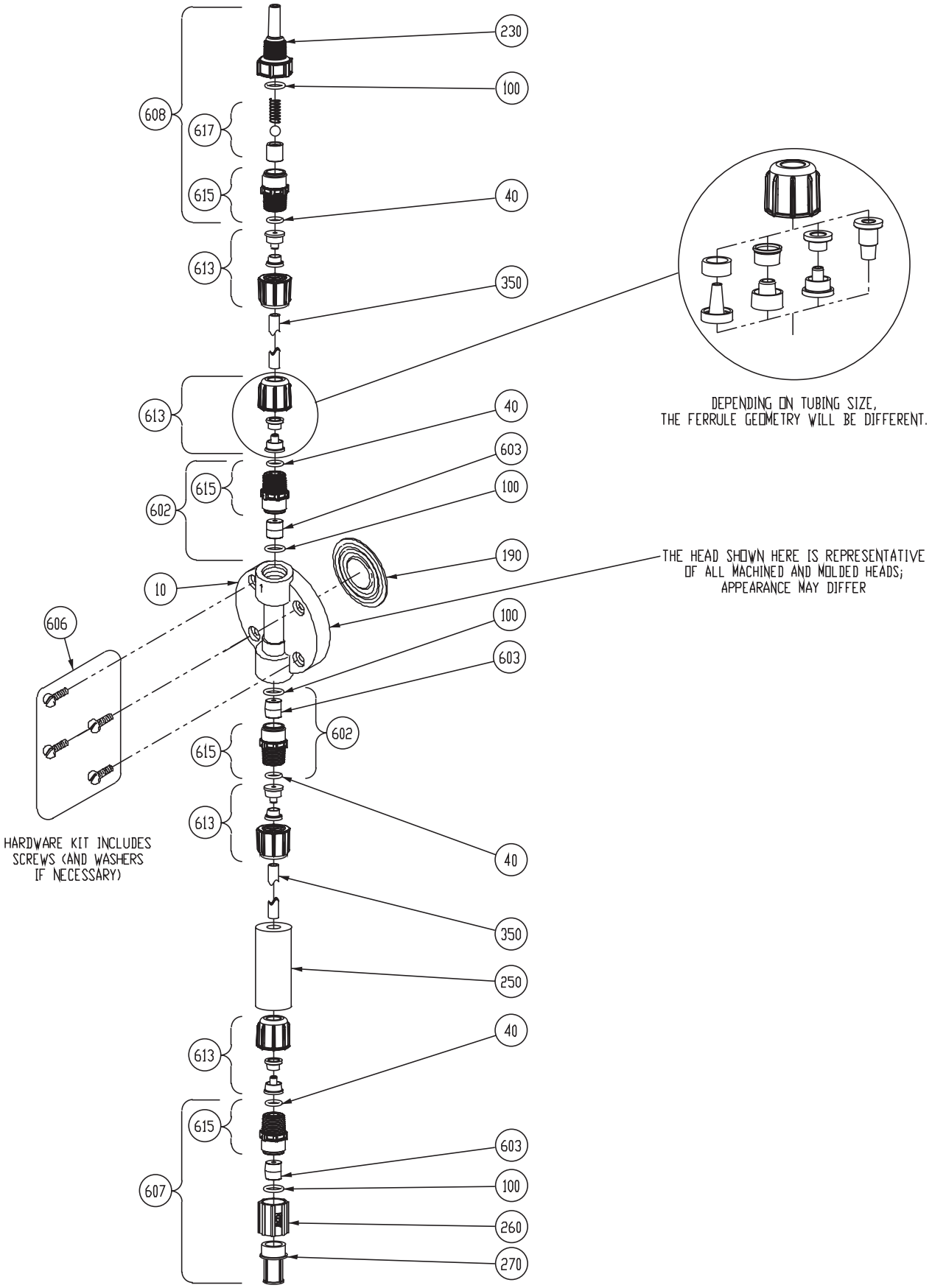
LE - 3X2NX, 3X8NX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			312NX	352NX	362NX	392NX	318NX	358NX	368NX	398NX
10	Pump Head	37980		1						
		37979				1				
		38543			1					
		36128	1							
		37750						1		
		37752								1
		37754							1	
		37756					1			
40	O-Ring	48349	4	4	4	4	4	4	4	4
100	O-Ring	36103	4	4	4	4	4	4	4	4
190	Liquifram™	30916		1				1		
		30917				1				1
		31420			1				1	
		31419	1				1			
230	Injection Valve Body	48617					1	1	1	1
		48618	1	1	1	1				
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **3XXNI ONLY**	25636-16		1				1		
		10342-16			1	1			1	1
		10142-16	1				1			
	Tubing, Suction & Discharge **3XXNU ONLY**	28636-16		1				1		
		27342-16			1	1			1	1
		27142-16	1				1			
602	Check Valve	49089		2						
		49090	2		2	2				
		49087						2		
		49088					2		2	2
603	Cartridge Valve	37335		3				3		
		37338	3		3	3	3		3	3
606	Liquid End Hardware	49110		1	1	1				
		49111	1				1	1	1	1
607	Foot Valve	49101		1						
		49102	1		1	1				
		49099						1		
		49100					1		1	1
608	Injection Valve	48728					1	1	1	1
		48731	1	1	1	1				
613	Tubing Connection Kit **3XXNI and 3XXNU**	77382		4				4		
		77383			4	4			4	4
		77384	4				4			
	Tubing Connection Kit **3XXNM ONLY**	77378		4				4		
		77379			4	4			4	4
		77380	4				4			
615	Check Valve Fitting	48787					4	4	4	4
		48788	4	4	4	4				
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1

LE-3X2NX, 3X8NX



D. PRIMING

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

1. Plug in or switch the pump on.
2. While the pump is running, set at 100% speed and 100% stroke length.
3. The suction tubing should begin to fill with solution from the tank.
4. A small amount of solution will begin to discharge out the discharge valve. Once this happens, **SHUT THE PUMP OFF.**
5. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the discharge valve and discharge cartridge and slowly pour water or solution into the pump head until it is filled. Replace cartridge and discharge valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1 and 2 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.
2. **Line Depressurization:**
   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE–3X2SX, 3X8SX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

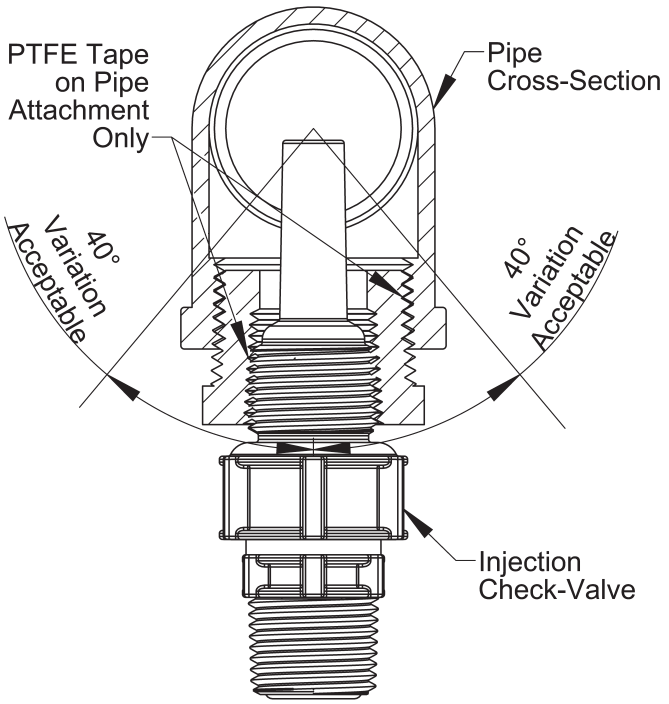


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

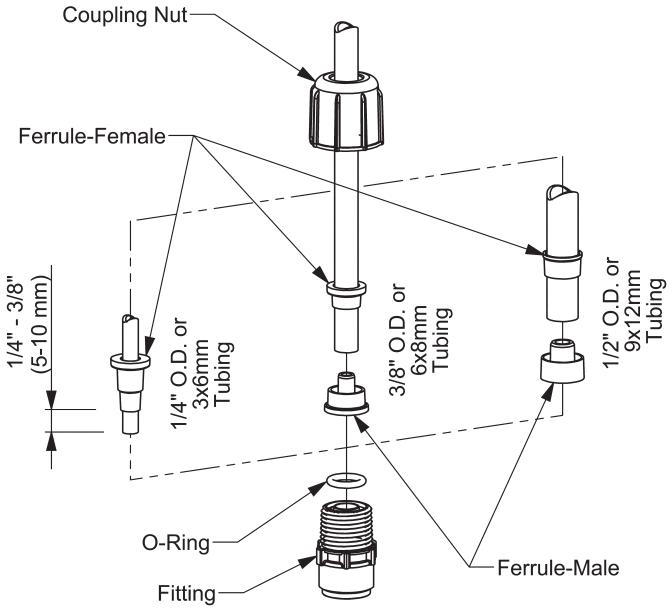


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for suction connections on certain liquid ends.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS. USE ONLY LMI TUBING—ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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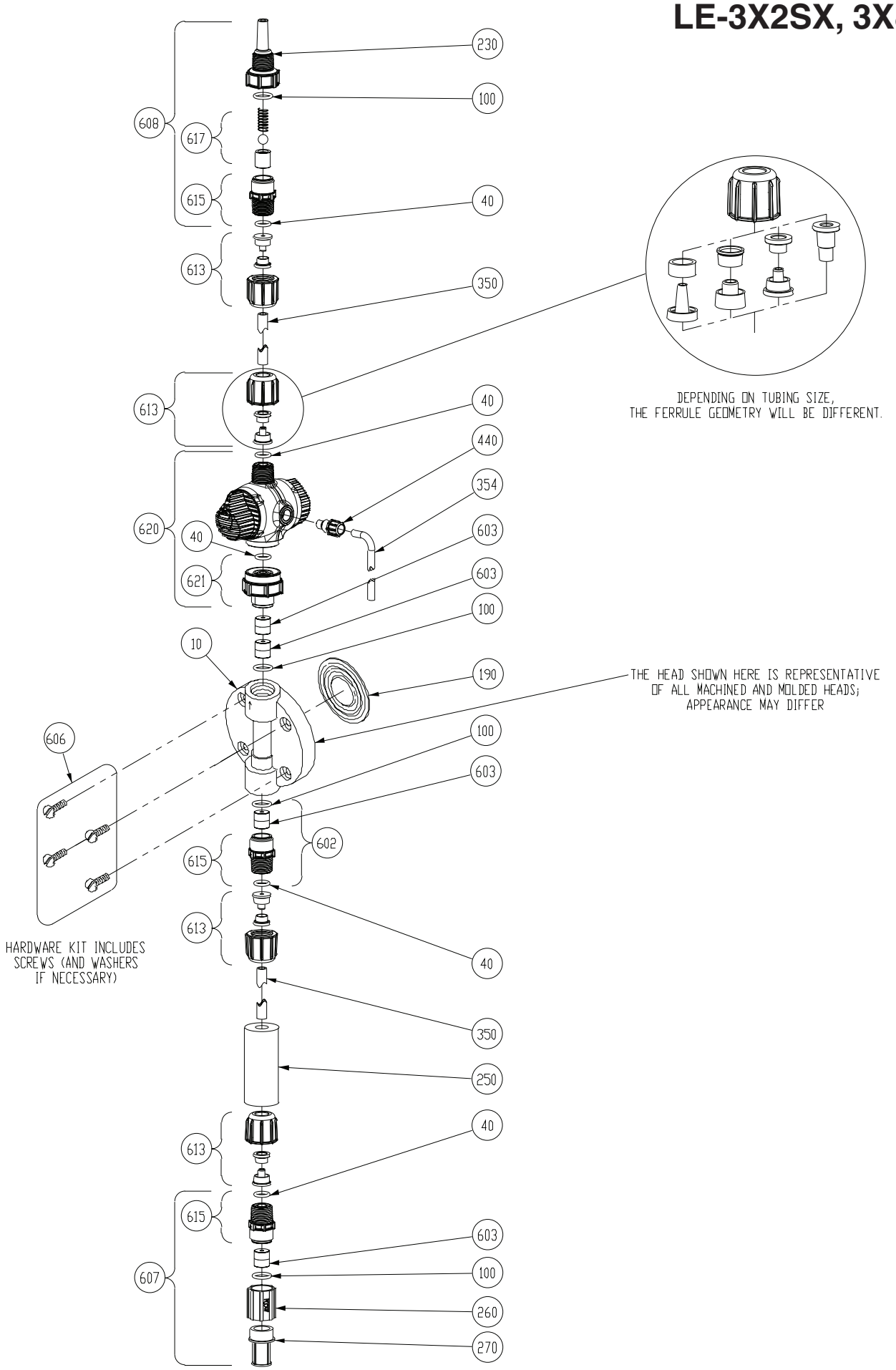
LE-3X2SX, 3X8SX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			312SX	352SX	362SX	392SX	318SX	358SX	368SX	398SX
10	Pump Head	37980		1						
		37979				1				
		38543			1					
		36128	1							
		37750						1		
		37752								1
		37754							1	
		37756					1			
40	O-Ring	48349	5	5	5	5	5	5	5	5
100	O-Ring	36103	4	4	4	4	4	4	4	4
190	Liquifram™	30916		1				1		
		30917				1				1
		31420			1				1	
		31419	1				1			
230	Injection Valve Body	48617					1	1	1	1
		48618	1	1	1	1				
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **3XXSI ONLY**	25636-16		1				1		
		10342-16			1	1			1	1
		10142-16	1				1			
	Tubing, Suction & Discharge **3XXSU ONLY**	28636-16		1				1		
		27342-16			1	1			1	1
		27142-16	1				1			
354	Tubing, 4FV	25636-06	1	1	1	1	1	1	1	1
440	Bleed Nut	48622	1	1	1	1	1	1	1	1
602	Suction Check Valve	49089		1						
		49090	1		1	1				
		49087						1		
		49088					1		1	1
603	Cartridge Valve	37335		4				4		
		37338	4		4	4	4		4	4
606	Liquid End Hardware	49110		1	1	1				
		49111	1				1	1	1	1
607	Foot Valve	49101		1						
		49102	1		1	1				
		49099						1		
		49100					1		1	1
608	Injection Valve	48728					1	1	1	1
		48731	1	1	1	1				
613	Tubing Connection Kit **3XXSI and 3XXSU**	77382		4				4		
		77383			4	4			4	4
		77384	4				4			
	Tubing Connection Kit **3XXSM ONLY**	77378		4				4		
		77379			4	4			4	4
		77380	4				4			
615	Check Valve Fitting	48787					3	3	3	3
		48788	3	3	3	3				
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1
620	4FV Assembly	48799		1						
		48754	1		1	1				
		48798						1		
		48753					1		1	1
621	4FV Fitting Assembly	49254					1	1	1	1
		49255	1	1	1	1				

LE-3X2SX, 3X8SX



D. PRIMING WITH 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port **(FIGURE 3)**. Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

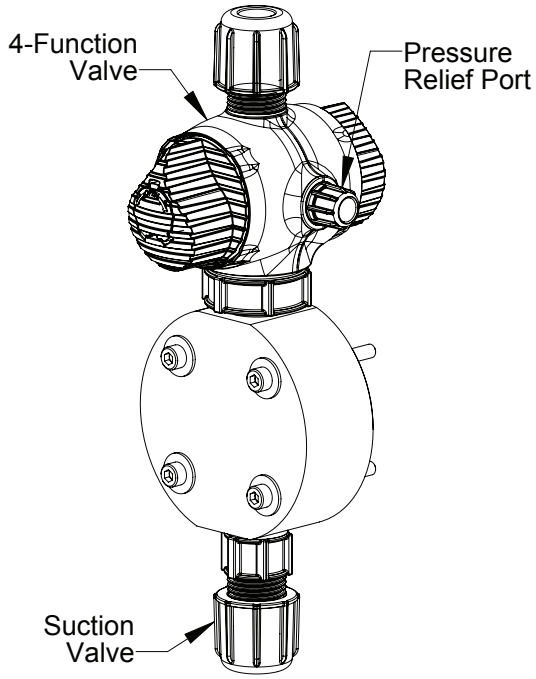


FIGURE 3

Note: The head drawing is for reference only; actual appearance may differ.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

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Liquid End Sheet

LE-3X3NX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

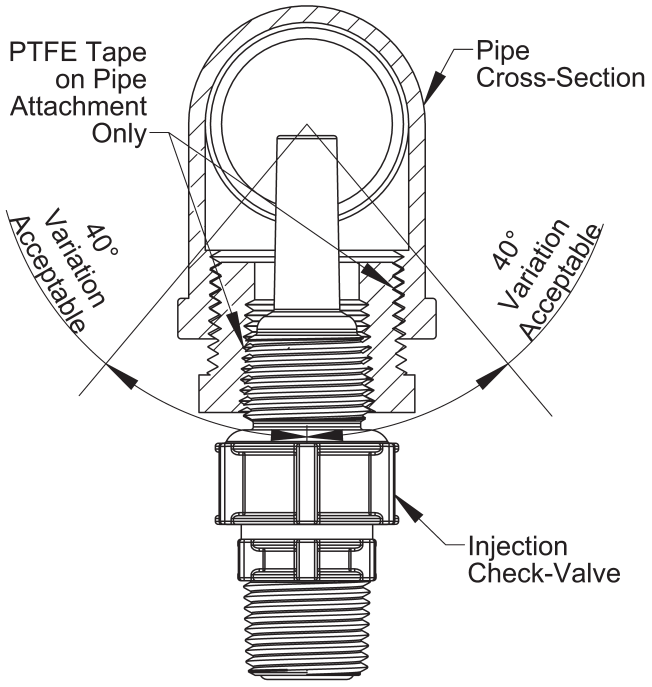

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

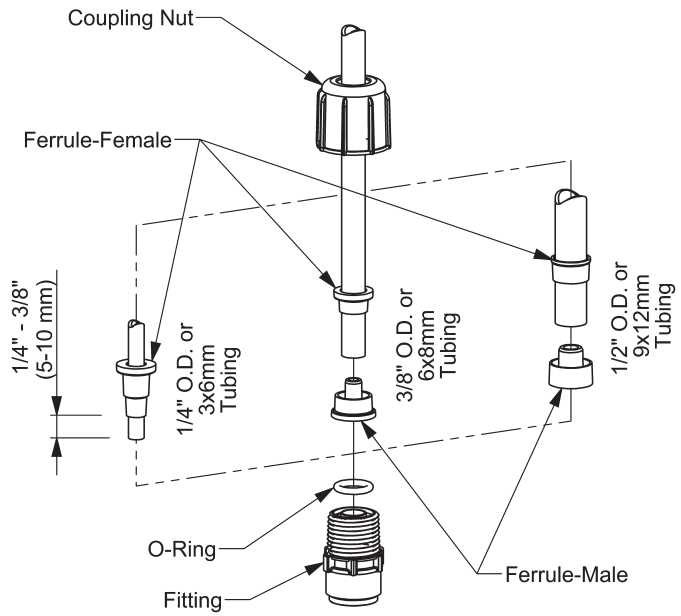

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for suction connections on certain liquid ends.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS. USE ONLY LMI TUBING—ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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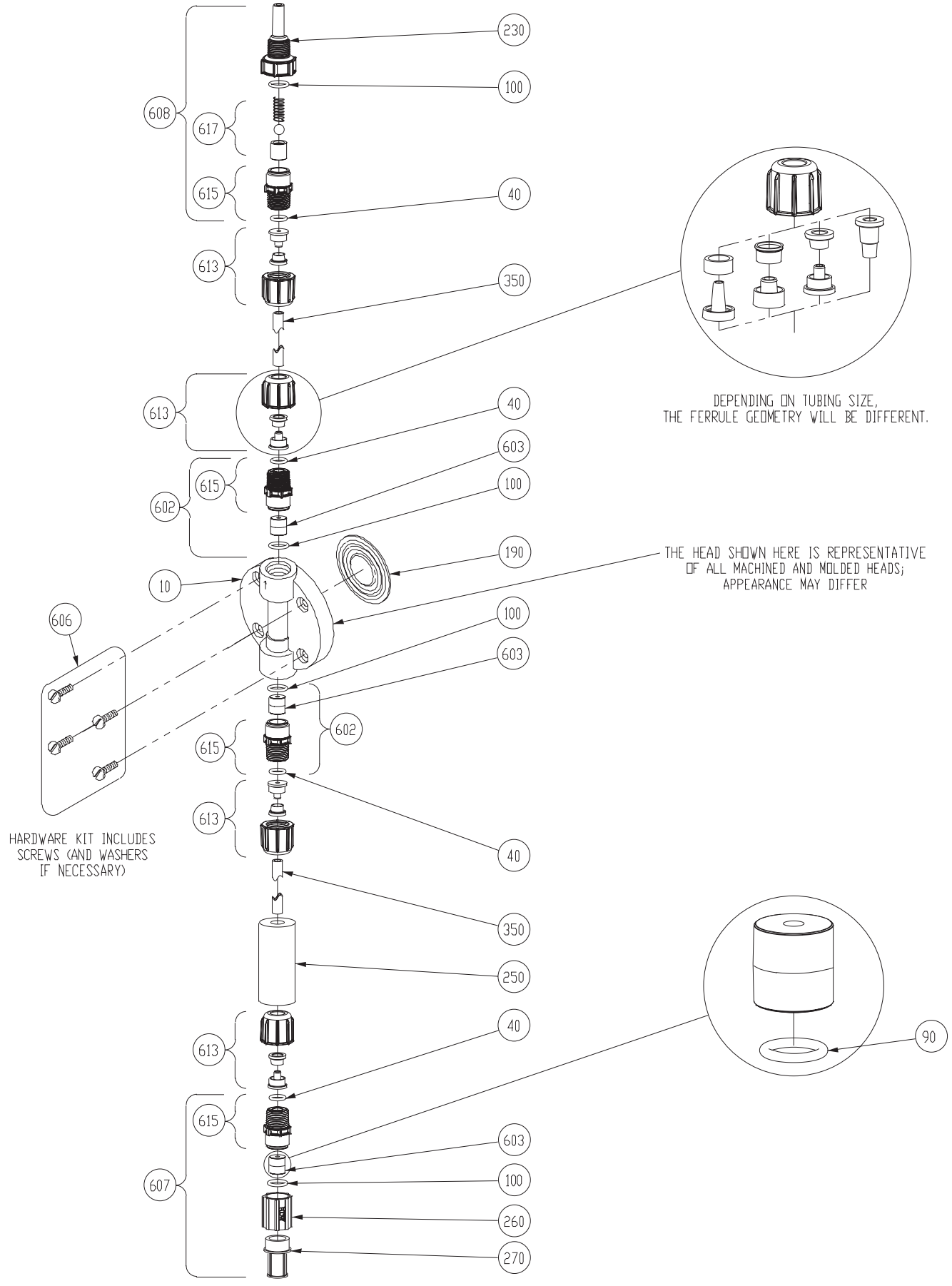
2038.A 11/2010

LE—3X3NX

Key Number	Description	Part Number	QUANTITY			
			313NX	353NX	363NX	393NX
10	Pump Head	37980		1		
		37979				1
		38543			1	
		36128	1			
40	O-Ring	48591	4	4	4	4
90	O-Ring	39413	4	4	4	4
100	O-Ring	48589	4	4	4	4
190	Liquifram™	30916		1		
		30917				1
		31420			1	
		31419	1			
230	Injection Valve Body	48618	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge **3XXNI ONLY**	25636-16		1		
		10342-16			1	1
		10142-16	1			
	Tubing, Suction & Discharge **3XXNU ONLY**	28636-16		1		
		27342-16			1	1
		27142-16	1			
602	Check Valve	49091		2		
		49092	2		2	2
603	Cartridge Valve	37334		3		
		37337	3		3	3
606	Liquid End Hardware	49110		1	1	1
		49111	1			
607	Foot Valve	49103		1		
		49104	1		1	1
608	Injection Valve	48732	1	1	1	1
613	Tubing Connection Kit **3XXNI and 3XXNU**	77382		4		
		77383			4	4
		77384	4			
	Tubing Connection Kit **3XXNM ONLY**	77378		4		
		77379			4	4
		77380	4			
615	Check Valve Fitting	48789	4	4	4	4
617	Injection Valve Cartridge	48795	1	1	1	1

LE-3X3NX


230
100
608
617
615
40
613
350
613
40
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602
100
190
10
606
100
603
602
615
613
40
350
250
613
40
615
603
607
100
260
270
DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.
THE HEAD SHOWN HERE IS REPRESENTATIVE
OF ALL MACHINED AND MOLDED HEADS;
APPEARANCE MAY DIFFER
HARDWARE KIT INCLUDES
SCREWS (AND WASHERS
IF NECESSARY)
90

D. PRIMING

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

1. Plug in or switch the pump on.
2. While the pump is running, set at 100% speed and 100% stroke length.
3. The suction tubing should begin to fill with solution from the tank.
4. A small amount of solution will begin to discharge out the discharge valve. Once this happens, **SHUT THE PUMP OFF.**
5. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the discharge valve and discharge cartridge and slowly pour water or solution into the pump head until it is filled. Replace cartridge and discharge valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1 and 2 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.
2. **Line Depressurization:**
   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

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Liquid End Sheet

LE-3X3SX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

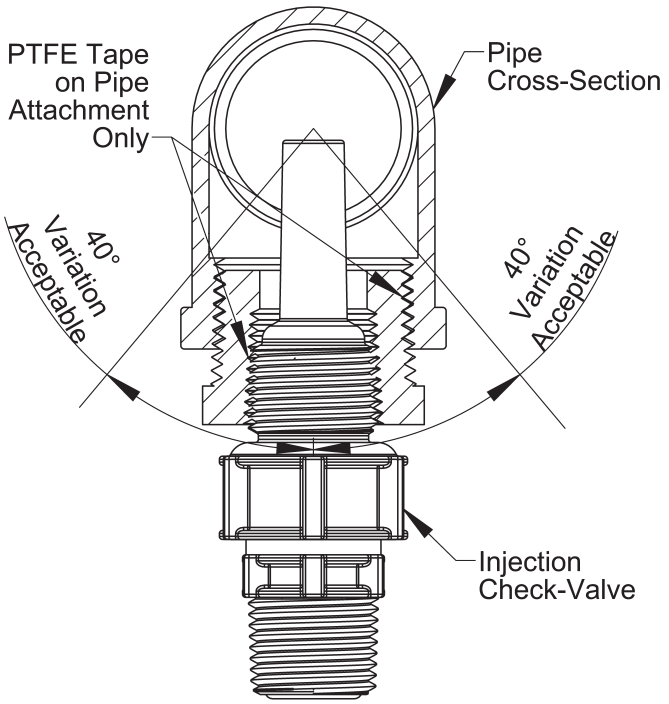

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

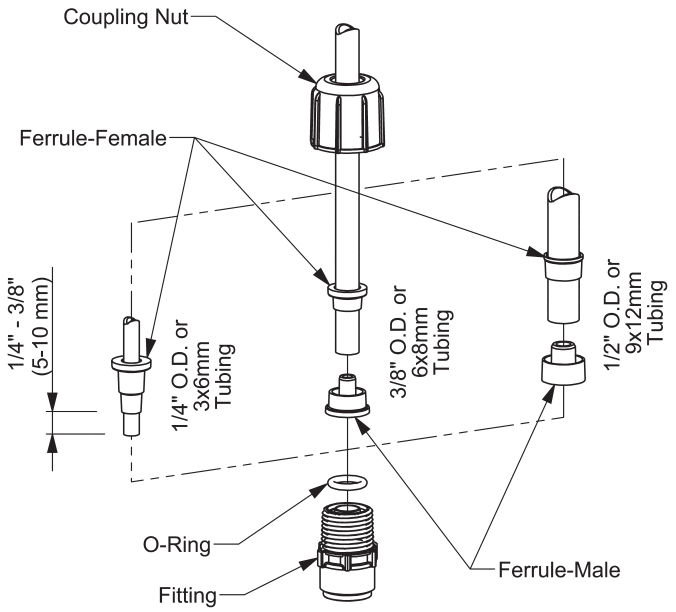

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for suction connections on certain liquid ends.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS. USE ONLY LMI TUBING—ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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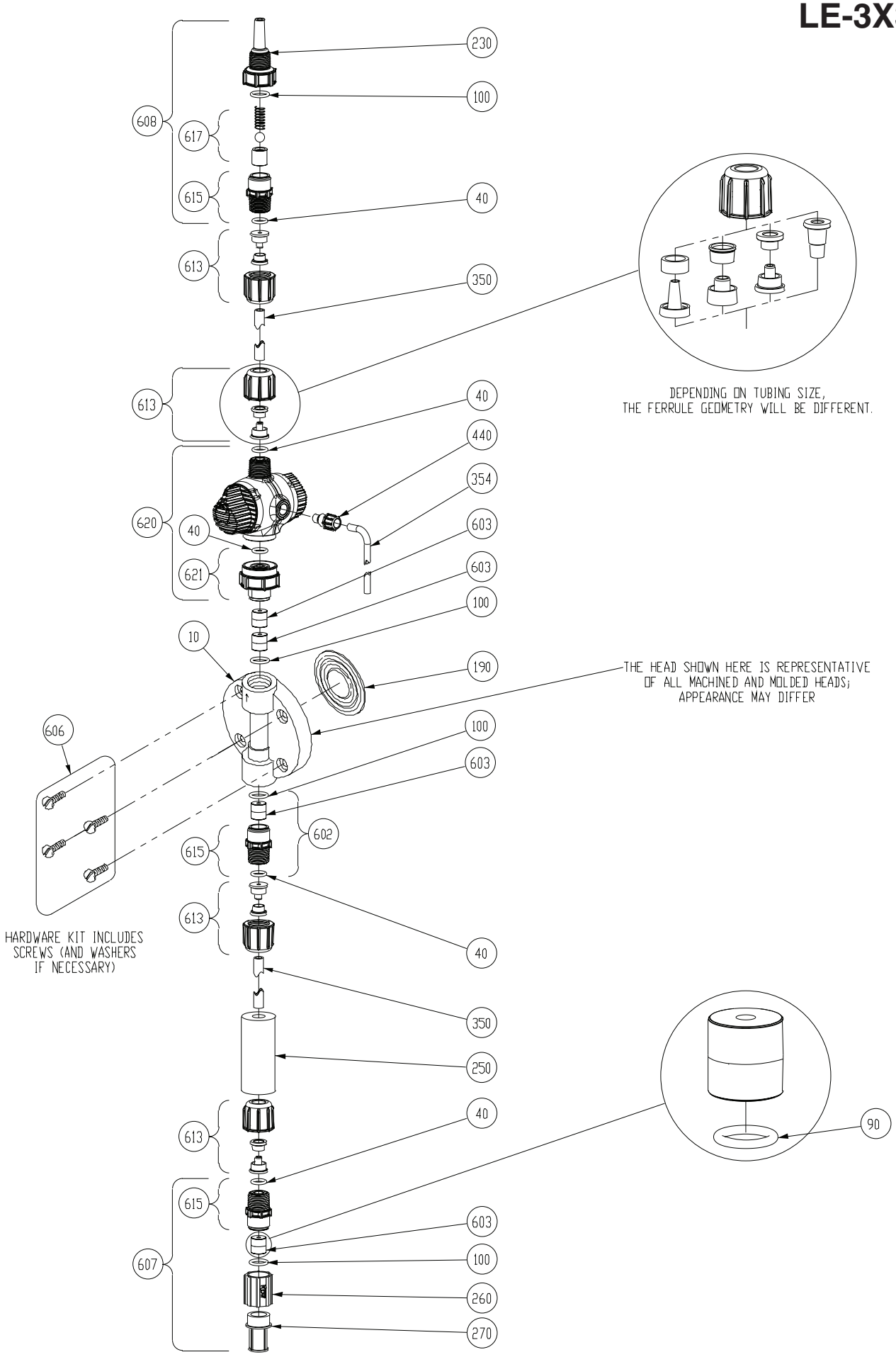
LE - 3X3SX

Key Number	Description	Part Number	QUANTITY			
			313SX	353SX	363SX	393SX
10	Pump Head	37980		1		
		37979				1
		38543			1	
		36128	1			
40	O-Ring	48591	5	5	5	5
90	O-Ring	39413	4	4	4	4
100	O-Ring	48589	4	4	4	4
190	Liquifram™	30916		1		
		30917				1
		31420			1	
		31419	1			
230	Injection Valve Body	48618	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge **3XXSI ONLY**	25636-16		1		
		10342-16			1	1
		10142-16	1			
	Tubing, Suction & Discharge **3XXSU ONLY**	28636-16		1		
		27342-16			1	1
		27142-16	1			
354	Tubing, 4FV	25636-06	1	1	1	1
440	Bleed Nut	48622	1	1	1	1
602	Suction Check Valve	49091		1		
		49092	1		1	1
603	Cartridge Valve	37334		4		
		37337	4		4	4
606	Liquid End Hardware	49110		1	1	1
		49111	1			
607	Foot Valve	49103		1		
		49104	1		1	1
608	Injection Valve	48732	1	1	1	1
613	Tubing Connection Kit **3XXSI and 3XXSU**	77382		4		
		77383			4	4
		77384	4			
	Tubing Connection Kit **3XXSM ONLY**	77378		4		
		77379			4	4
		77380	4			
615	Check Valve Fitting	48789	3	3	3	3
617	Injection Valve Cartridge	48795	1	1	1	1
620	4FV Assembly	48800		1		
		48755	1		1*	1
621	4FV Fitting Assembly	49256	1	1	1	1

***For 363SP liquid end, use 48800 4FV assembly.**

LE-3X3SX


230
100
608
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190
606
100
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350
250
613
40
615
603
607
100
260
270
DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.
THE HEAD SHOWN HERE IS REPRESENTATIVE
OF ALL MACHINED AND MOLDED HEADS;
APPEARANCE MAY DIFFER
HARDWARE KIT INCLUDES
SCREWS (AND WASHERS
IF NECESSARY)
90

D. PRIMING WITH 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port **(FIGURE 3)**. Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

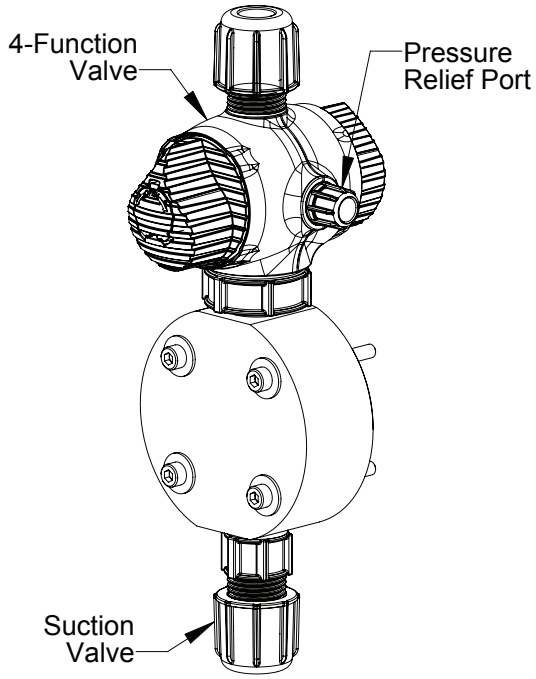

FIGURE 3

Note: The head drawing is for reference only; actual appearance may differ.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE - 4X0NX, 4X8NX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

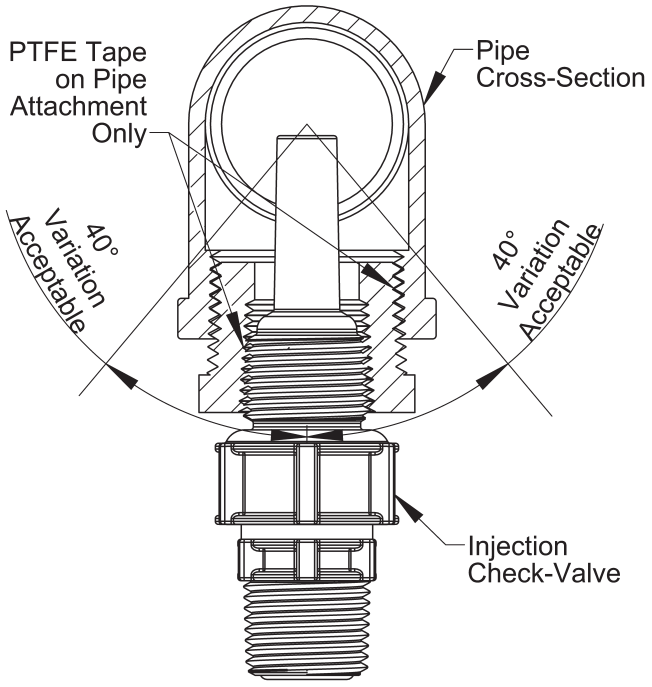

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

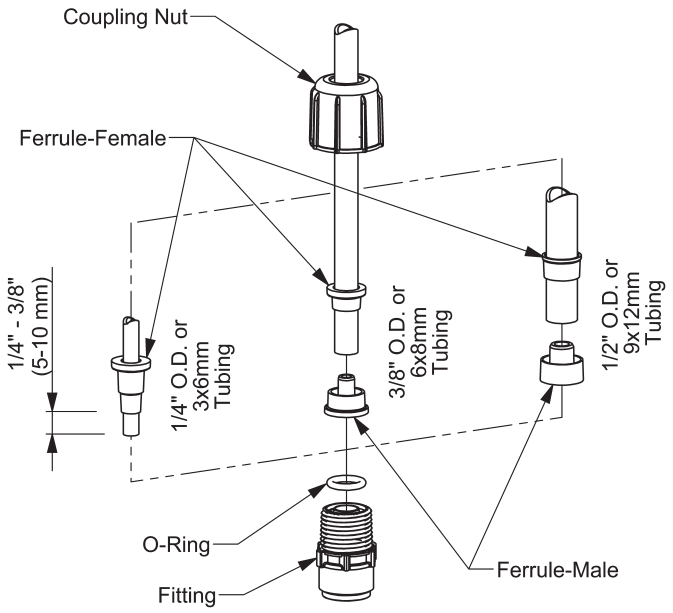

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for suction connections on certain liquid ends.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS. USE ONLY LMI TUBING—ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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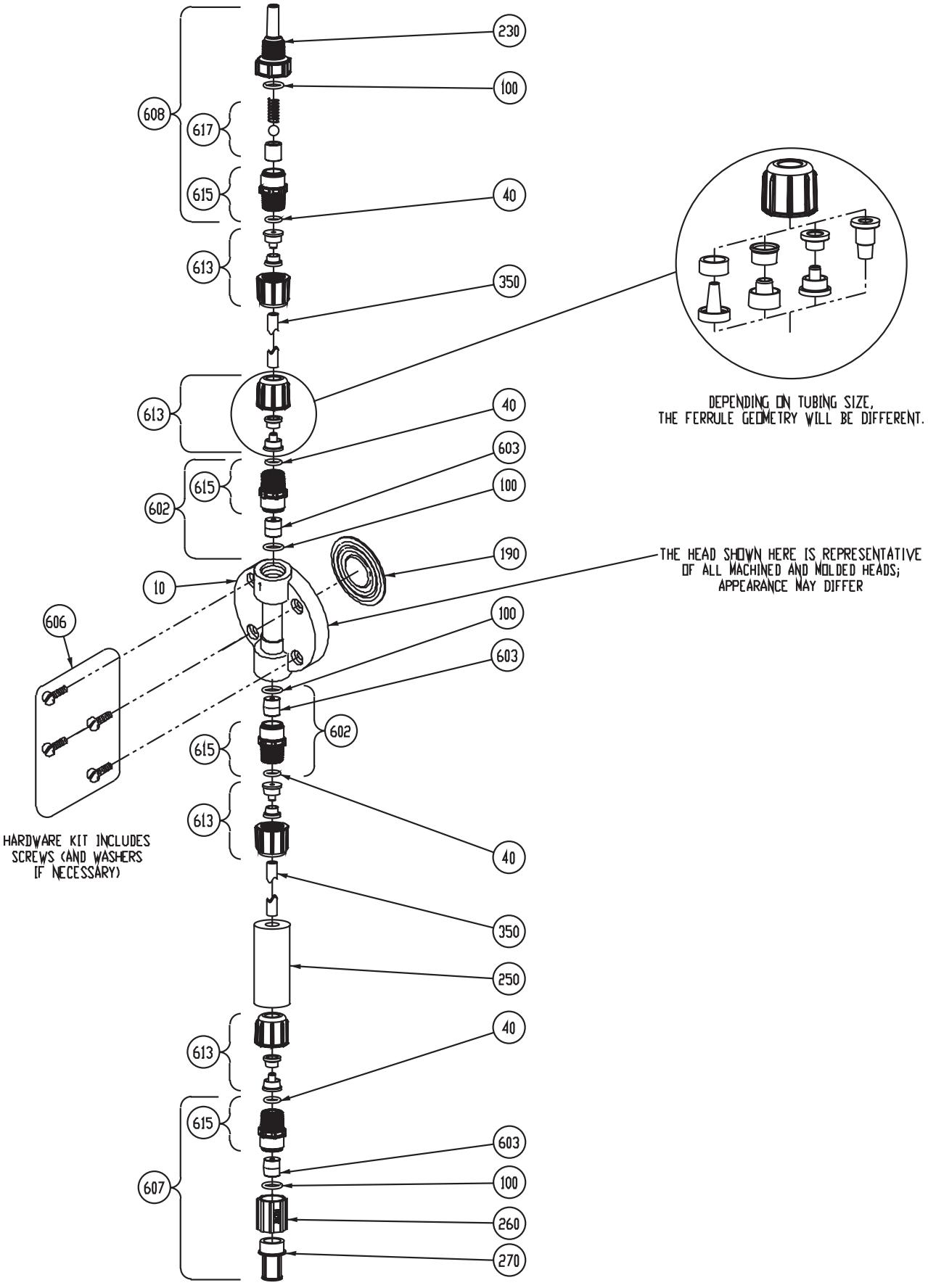
http://www.lmipumps.com

LE - 4X0NX, 4X8NX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			410NX	450NX	460NX	490NX	418NX	458NX	468NX	498NX
10	Pump Head	38578		1						
		38579						1		
		38561				1				
		38562								1
		38595			1					
		38596							1	
		36159	1							
		37745					1			
40	O-Ring	48349	4	4	4	4	4	4	4	4
100	O-Ring	36103	4	4	4	4	4	4	4	4
190	Liquifram™	30916		1				1		
		30917				1				1
		31420			1				1	
		31419	1				1			
230	Injection Valve Body	48617	1	1	1	1	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **4XXNI ONLY**	25636-16		1				1		
		10342-16			1	1			1	1
		10142-16	1				1			
	Tubing, Suction & Discharge **4XXNU ONLY**	28636-16		1				1		
		27342-16			1	1			1	1
		27142-16	1				1			
602	Check Valve	49087		2				2		
		49088	2		2	2	2		2	2
603	Cartridge Valve	37335		3				3		
		37338	3		3	3	3		3	3
606	Liquid End Hardware	49109		1	1	1		1	1	1
		49110	1				1			
607	Foot Valve	49099		1				1		
		49100	1		1	1	1		1	1
608	Injection Valve	48728	1	1	1	1	1	1	1	1
613	Tubing Connection Kit **4XXNI and 4XXNU**	77382		4				4		
		77383			4	4			4	4
		77384	4				4			
	Tubing Connection Kit **4XXNM ONLY**	77378		4				4		
		77379			4	4			4	4
		77380	4				4			
615	Check Valve Fitting	48787	4	4	4	4	4	4	4	4
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1

LE - 4X0NX, 4X8NX



D. PRIMING

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

1. Plug in or switch the pump on.
2. While the pump is running, set at 100% speed and 100% stroke length.
3. The suction tubing should begin to fill with solution from the tank.
4. A small amount of solution will begin to discharge out the discharge valve. Once this happens, **SHUT THE PUMP OFF.**
5. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the discharge valve and discharge cartridge and slowly pour water or solution into the pump head until it is filled. Replace cartridge and discharge valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1 and 2 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.
2. **Line Depressurization:**
   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

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Liquid End Sheet

LE-4X0SX, 4X8SX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

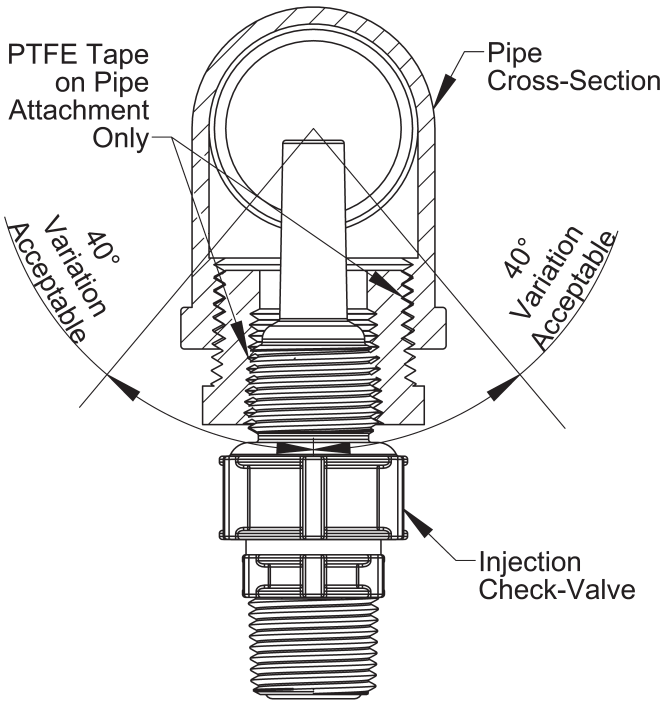

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

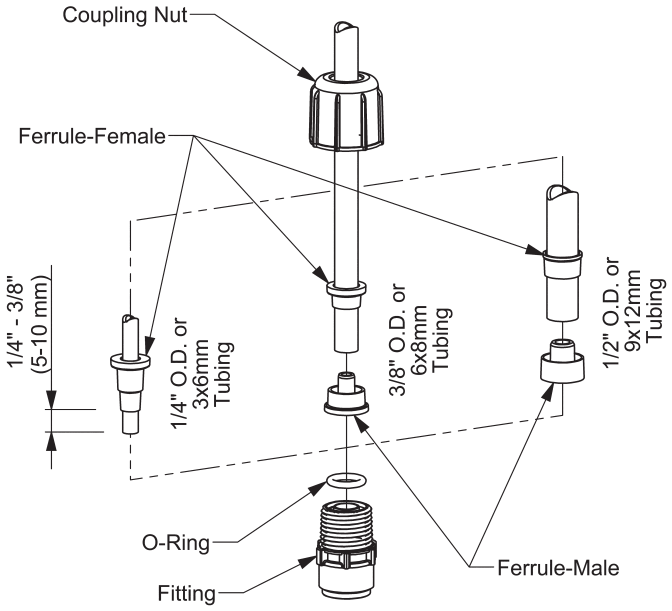

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for suction connections on certain liquid ends.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS. USE ONLY LMI TUBING—ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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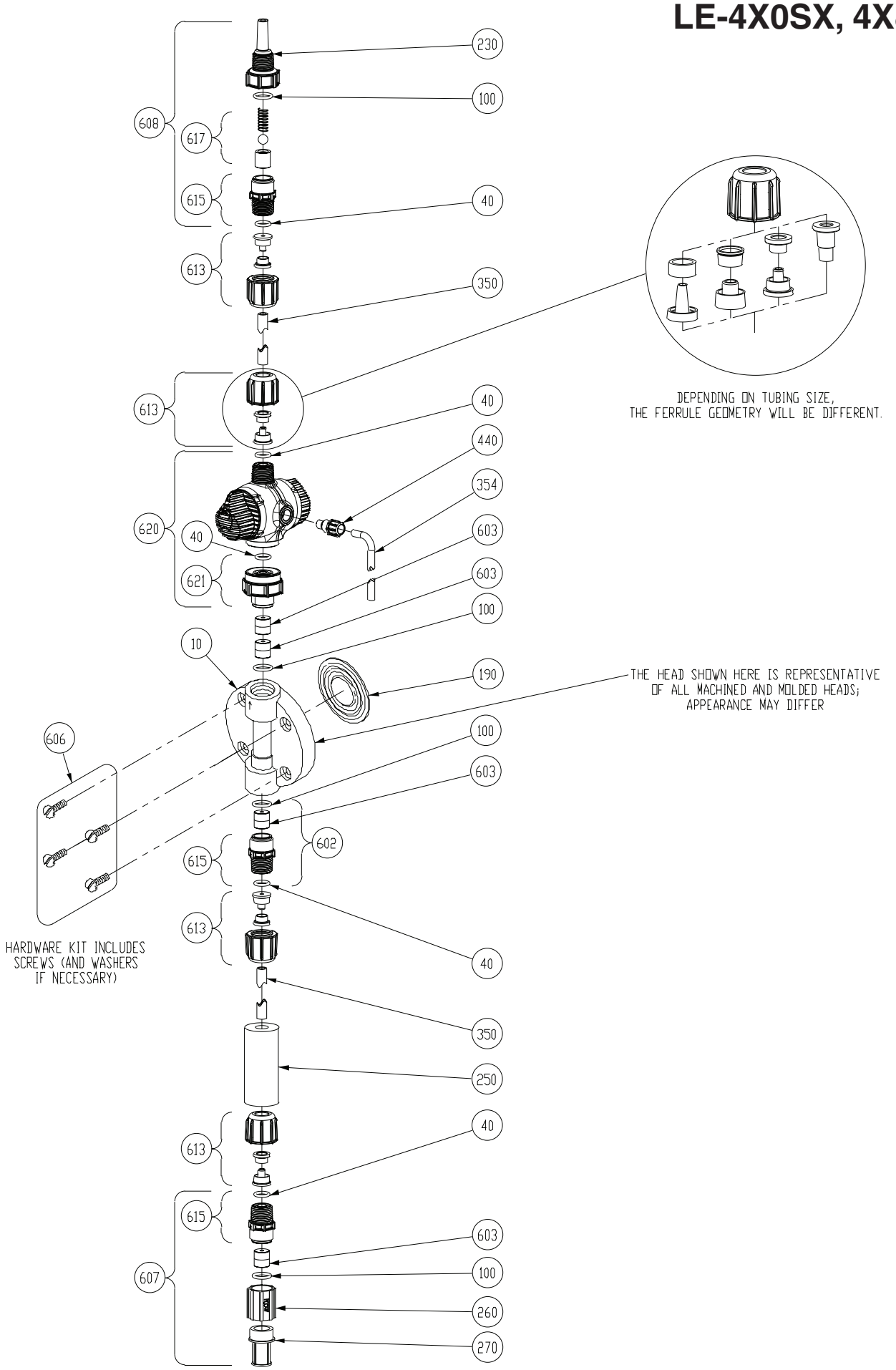
LE-4X0SX, 4X8SX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			410SX	450SX	460SX	490SX	418SX	458SX	468SX	498SX
10	Pump Head	38578		1						
		38579						1		
		38561				1				
		38562								1
		38595			1					
		38596							1	
		36159	1							
		37745					1			
40	O-Ring	48349	5	5	5	5	5	5	5	5
100	O-Ring	36103	4	4	4	4	4	4	4	4
190	Liquifram™	30916		1				1		
		30917				1				1
		31420			1				1	
		31419	1				1			
230	Injection Valve Body	48617	1	1	1	1	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **4XXSI ONLY**	25636-16		1				1		
		10342-16			1	1			1	1
		10142-16	1				1			
	Tubing, Suction & Discharge **4XXSU ONLY**	28636-16		1				1		
		27342-16			1	1			1	1
		27142-16	1				1			
354	Tubing, 4FV	25636-06	1	1	1	1	1	1	1	1
440	Bleed Nut	48622	1	1	1	1	1	1	1	1
602	Suction Check Valve	49087		1				1		
		49088	1		1	1	1		1	1
603	Cartridge Valve	37335		4				4		
		37338	4		4	4	4		4	4
606	Liquid End Hardware	49109		1	1	1		1	1	1
		49110	1				1			
607	Foot Valve	49099		1				1		
		49100	1		1	1	1		1	1
608	Injection Valve	48728	1	1	1	1	1	1	1	1
613	Tubing Connection Kit **4XXSI and 4XXSU**	77382		4				4		
		77383			4	4			4	4
		77384	4				4			
	Tubing Connection Kit **4XXSM ONLY**	77378		4				4		
		77379			4	4			4	4
		77380	4				4			
615	Check Valve Fitting	48787	3	3	3	3	3	3	3	3
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1
620	4FV Assembly	48798		1				1		
		48753	1		1	1	1		1*	1*
621	4FV Fitting Assembly	49254	1	1	1	1	1	1	1	1

***For 468SP and 498SP liquid ends, use 48798 4FV assembly.**

LE-4X0SX, 4X8SX



D. PRIMING WITH 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port **(FIGURE 3)**. Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

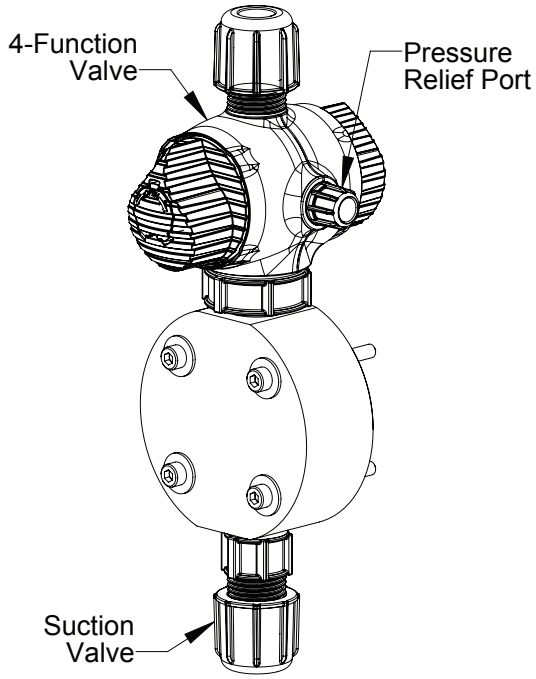


FIGURE 3

Note: The head drawing is for reference only; actual appearance may differ.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

LE - 4X5NX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

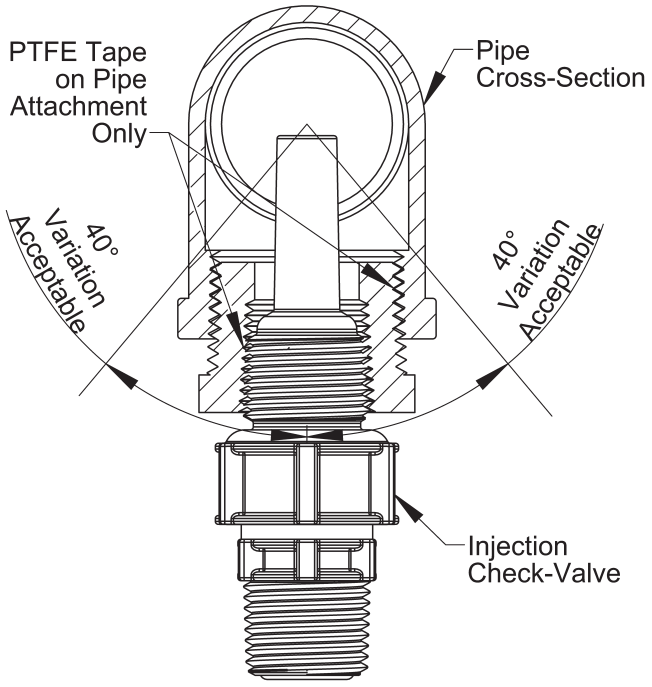


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

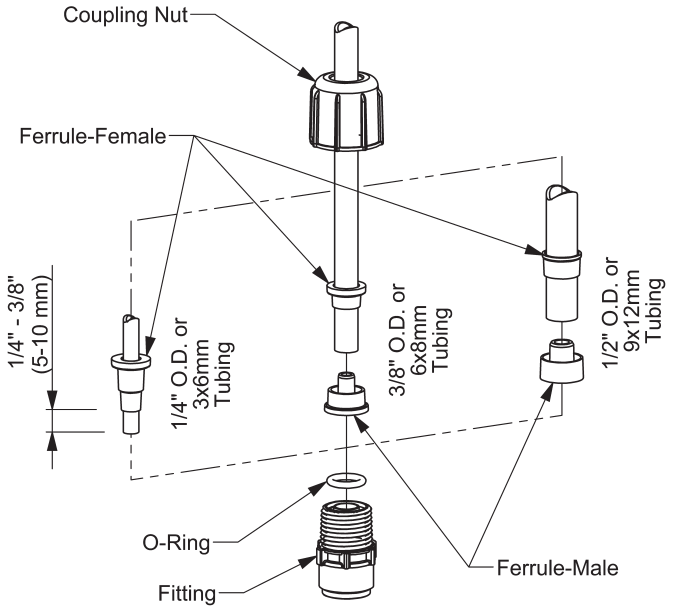


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for suction connections on certain liquid ends.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS. USE ONLY LMI TUBING—ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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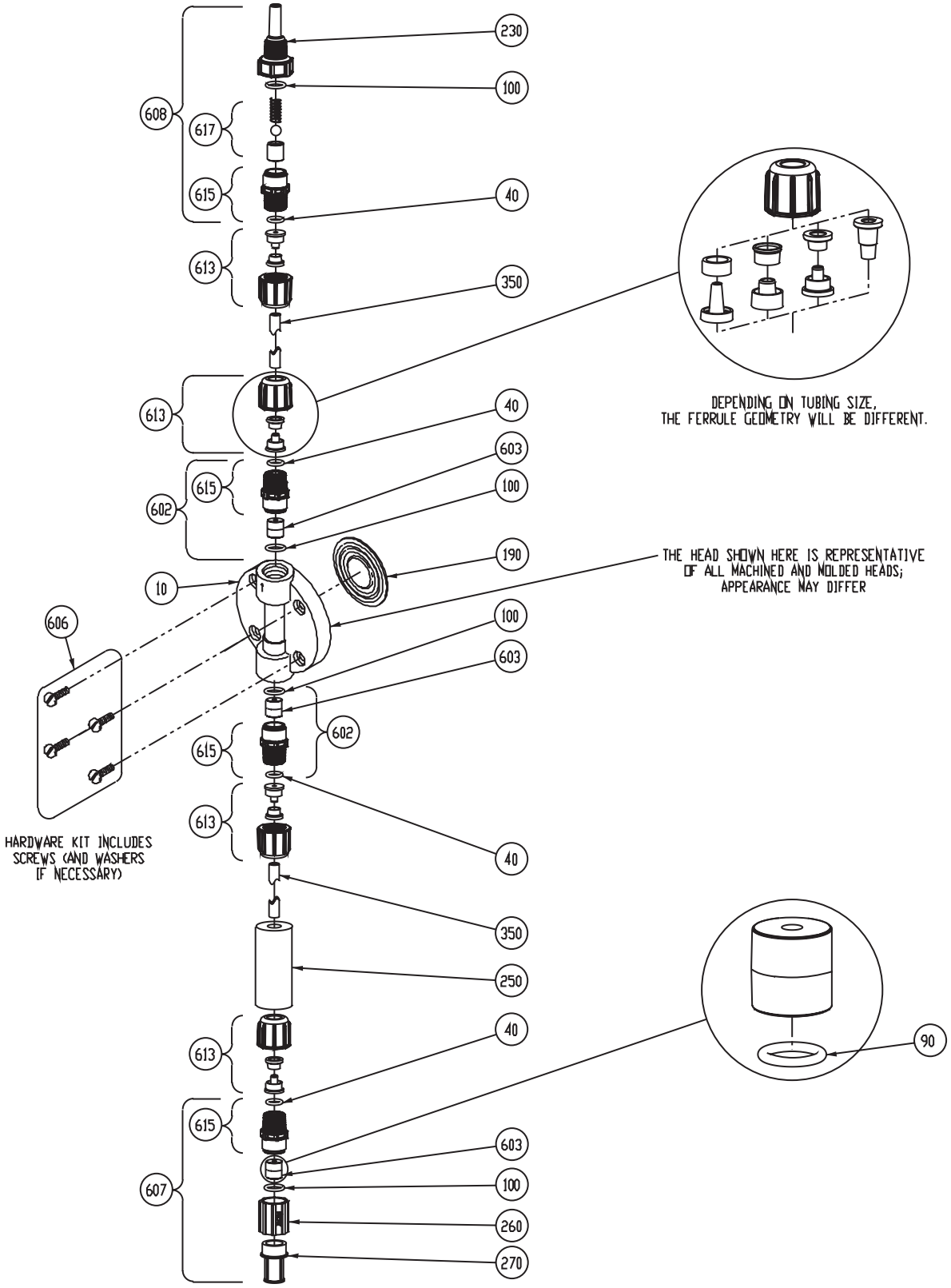
LE - 4X5NX

Key Number	Description	Part Number	QUANTITY			
			415NX	455NX	465NX	495NX
10	Pump Head	38580		1		
		38563				1
		38597			1	
		37746	1			
40	O-Ring	48591	4	4	4	4
90	O-Ring	39413	4	4	4	4
100	O-Ring	48589	4	4	4	4
190	Liquifram™ Size Code	30916		1		
		30917				1
		31420			1	
		31419	1			
230	Injection Valve Body	48619	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge **4XXNI ONLY**	25636-16		1		
		10342-16			1	1
		10142-16	1			
	Tubing, Suction & Discharge **4XXNU ONLY**	28636-16		1		
		27342-16			1	1
		27142-16	1			
602	Check Valve	49095		2		
		49096	2		2	2
603	Cartridge Valve	37334		3		
		37337	3		3	3
606	Liquid End Hardware	49109		1	1	1
		49110	1			
607	Foot Valve	49107		1		
		49108	1		1	1
608	Injection Valve	48729	1	1	1	1
613	Tubing Connection Kit **4XXNI and 4XXNU**	77382		4		
		77383			4	4
		77384	4			
	Tubing Connection Kit **4XXNM ONLY**	77378		4		
		77379			4	4
		77380	4			
615	Check Valve Fitting	48790	4	4	4	4
617	Injection Valve Cartridge	48795	1	1	1	1

LE - 4X5NX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DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.
THE HEAD SHOWN HERE IS REPRESENTATIVE
OF ALL MACHINED AND MOLDED HEADS;
APPEARANCE MAY DIFFER
HARDWARE KIT INCLUDES
SCREWS (AND WASHERS
IF NECESSARY)
90

D. PRIMING

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

1. Plug in or switch the pump on.
2. While the pump is running, set at 100% speed and 100% stroke length.
3. The suction tubing should begin to fill with solution from the tank.
4. A small amount of solution will begin to discharge out the discharge valve. Once this happens, **SHUT THE PUMP OFF.**
5. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the discharge valve and discharge cartridge and slowly pour water or solution into the pump head until it is filled. Replace cartridge and discharge valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1 and 2 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.
2. **Line Depressurization:**
   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-4X5SX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

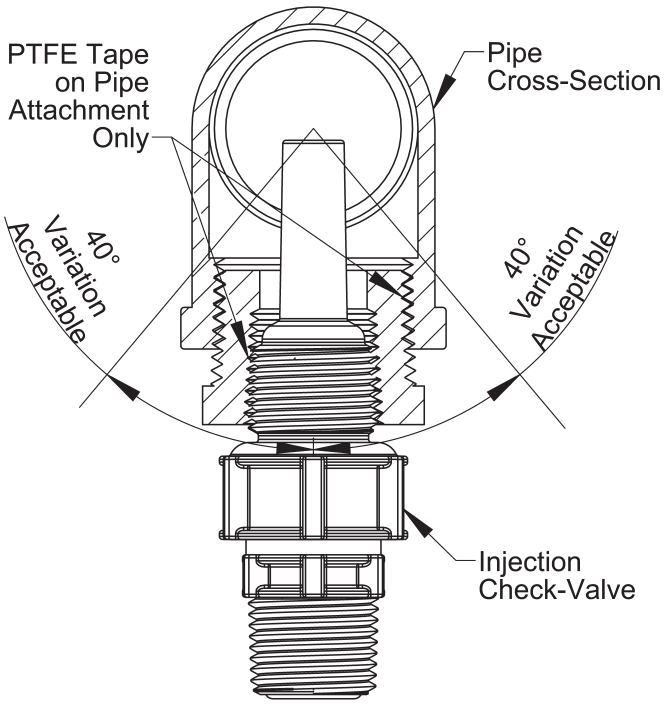

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

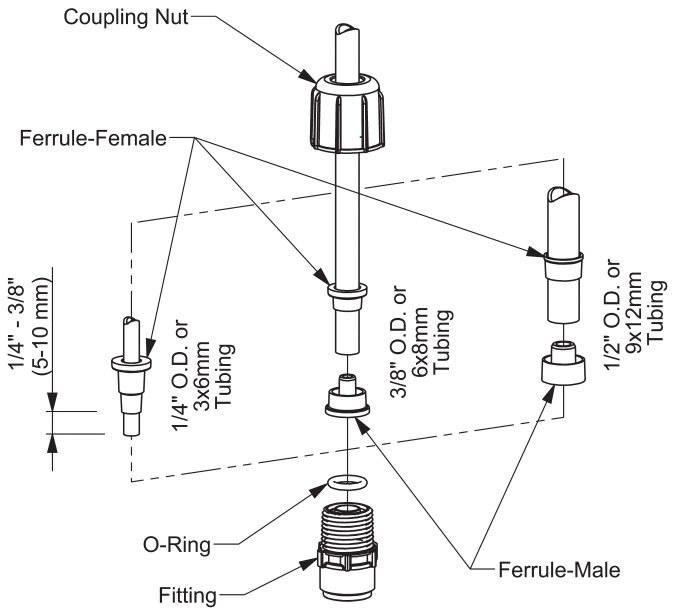

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for suction connections on certain liquid ends.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS. USE ONLY LMI TUBING—ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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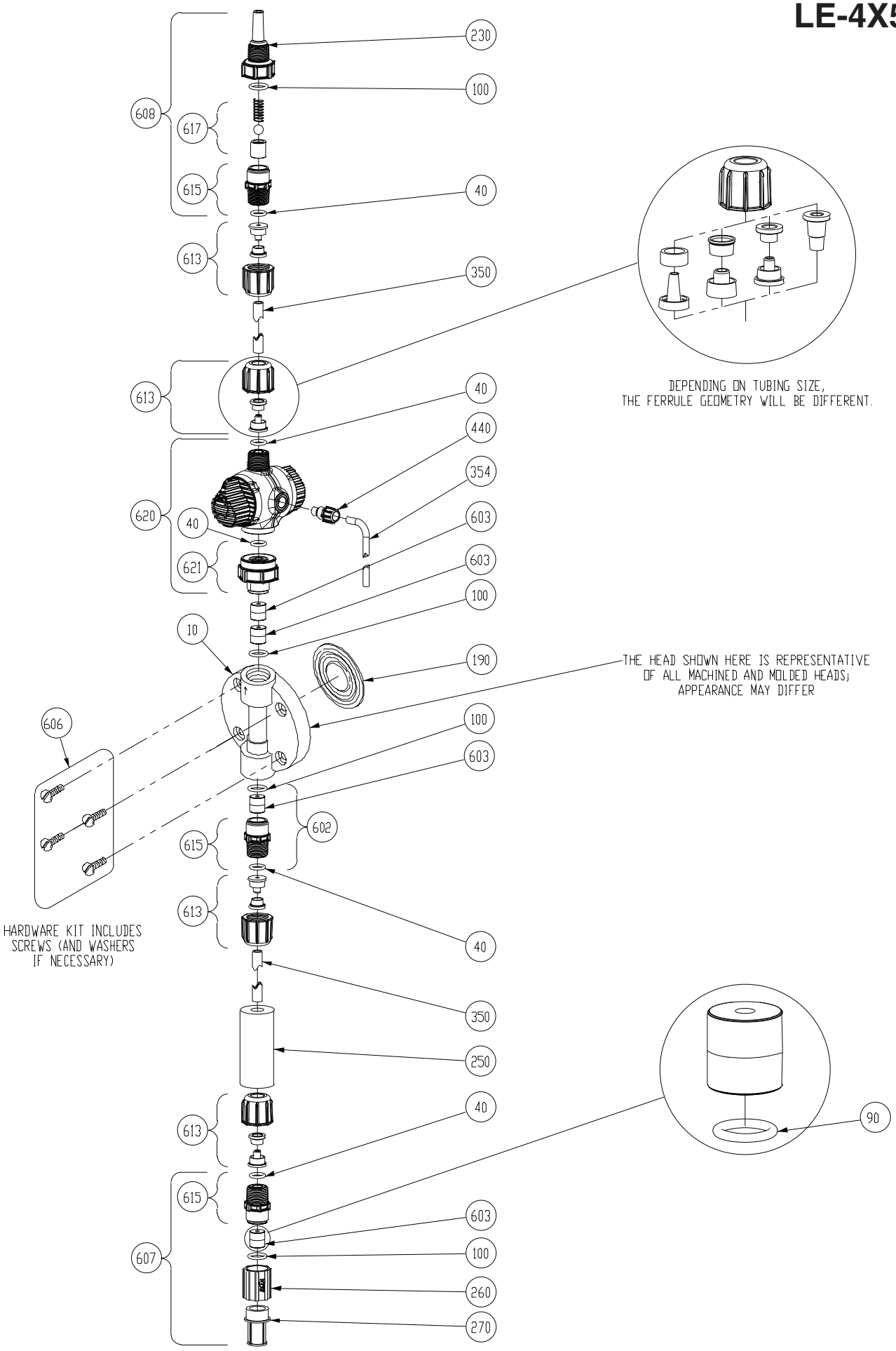
http://www.lmipumps.com

2028.A 3/2010

LE-4X5SX

Key Number	Description	Part Number	QUANTITY			
			415SX	455SX	465SX	495SX
10	Pump Head	38580		1		
		38563				1
		38597			1	
		37746	1			
40	O-Ring	48591	5	5	5	5
90	O-Ring	39413	4	4	4	4
100	O-Ring	48589	4	4	4	4
190	Liquifram™ Size Code	30916		1		
		30917				1
		31420			1	
		31419	1			
230	Injection Valve Body	48619	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge **4XXSI ONLY**	25636-16		1		
		10342-16			1	1
		10142-16	1			
	Tubing, Suction & Discharge **4XXSU ONLY**	28636-16		1		
		27342-16			1	1
		27142-16	1			
354	Tubing, 4FV	25636-06	1	1	1	1
440	Bleed Nut	48622	1	1	1	1
602	Suction Check Valve	49095		1		
		49096	1		1	1
603	Cartridge Valve	37334		4		
		37337	4		4	4
606	Liquid End Hardware	49109		1	1	1
		49110	1			
607	Foot Valve	49107		1		
		49108	1		1	1
608	Injection Valve	48729	1	1	1	1
613	Tubing Connection Kit **4XXSI and 4XXSU**	77382		4		
		77383			4	4
		77384	4			
	Tubing Connection Kit **4XXSM ONLY**	77378		4		
		77379			4	4
		77380	4			
615	Check Valve Fitting	48790	3	3	3	3
617	Injection Valve Cartridge	48795	1	1	1	1
620	4FV Assembly	48801		1		
		48756	1		1	1
621	4FV Fitting Assembly	49257	1	1	1	1

LE-4X5SX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DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.
THE HEAD SHOWN HERE IS REPRESENTATIVE
OF ALL MACHINED AND MOLDED HEADS;
APPEARANCE MAY DIFFER
HARDWARE KIT INCLUDES
SCREWS (AND WASHERS
IF NECESSARY)

D. PRIMING WITH 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port **(FIGURE 3)**. Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

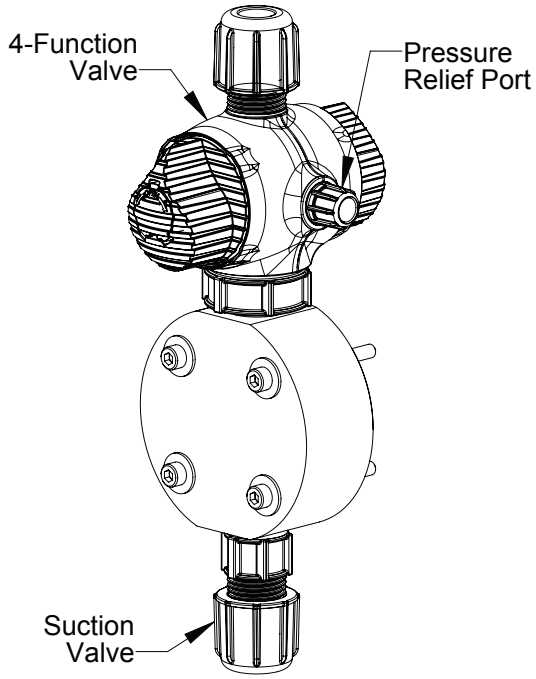

FIGURE 3

Note: The head drawing is for reference only; actual appearance may differ.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

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LE-4X9NX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

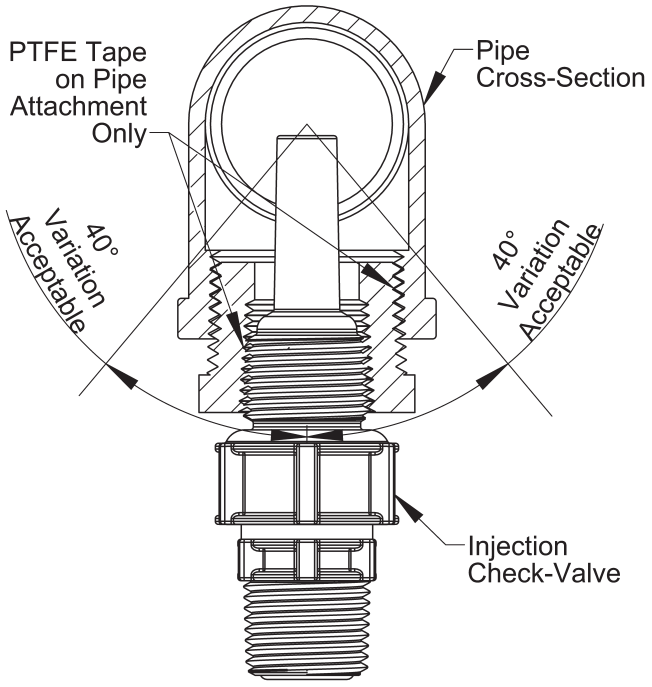

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

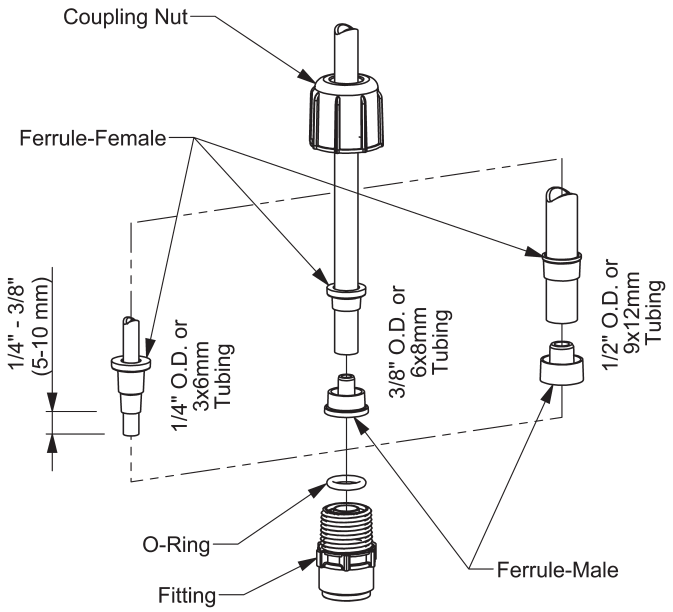

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for suction connections on certain liquid ends.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS. USE ONLY LMI TUBING—ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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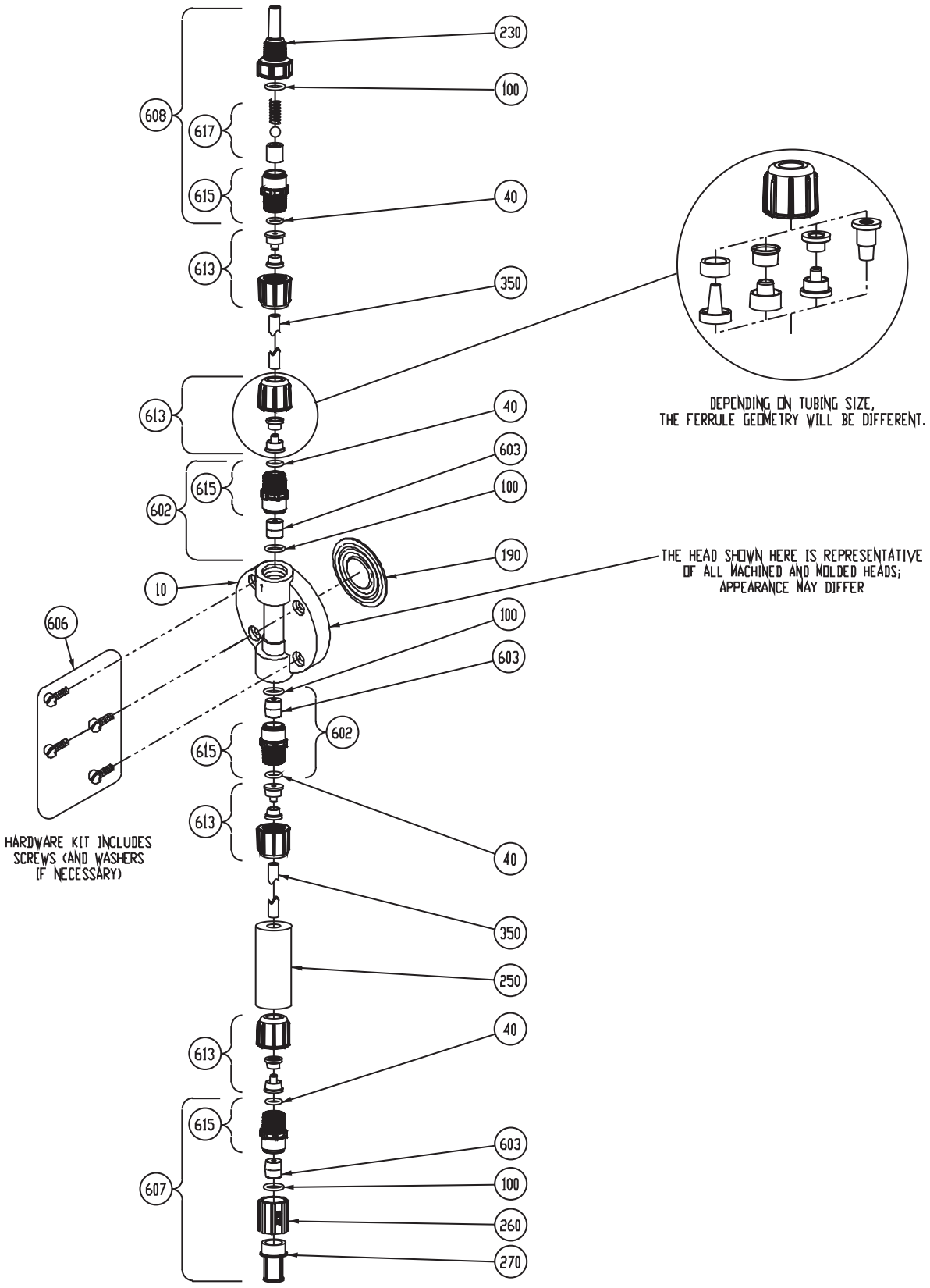
LE-4X9NX

Key Number	Description	Part Number	QUANTITY			
			419NX	459NX	469NX	499NX
10	Pump Head	38578		1		
		38561				1
		38595			1	
		36159	1			
40	O-Ring	48349	4	4	4	4
100	O-Ring	36103	4	4	4	4
190	Liquifram™	30916		1		
		30917				1
		31420			1	
		31419	1			
230	Injection Valve Body	48618	1	1	1	1
250	Tubing Straightener	32293	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge **4XXNI ONLY**	25636-16		1		
		10342-16			1	1
		10142-16	1			
	Tubing, Suction & Discharge **4XXNU ONLY**	28636-16		1		
		27342-16			1	1
		27142-16	1			
602	Check Valve	49093		2		
		49094	2		2	2
603	Cartridge Valve	37858		3		
		37859	3		3	3
606	Liquid End Hardware	49109		1	1	1
		49110	1			
607	Foot Valve	49105		1		
		49106	1		1	1
608	Injection Valve	48730	1	1	1	1
613	Tubing Connection Kit **4XXNI and 4XXNU**	77382		4		
		77383			4	4
		77384	4			
	Tubing Connection Kit **4XXNM ONLY**	77378		4		
		77379			4	4
		77380	4			
615	Check Valve Fitting	48788	4	4	4	4
617	Injection Valve Cartridge	48796	1	1	1	1

LE-4X9NX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D. PRIMING

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

1. Plug in or switch the pump on.
2. While the pump is running, set at 100% speed and 100% stroke length.
3. The suction tubing should begin to fill with solution from the tank.
4. A small amount of solution will begin to discharge out the discharge valve. Once this happens, **SHUT THE PUMP OFF.**
5. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the discharge valve and discharge cartridge and slowly pour water or solution into the pump head until it is filled. Replace cartridge and discharge valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1 and 2 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.
2. **Line Depressurization:**
   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

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Liquid End Sheet

LE-4X9SX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

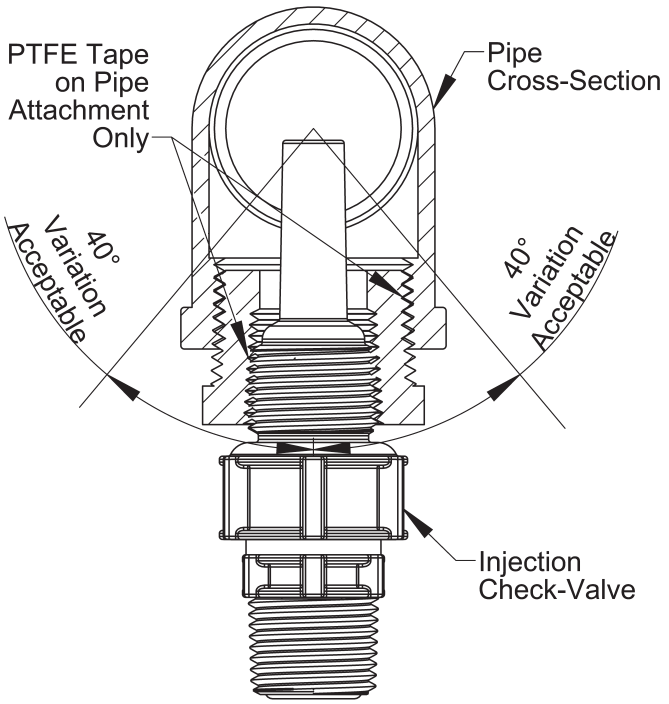

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

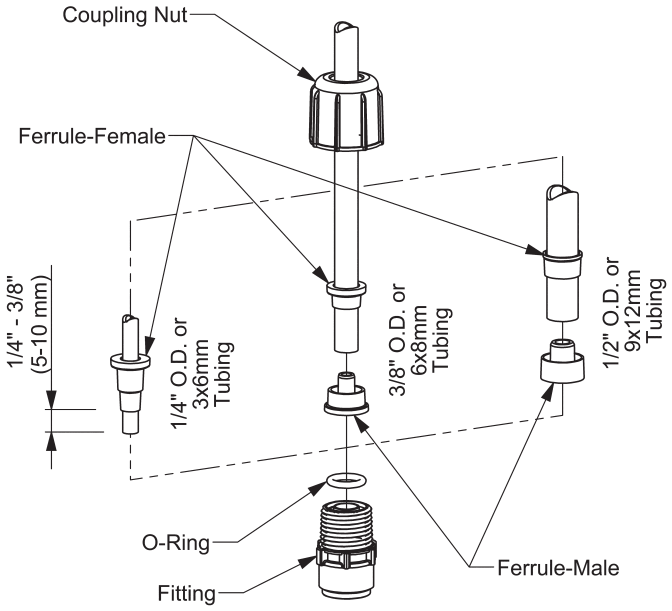

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for suction connections on certain liquid ends.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS. USE ONLY LMI TUBING—ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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Key Number	Description	Part Number	QUANTITY			
			419SX	459SX	469SX	499SX
10	Pump Head	38578		1		
		38561				1
		38595			1	
		36159	1			
40	O-Ring	48349	5	5	5	5
100	O-Ring	36103	4	4	4	4
190	Liquifram™	30916		1		
		30917				1
		31420			1	
		31419	1			
230	Injection Valve Body	48618	1	1	1	1
250	Tubing Straightener	32293	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge **4XXSI ONLY**	25636-16		1		
		10342-16			1	1
		10142-16	1			
	Tubing, Suction & Discharge **4XXSU ONLY**	28636-16		1		
		27342-16			1	1
		27142-16	1			
354	Tubing, 4FV	25636-06	1	1	1	1
440	Bleed Nut	48622	1	1	1	1
602	Suction Check Valve	49093		1		
		49094	1		1	1
603	Cartridge Valve	37858		4		
		37859	4		4	4
606	Liquid End Hardware	49109		1	1	1
		49110	1			
607	Foot Valve	49105		1		
		49106	1		1	1
608	Injection Valve	48730	1	1	1	1
613	Tubing Connection Kit **4XXSI and 4XXSU**	77382		4		
		77383			4	4
		77384	4			
	Tubing Connection Kit **4XXSM ONLY**	77378		4		
		77379			4	4
		77380	4			
615	Check Valve Fitting	48788	3	3	3	3
617	Injection Valve Cartridge	48796	1	1	1	1
620	4FV Assembly	48799		1		
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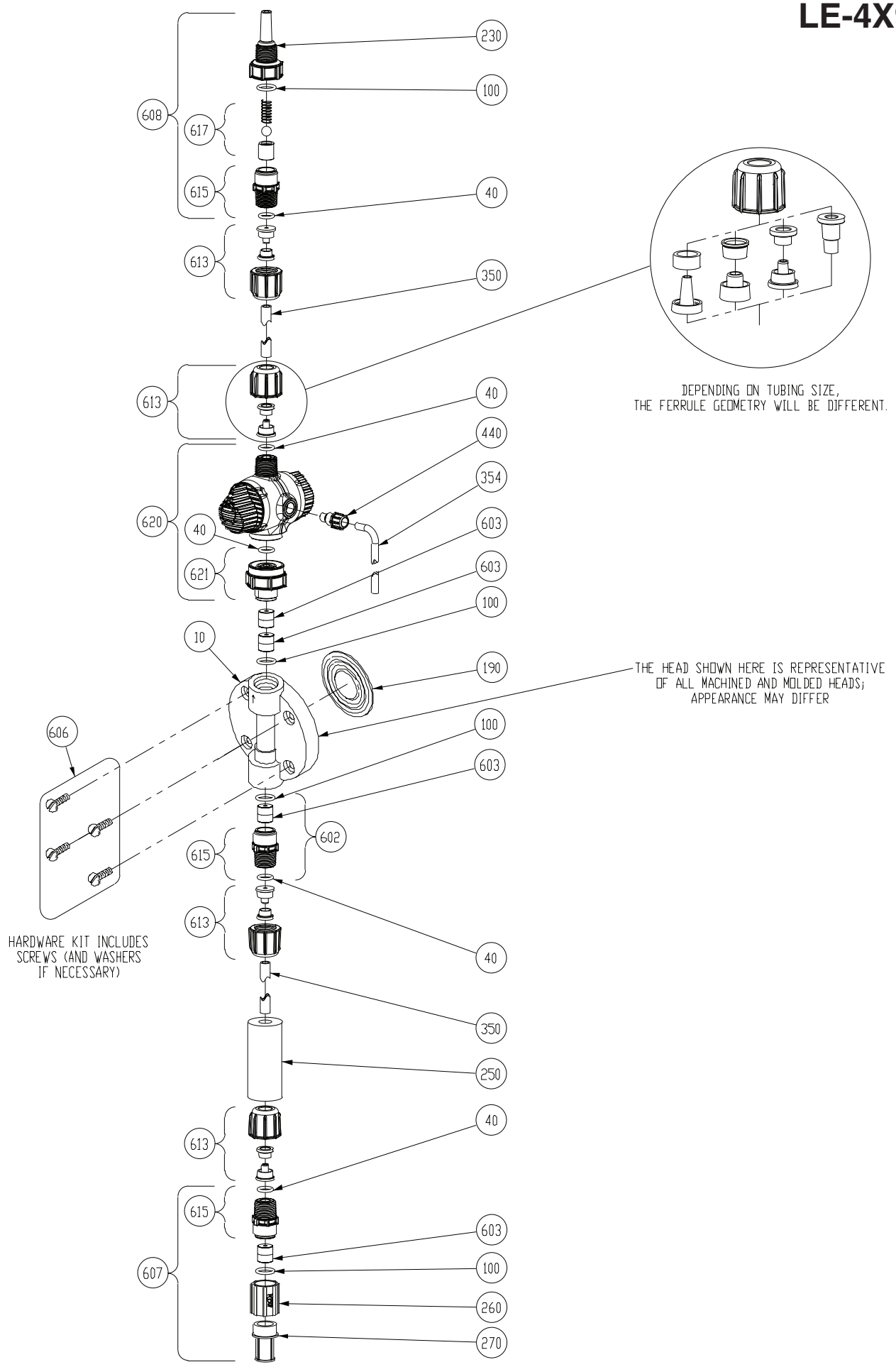
621	4FV Fitting Assembly	49255	1	1	1	1

LE-4X9SX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D. PRIMING WITH 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port **(FIGURE 3)**. Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

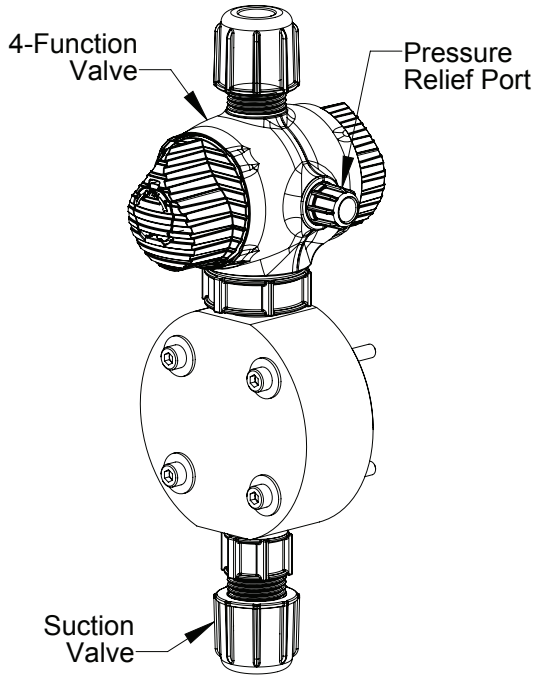

FIGURE 3

Note: The head drawing is for reference only; actual appearance may differ.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-4X0SX, 4X8SX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

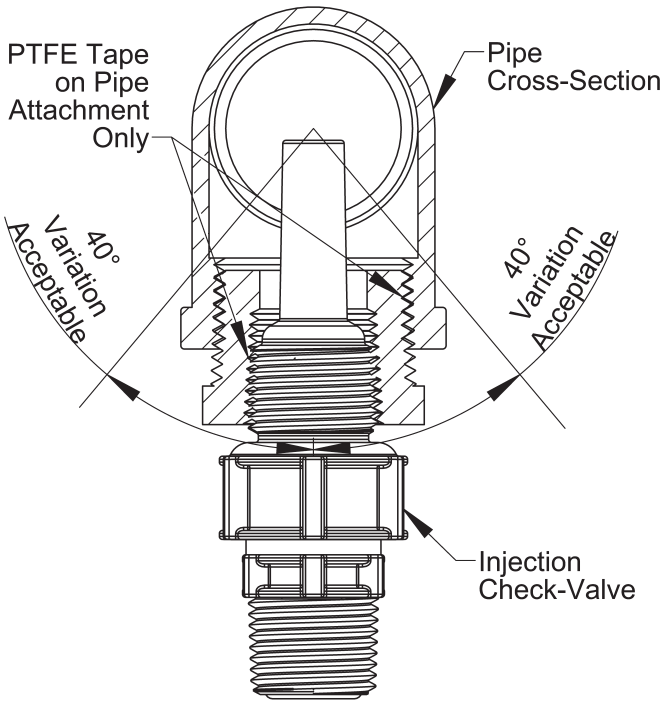

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

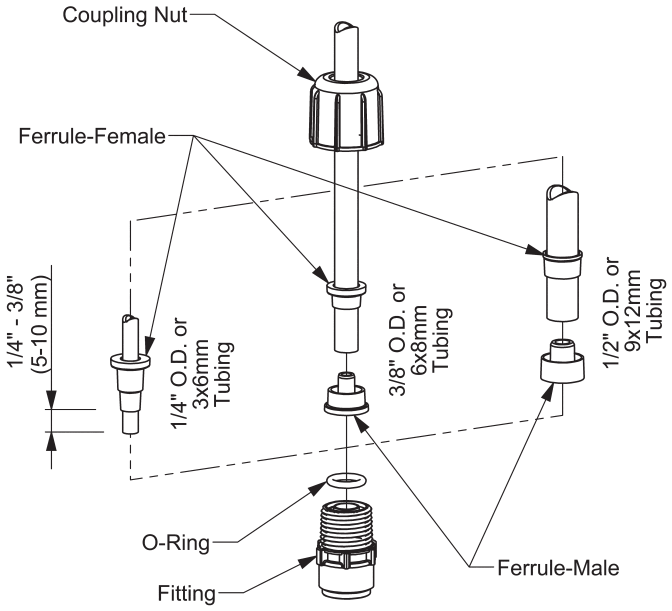

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for suction connections on certain liquid ends.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS. USE ONLY LMI TUBING—ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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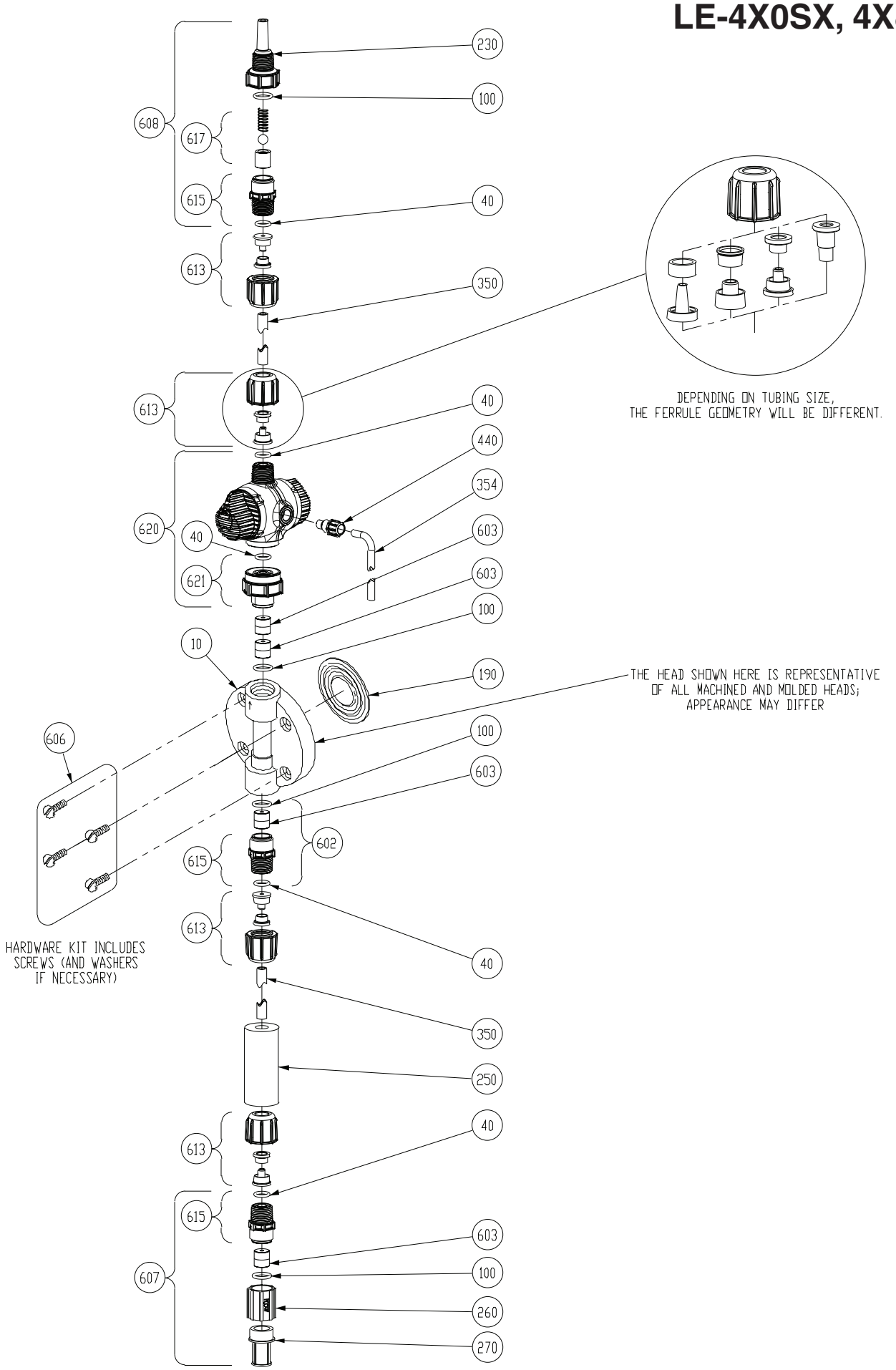
http://www.lmipumps.com

LE-4X0SX, 4X8SX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			410SX	450SX	460SX	490SX	418SX	458SX	468SX	498SX
10	Pump Head	38578		1						
		38579						1		
		38561				1				
		38562								1
		38595			1					
		38596							1	
		36159	1							
		37745					1			
40	O-Ring	48349	5	5	5	5	5	5	5	5
100	O-Ring	36103	4	4	4	4	4	4	4	4
190	Liquifram™	30916		1				1		
		30917				1				1
		31420			1				1	
		31419	1				1			
230	Injection Valve Body	48617	1	1	1	1	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **4XXSI ONLY**	25636-16		1				1		
		10342-16			1	1			1	1
		10142-16	1				1			
	Tubing, Suction & Discharge **4XXSU ONLY**	28636-16		1				1		
		27342-16			1	1			1	1
		27142-16	1				1			
354	Tubing, 4FV	25636-06	1	1	1	1	1	1	1	1
440	Bleed Nut	48622	1	1	1	1	1	1	1	1
602	Suction Check Valve	49087		1				1		
		49088	1		1	1	1		1	1
603	Cartridge Valve	37335		4				4		
		37338	4		4	4	4		4	4
606	Liquid End Hardware	49109		1	1	1		1	1	1
		49110	1				1			
607	Foot Valve	49099		1				1		
		49100	1		1	1	1		1	1
608	Injection Valve	48728	1	1	1	1	1	1	1	1
613	Tubing Connection Kit **4XXSI and 4XXSU**	77382		4				4		
		77383			4	4			4	4
		77384	4				4			
	Tubing Connection Kit **4XXSM ONLY**	77378		4				4		
		77379			4	4			4	4
		77380	4				4			
615	Check Valve Fitting	48787	3	3	3	3	3	3	3	3
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1
620	4FV Assembly	48798		1				1		
		48753	1		1	1	1		1	1
621	4FV Fitting Assembly	49254	1	1	1	1	1	1	1	1

LE-4X0SX, 4X8SX



D. PRIMING WITH 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port **(FIGURE 3)**. Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

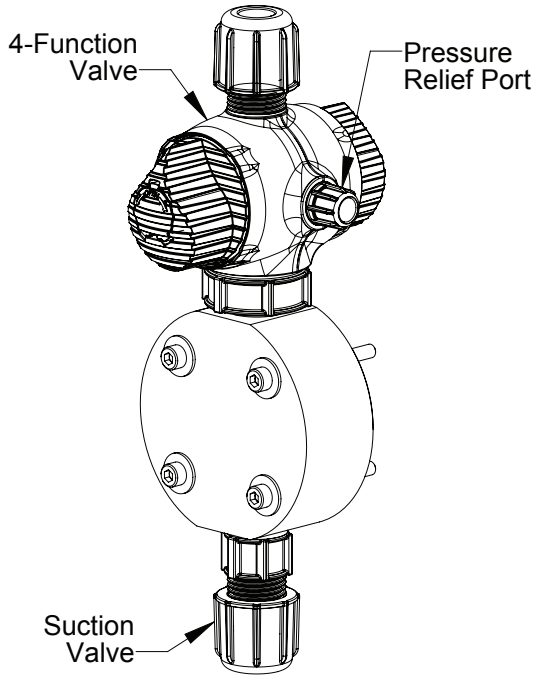


FIGURE 3

Note: The head drawing is for reference only; actual appearance may differ.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

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Liquid End Sheet

LE-7X8NX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

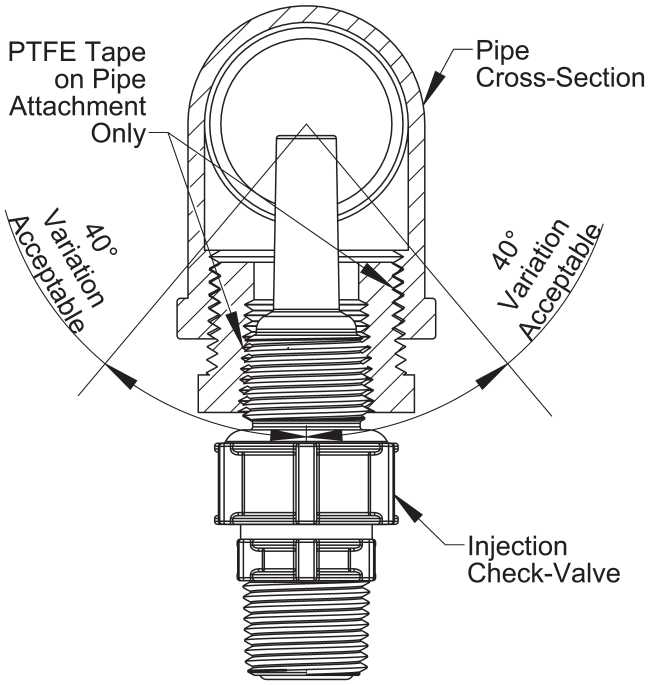

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

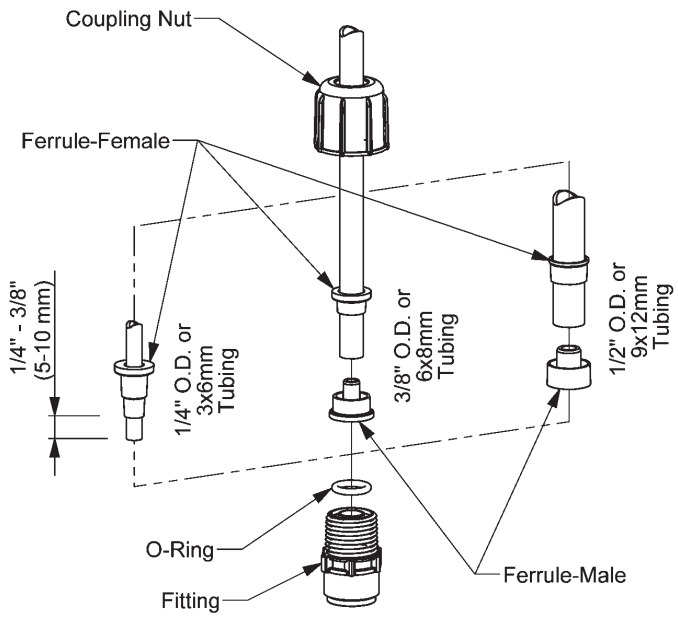

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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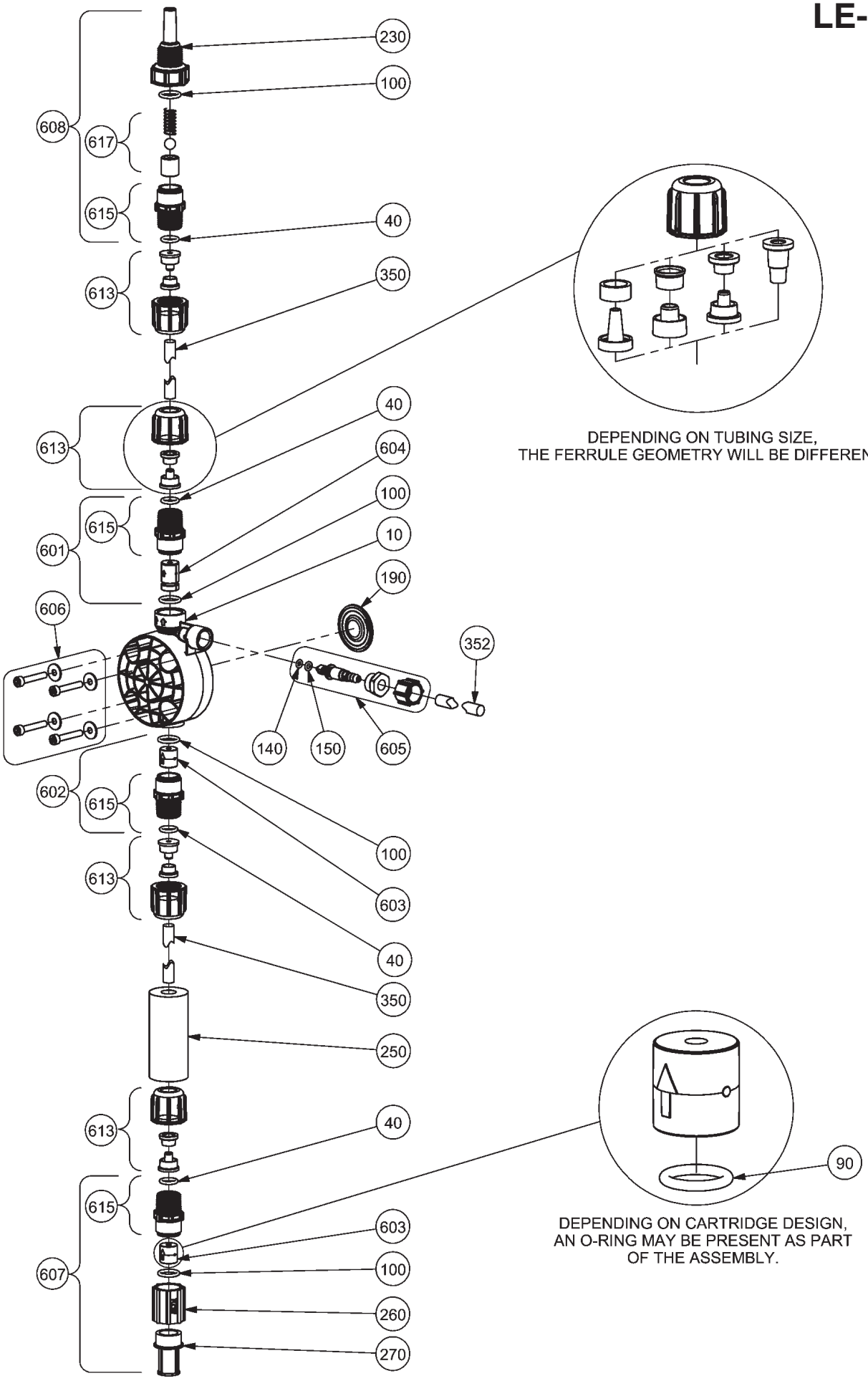
LE-7X8NX

Key Number	Description	Part Number	QUANTITY			
			718NX	728NX	738NX	748NX
10	Pump Head Molded FastPrime™	48360	1			
		48363		1		
		48366			1	
		48369				1
40	O-Ring	48349	4	4	4	4
90	O-Ring	39413	3	3	3	3
100	O-Ring	36103	4	4	4	4
140	O-Ring	48590	1	1	1	1
150	O-Ring	48347	1	1	1	1
190	Liquifram™	48186	1			
		48187		1		
		48188			1	
		48189				1
230	Injection Check Valve Body	48617	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge **7XXNI ONLY**	25636-16	1	1*		
		10342-16		1#	1	1
	Tubing, Suction & Discharge **7XXNU ONLY**	28636-16	1	1*		
		27342-16		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1
601	FastPrime™ Discharge Check Valve	48663	1			
		48664		1	1	1
602	Suction Check Valve	48675	1			
		48676		1	1	1
603	Cartridge Valve	48542	2			
		48543		2	2	2
604	FastPrime™ Cartridge Valve	48548	1			
		48549		1	1	1
605	FastPrime™ Valve	48848	1	1	1	1
606	Liquid End Hardware	48703	1	1	1	1
607	Foot Valve	48718	1			
		48721		1	1	1
608	Injection Valve	48728	1	1	1	1
613	Tubing Connection Kit **7XXNI and 7XXNU**	77382	4	4*		
		77383		4#	4	4
	Tubing Connection Kit **7XXNM ONLY**	77378	4	4*		
		77379		4#	4	4
615	Single Ball Check Valve Fitting	48787	4	4	4	4
617	Injection Valve Cartridge	48795	1	1	1	1

ROYTRONIC® Series A pumps
* ROYTRONIC™ EXCEL Series A+ pumps

LE-7X8NX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40
350
250
613
40
615
603
607
100
260
270
DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.
90
DEPENDING ON CARTRIDGE DESIGN,
AN O-RING MAY BE PRESENT AS PART
OF THE ASSEMBLY.

D. PRIMING FOR FastPrime™ LIQUID ENDS

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the discharge valve and discharge cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and discharge valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1 and 2 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.

Be sure your relief tubing is connected to your FastPrime™ valve and runs back to your solution drum or tank.

2. Turn the FastPrime™ knob one-and-a-half turns counter-clockwise ↺. The discharge line is now depressurized. Keep valve open until solution drains back down the discharge tubing into solution drum or tank. Then turn the knob clockwise ↻ to tighten knob to closed position.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

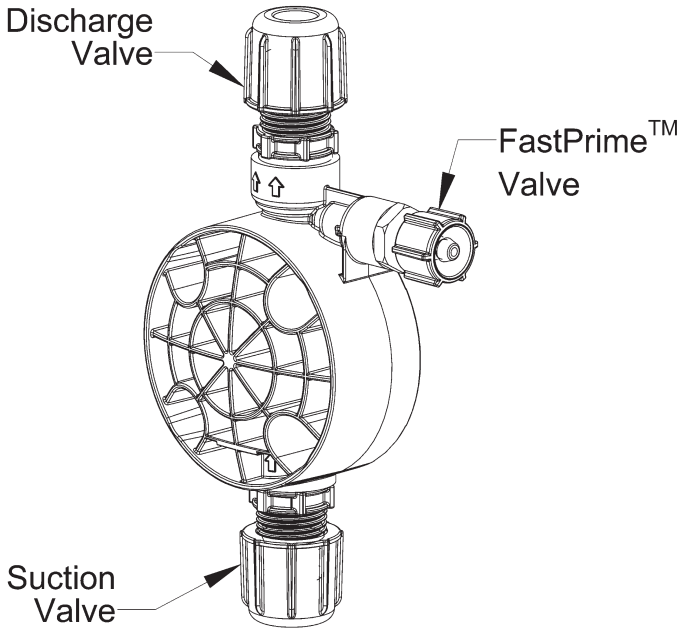

FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-7X8SX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

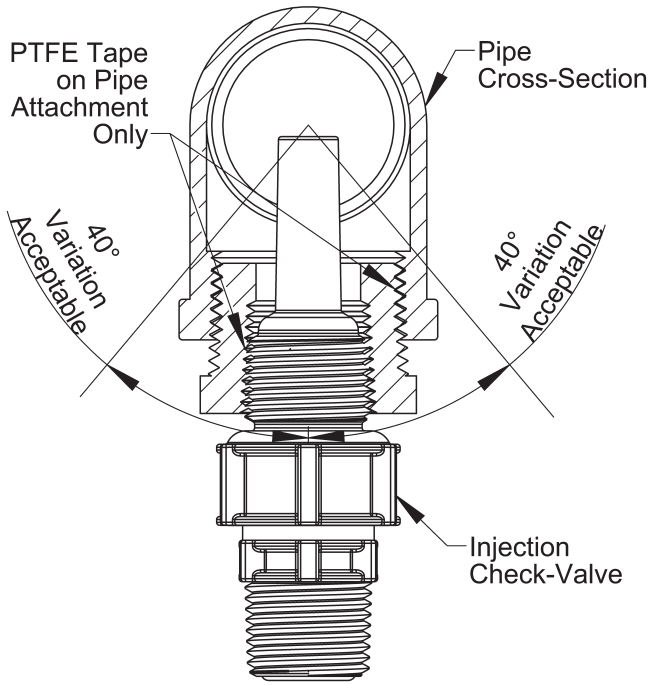

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

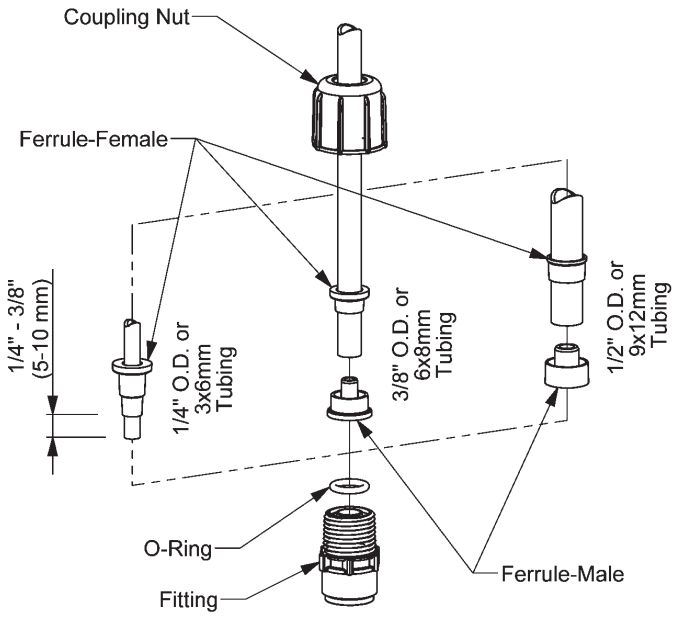

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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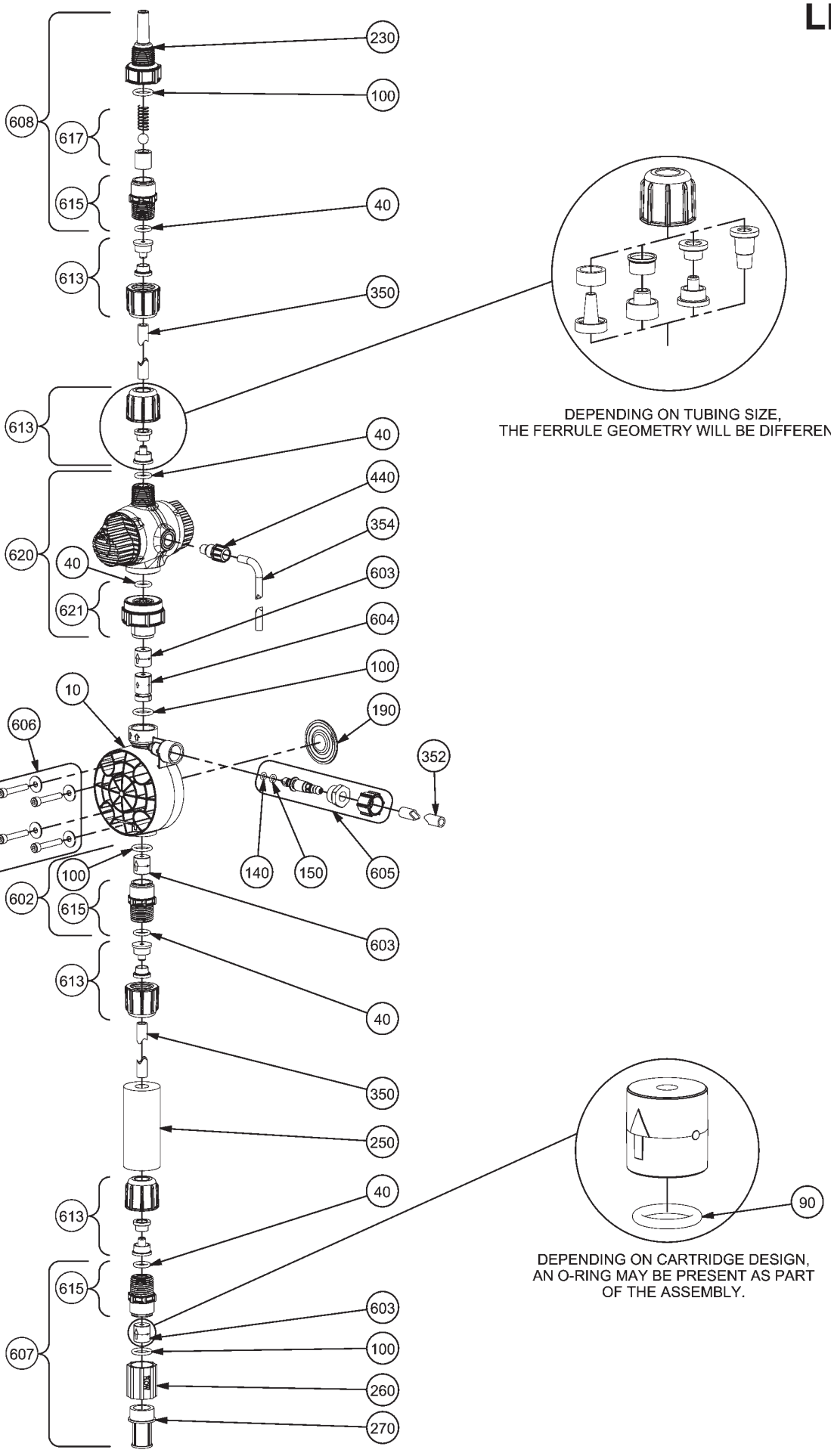
LE-7X8SX

Key Number	Description	Part Number	QUANTITY			
			718SX	728SX	738SX	748SX
10	Pump Head Molded FastPrime™	48360	1			
		48363		1		
		48366			1	
		48369				1
40	O-Ring	48590	5	5	5	5
90	O-Ring	39413	4	4	4	4
100	O-Ring	36103	4	4	4	4
140	O-Ring	48590	1	1	1	1
150	O-Ring	48347	1	1	1	1
190	Liquifram™	48186	1			
		48187		1		
		48188			1	
		48189				1
230	Injection Check Valve Body	48617	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge	25636-16	1	1*		
	7XXSI ONLY	10342-16		1#	1	1
	Tubing, Suction & Discharge	28636-16	1	1*		
	7XXSU ONLY	27342-16		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1
354	Tubing, 4FV	25636-06	1	1	1	1
440	Bleed Nut	48622	1	1	1	1
602	Suction Check Valve	48675	1			
		48676		1	1	1
603	Cartridge Valve	48542	2			
		48543		2	2	2
604	FastPrime™ Cartridge Valve	48548	1			
		48549		1	1	1
605	FastPrime™ Valve	48848	1	1	1	1
606	Liquid End Hardware	48703	1	1	1	1
607	Foot Valve	48718	1			
		48721		1	1	1
608	Injection Valve	48728	1	1	1	1
613	Tubing Connection Kit	77382	4	4*		
	7XXSI and 7XXSU	77383		4#	4	4
	Tubing Connection Kit	77378	4	4*		
	7XXSM ONLY	77379		4#	4	4
615	Single Ball Check Valve Fitting	48787	3	3	3	3
617	Injection Valve Cartridge	48795	1	1	1	1
620	4FV Assembly	48798	1	1*		
		48753		1#	1	1
621	4FV Fitting Assembly	49254	1	1	1	1

ROYTRONIC® Series A pumps

* ROYTRONIC™ EXCEL Series A+ pumps

LE-7X8SX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100
608
617
615
40
613
350
613
40
440
354
620
40
603
621
604
100
10
190
606
352
140
150
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100
602
615
603
613
40
350
250
613
40
615
603
607
100
260
270
DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.
90
DEPENDING ON CARTRIDGE DESIGN,
AN O-RING MAY BE PRESENT AS PART
OF THE ASSEMBLY.

D. PRIMING WITH ROYTRONIC® 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. PRIMING WITH FastPrime™ VALVE

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

F. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

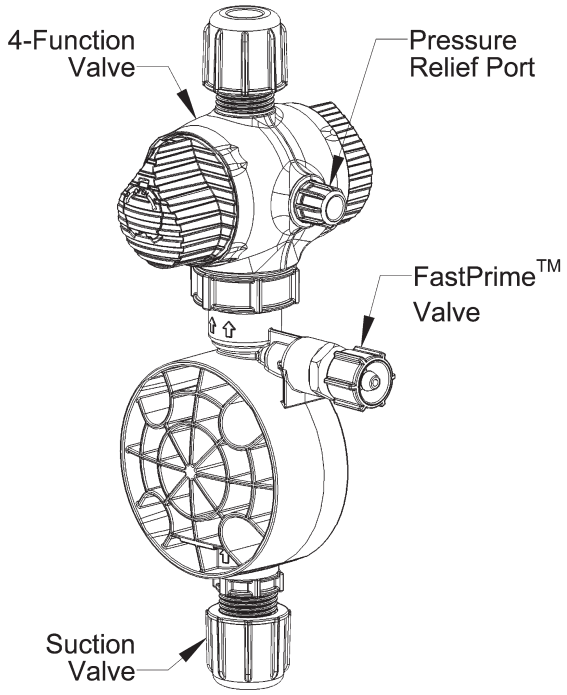

FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-8X2NX, 8X8NX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

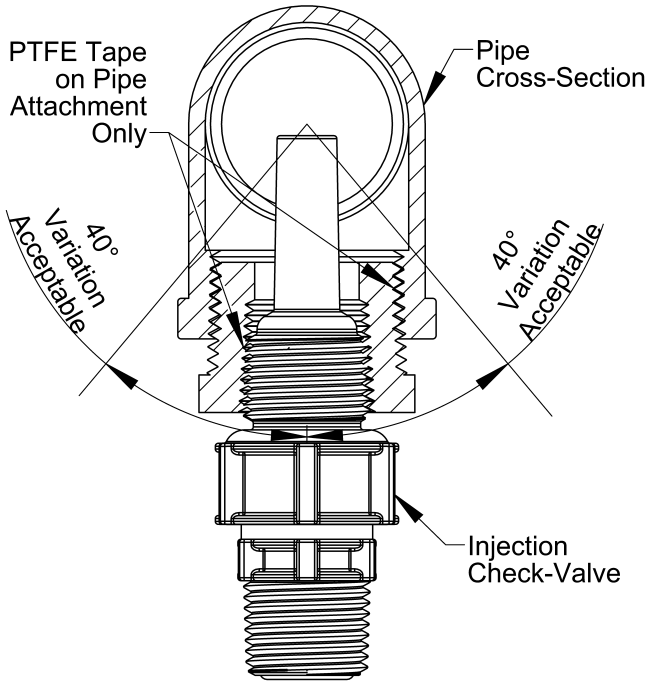

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

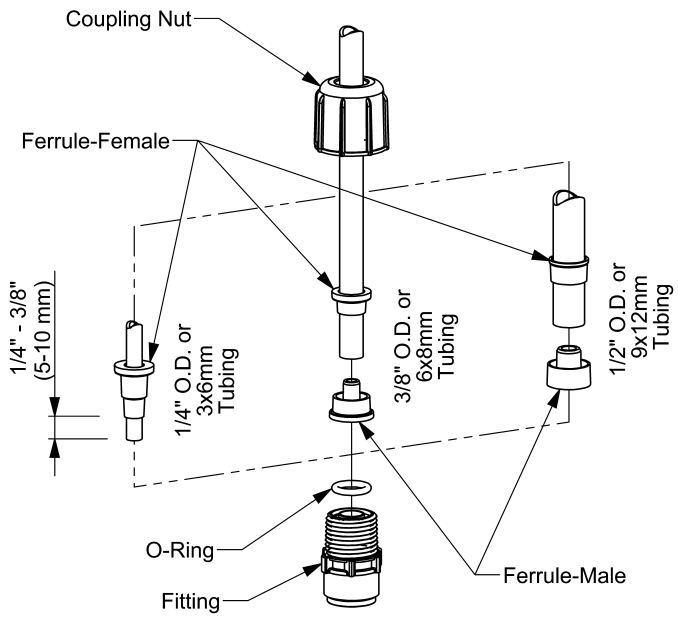

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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2016.A 11/2009

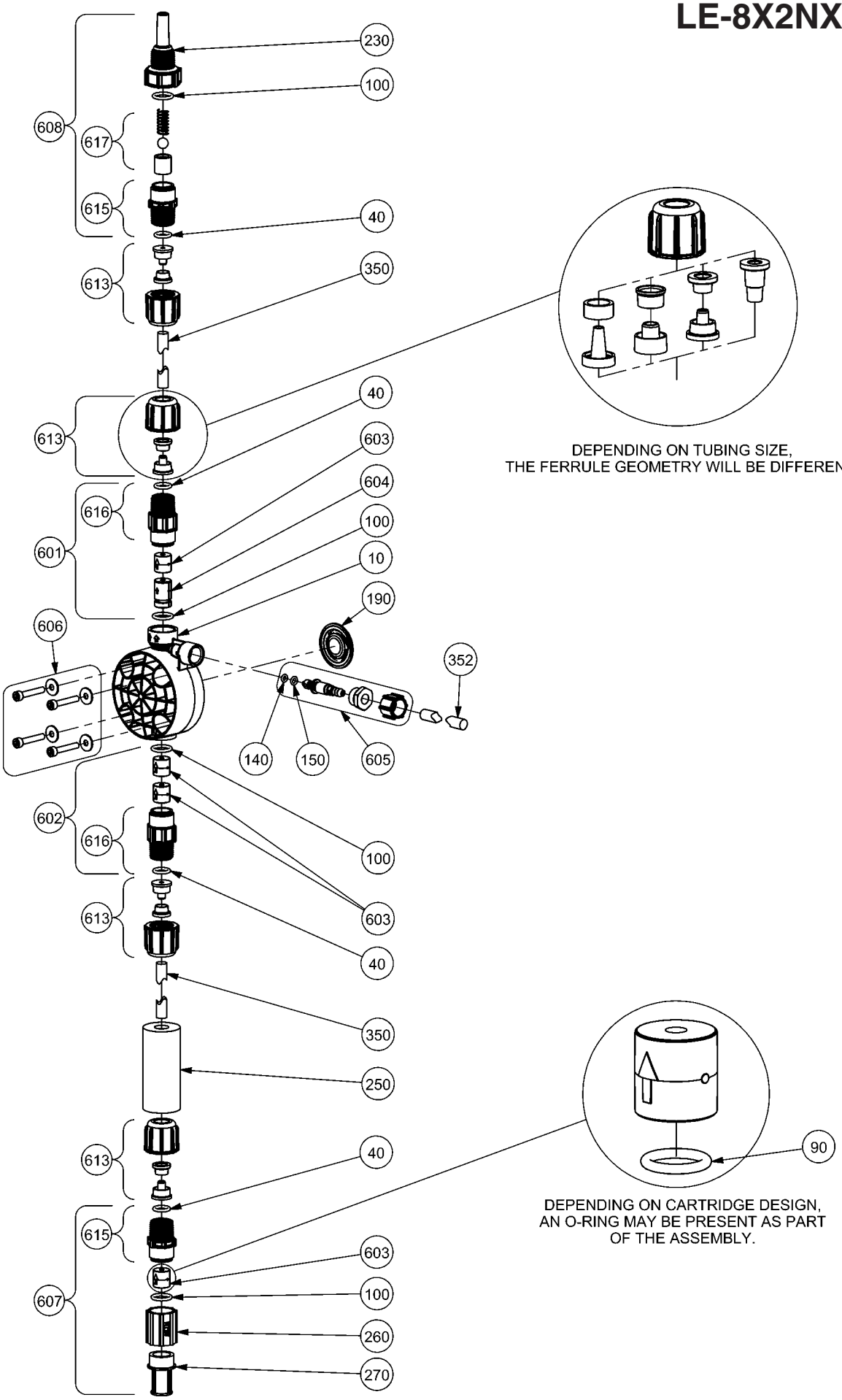
LE-8X2NX, 8X8NX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			812NX	822NX	832NX	842NX	818NX	828NX	838NX	848NX
10	Pump Head Molded FastPrime™	48360					1			
		48361	1							
		48363						1		
		48364		1						
		48366							1	
		48367			1					
		48369								1
		48370				1				
40	O-Ring	48349	4	4	4	4	4	4	4	4
90	O-Ring	39413	5	5	5	5	5	5	5	5
100	O-Ring	36103	4	4	4	4	4	4	4	4
140	O-Ring	48590	1	1	1	1	1	1	1	1
150	O-Ring	48347	1	1	1	1	1	1	1	1
190	Liquifram™	48186	1				1			
		48187		1				1		
		48188			1				1	
		48189				1				1
230	Injection Check Valve Body	48617					1	1	1	1
		48618	1	1	1	1				
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge	25636-16	1	1*			1	1*		
	8XXNI ONLY	10342-16		1#	1	1		1#	1	1
	Tubing, Suction & Discharge	28636-16	1	1*			1	1*		
	8XXNU ONLY	27342-16		1#	1	1		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1	1	1	1	1
601	FastPrime™ Discharge Check Valve	48665	1							
		48667		1	1	1				
		48669					1			
		48672						1	1	1
602	Suction Check Valve	48677	1							
		48679		1	1	1				
		48681					1			
		48684						1	1	1
603	Cartridge Valve	48542	4				4			
		48543		4	4	4		4	4	4
604	FastPrime™ Cartridge Valve	48548	1				1			
		48549		1	1	1		1	1	1
605	FastPrime™ Valve	48700	1	1	1	1				
		48848					1	1	1	1
606	Liquid End Hardware	48703	1	1	1	1	1	1	1	1
607	Foot Valve	48718					1			
		48721						1	1	1
		48720	1							
		48723		1	1	1				
608	Injection Valve	48728					1	1	1	1
		48731	1	1	1	1				
613	Tubing Connection Kit	77382	4	4*			4	4*		
	8XXNI and 8XXNU	77383		4#	4	4		4#	4	4
	Tubing Connection Kit	77378	4	4*			4	4*		
	8XXNM ONLY	77379		4#	4	4		4#	4	4
615	Single Ball Check Valve Fitting	48788	2	2	2	2				
		48787					2	2	2	2
616	Double Ball Check Valve Fitting	48791					2	2	2	2
		48792	2	2	2	2				
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1

ROYTRONIC® Series A pumps

* ROYTRONIC EXCEL™ Series A+ pumps

LE-8X2NX, 8X8NX



D. PRIMING FOR FastPrime™ LIQUID ENDS

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the discharge valve and discharge cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and discharge valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. DEPRESSURIZING THE DISCHARGE LINE AND PUMP HEAD

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1, 2 and 3 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.
2. **Line Depressurization:**
   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a ROYTRONIC® 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.
3. **Pump Head Depressurization:**
   Be sure your relief tubing is connected to your FastPrime™ valve and runs back to your solution drum or tank.
   Turn the FastPrime™ knob one-and-a-half turns counter-clockwise ↺. The Pump Head is now depressurized. Keep the valve open until solution drains into the solution drum or tank. Then turn the FastPrime™ knob clockwise ↻ to tighten the knob to a closed position.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

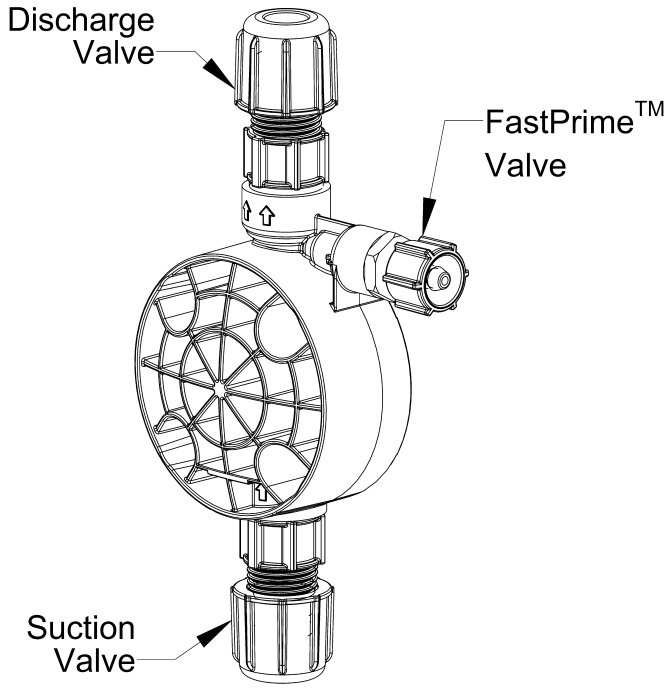


FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-8X2SX, 8X8SX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

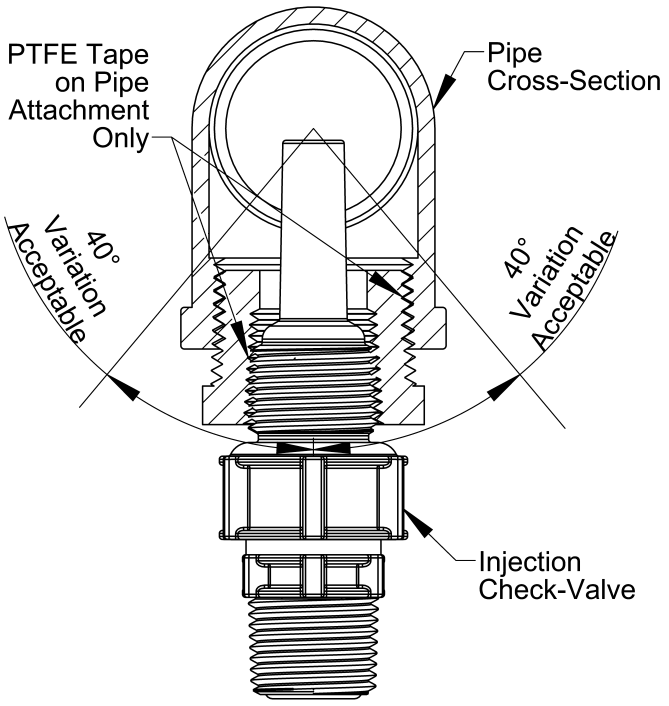


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

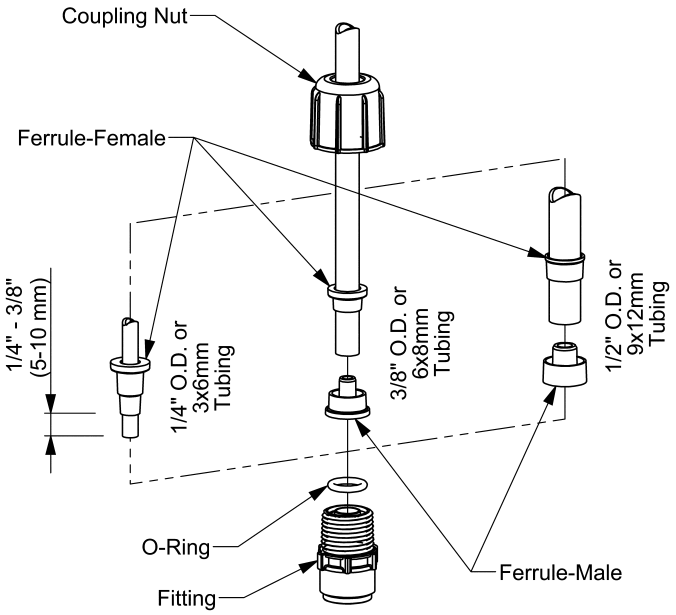


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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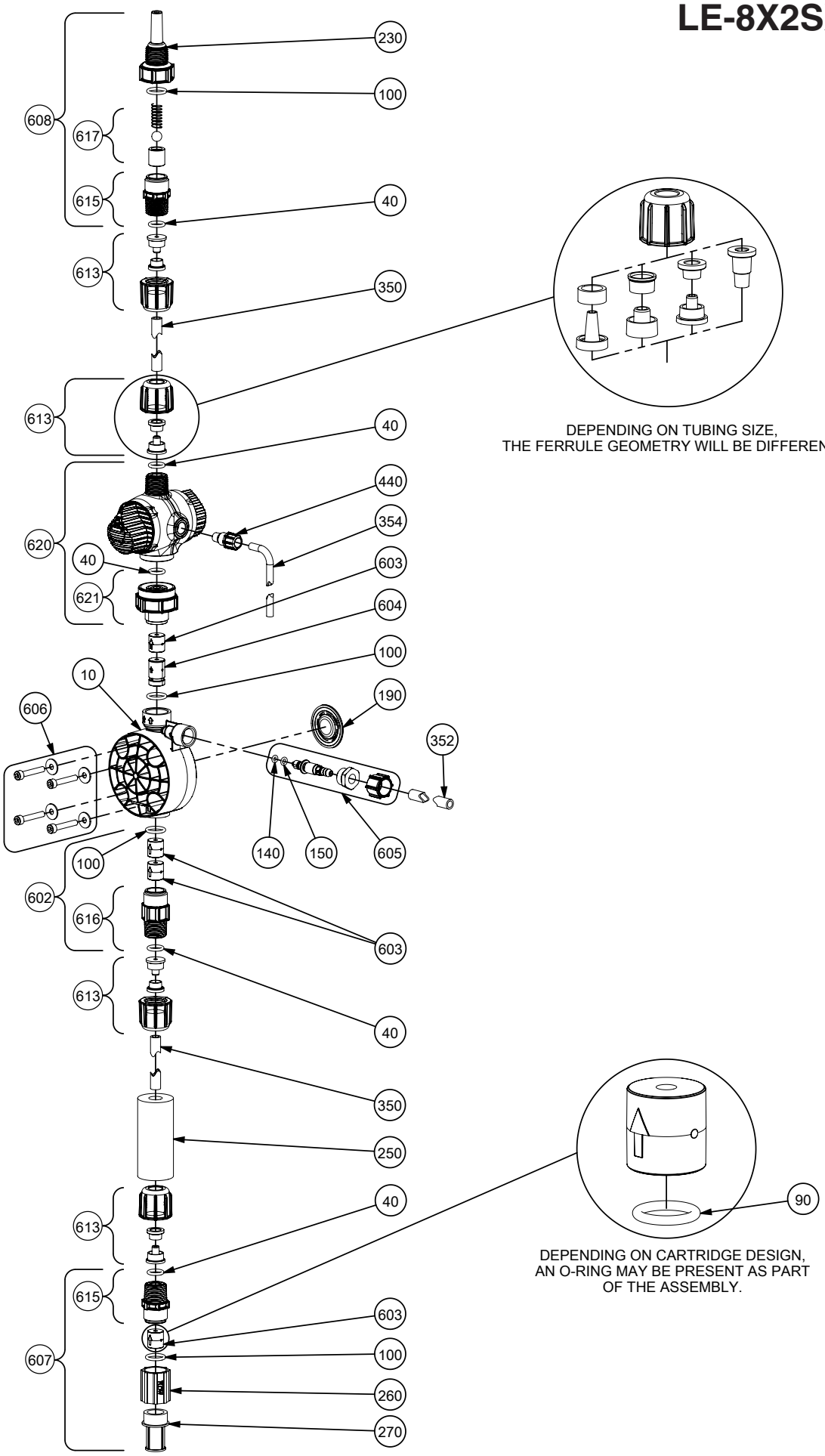
LE-8X2SX, 8X8SX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			812SX	822SX	832SX	842SX	818SX	828SX	838SX	848SX
10	Pump Head Molded FastPrime™	48360					1			
		48361	1							
		48363						1		
		48364		1						
		48366							1	
		48367			1					
		48369								1
		48370				1				
40	O-Ring	48349	5	5	5	5	5	5	5	5
90	O-Ring	39413	5	5	5	5	5	5	5	5
100	O-Ring	36103	4	4	4	4	4	4	4	4
140	O-Ring	48590	1	1	1	1	1	1	1	1
150	O-Ring	48347	1	1	1	1	1	1	1	1
190	Liquifram™	48186	1				1			
		48187		1				1		
		48188			1				1	
		48189				1				1
230	Injection Check Valve Body	48617					1	1	1	1
		48618	1	1	1	1				
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge	25636-16	1	1*			1	1*		
	8XXSI ONLY	10342-16		1#	1	1		1#	1	1
	Tubing, Suction & Discharge	28636-16	1	1*			1	1*		
	8XXSU ONLY	27342-16		1#	1	1		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1	1	1	1	1
354	Tubing, 4FV	25636-06	1	1	1	1	1	1	1	1
440	Bleed Nut	48622	1	1	1	1	1	1	1	1
602	Suction Check Valve	48677	1							
		48679		1	1	1				
		48681					1			
		48684						1	1	1
603	Cartridge Valve	48542	4				4			
		48543		4	4	4		4	4	4
604	FastPrime™ Cartridge Valve	48548	1				1			
		48549		1	1	1		1	1	1
605	FastPrime™ Valve	48700	1	1	1	1				
		48848					1	1	1	1
606	Liquid End Hardware	48703	1	1	1	1	1	1	1	1
607	Foot Valve	48718					1			
		48721						1	1	1
		48720	1							
		48723		1	1	1				
608	Injection Valve	48728					1	1	1	1
		48731	1	1	1	1				
613	Tubing Connection Kit	77382	4	4*			4	4*		
	8XXSI and 8XXSU	77383		4#	4	4		4#	4	4
	Tubing Connection Kit	77378	4	4*			4	4*		
	8XXSM ONLY	77379		4#	4	4		4#	4	4
615	Single Ball Check Valve Fitting	48788	2	2	2	2				
		48787					2	2	2	2
616	Double Ball Check Valve Fitting	48791					1	1	1	1
		48792	1	1	1	1				
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1
620	4FV Assembly	48798					1	1*		
		48753						1#	1	1
		48799	1	1*						
		48754		1#	1	1				
621	4FV Fitting Assembly	49255	1	1	1	1	1	1	1	1

ROYTRONIC® Series A pumps

* ROYTRONIC EXCEL™ Series A+ pumps

LE-8X2SX, 8X8SX



D. PRIMING WITH ROYTRONIC® 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. PRIMING WITH FastPrime™ VALVE

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

F. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

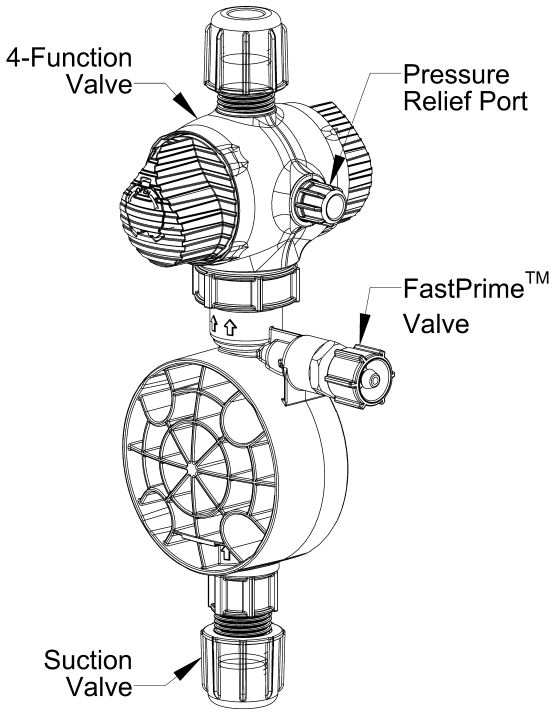


FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-8X3NX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

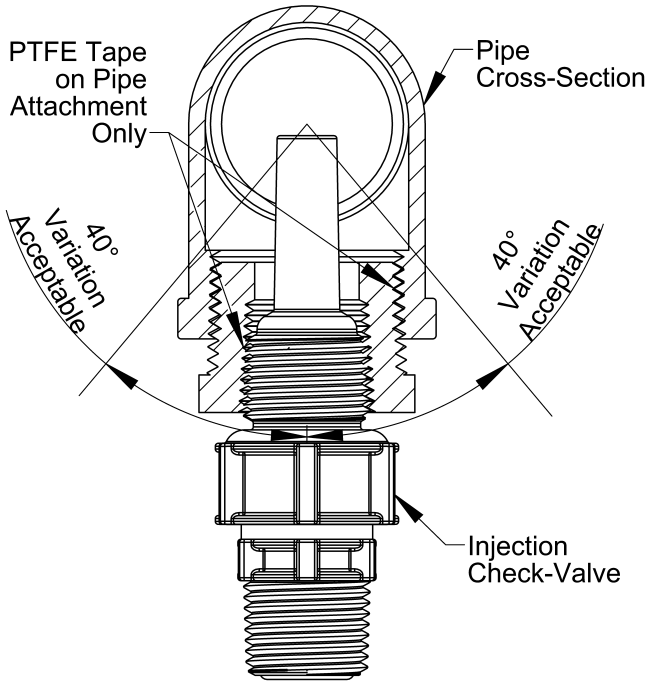


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

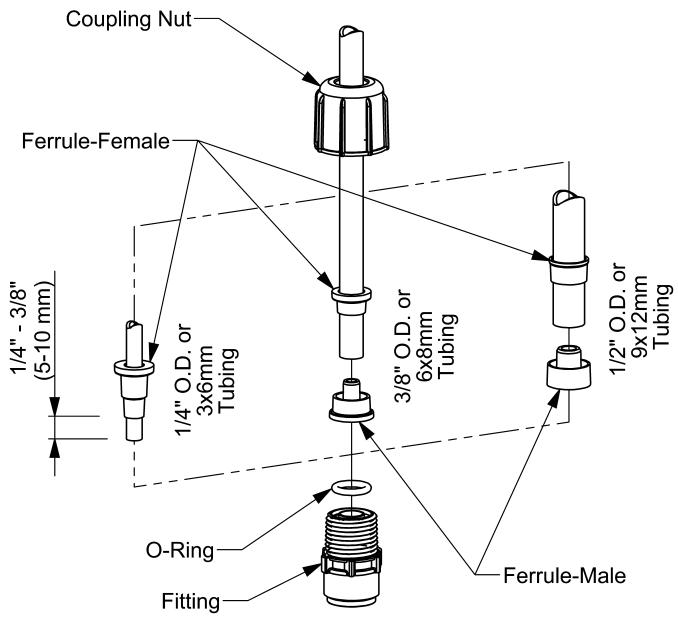


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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http://www.lmipumps.com

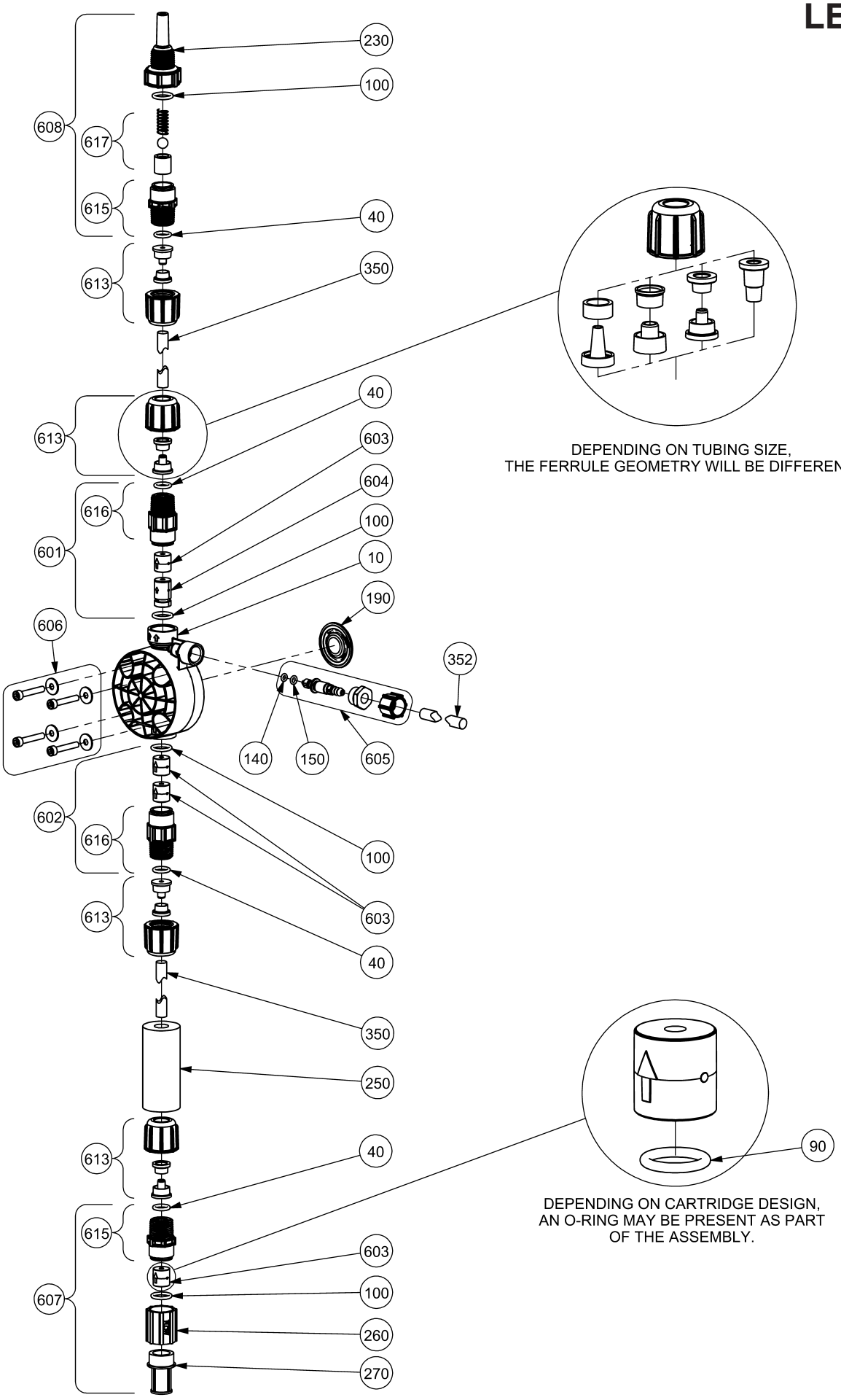
2014.A 11/2009

LE-8X3NX

Key Number	Description	Part Number	QUANTITY			
			813NX	823NX	833NX	843NX
10	Pump Head Molded FastPrime™	48361	1			
		48364		1		
		48367			1	
		48370				1
40	O-Ring	48591	4	4	4	4
90	O-Ring	39413	5	5	5	5
100	O-Ring	48589	4	4	4	4
140	O-Ring	48590	1	1	1	1
150	O-Ring	48347	1	1	1	1
190	Liquifram™	48186	1			
		48187		1		
		48188			1	
		48189				1
230	Injection Check Valve Body	48618	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge **8XXNI ONLY**	25636-16	1	1*		
		10342-16		1#	1	1
	Tubing, Suction & Discharge **8XXNU ONLY**	28636-16	1	1*		
		27342-16		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1
601	FastPrime™ Discharge Check Valve	48666	1			
		48668		1	1	1
602	Suction Check Valve	48678	1			
		48680		1	1	1
603	Cartridge Valve	48545	4			
		48546		4	4	4
604	FastPrime™ Cartridge Valve	48551	1			
		48552		1	1	1
605	FastPrime™ Valve	48700	1	1	1	1
606	Liquid End Hardware	48703	1	1	1	1
607	Foot Valve	48724	1			
		48725		1	1	1
608	Injection Valve	48732	1	1	1	1
613	Tubing Connection Kit **8XXNI and 8XXNU**	77382	4	4*		
		77383		4#	4	4
	Tubing Connection Kit **8XXNM ONLY**	77378	4	4*		
		77379		4#	4	4
615	Single Ball Check Valve Fitting	48789	2	2	2	2
616	Double Ball Check Valve Fitting	48793	2	2	2	2
617	Injection Valve Cartridge	48795	1	1	1	1

ROYTRONIC® Series A pumps
* ROYTRONIC EXCEL™ Series A+ pumps

LE-8X3NX



DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.

DEPENDING ON CARTRIDGE DESIGN,
AN O-RING MAY BE PRESENT AS PART
OF THE ASSEMBLY.

D. PRIMING FOR FastPrime™ LIQUID ENDS

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the discharge valve and discharge cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and discharge valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. DEPRESSURIZING THE DISCHARGE LINE AND PUMP HEAD

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1, 2 and 3 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.
2. **Line Depressurization:**
   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a ROYTRONIC® 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.
3. **Pump Head Depressurization:**
   Be sure your relief tubing is connected to your FastPrime™ valve and runs back to your solution drum or tank.
   Turn the FastPrime™ knob one-and-a-half turns counter-clockwise ↺. The Pump Head is now depressurized. Keep the valve open until solution drains into the solution drum or tank. Then turn the FastPrime™ knob clockwise ↻ to tighten the knob to a closed position.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

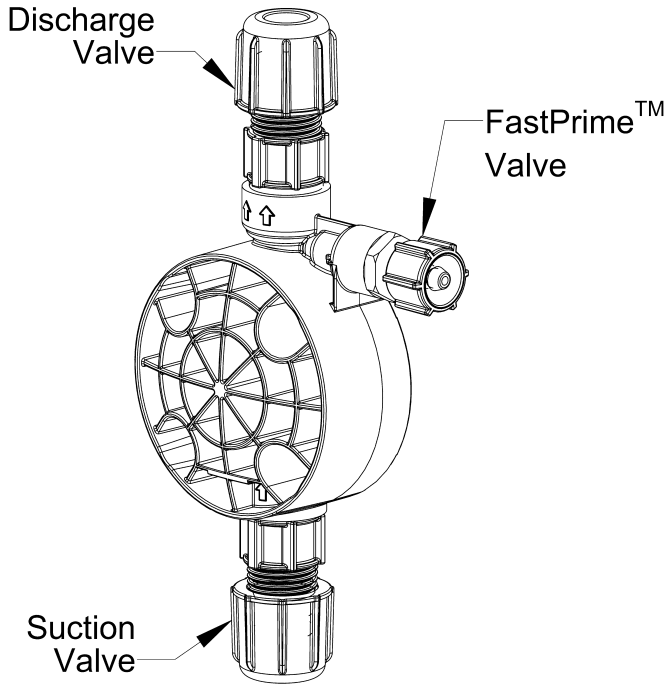


FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-8X3SX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

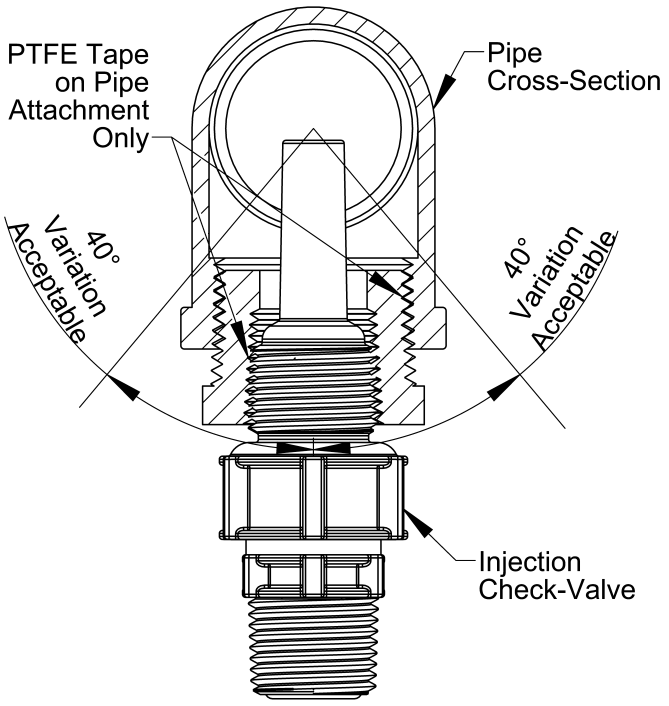


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

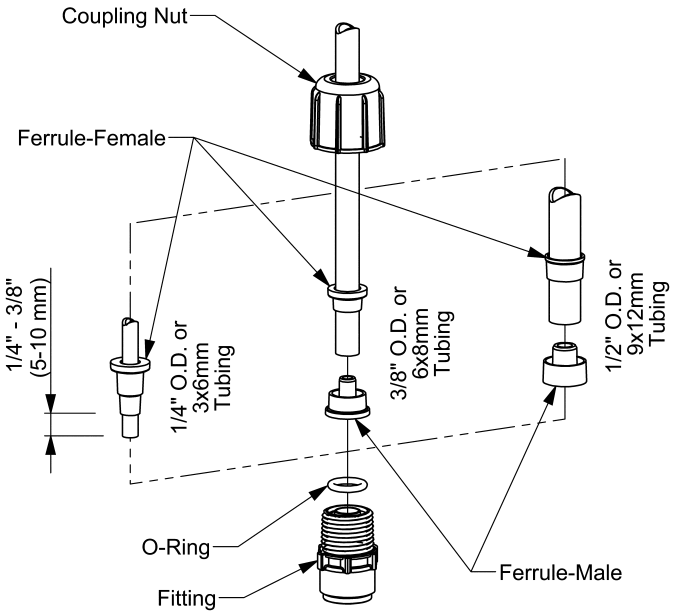


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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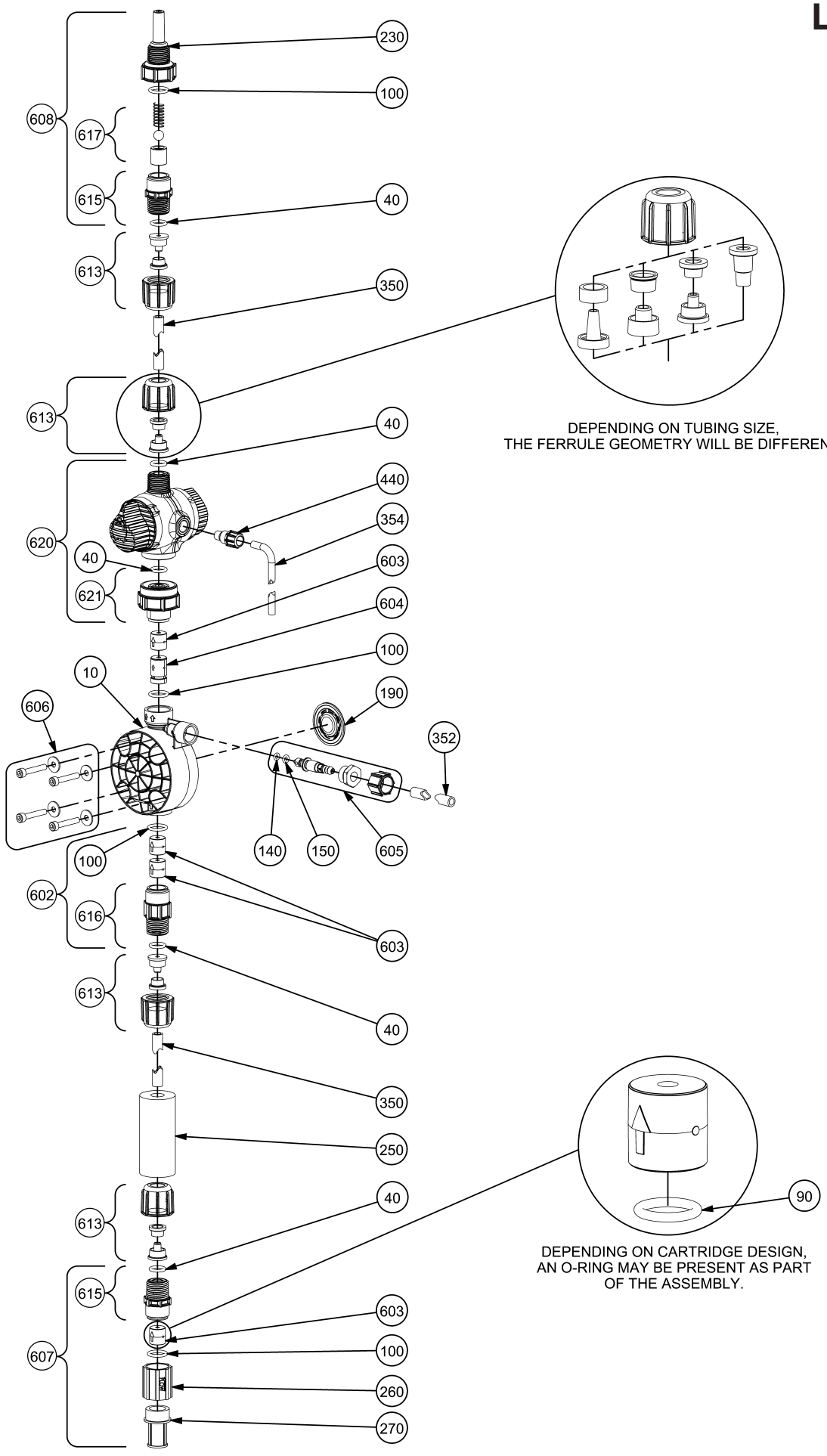
2013.A 11/2009

LE-8X3SX

Key Number	Description	Part Number	QUANTITY			
			813SX	823SX	833SX	843SX
10	Pump Head Molded FastPrime™	48361	1			
		48364		1		
		48367			1	
		48370				1
40	O-Ring	48591	5	5	5	5
90	O-Ring	39413	5	5	5	5
100	O-Ring	48589	4	4	4	4
140	O-Ring	48590	1	1	1	1
150	O-Ring	48347	1	1	1	1
190	Liquifram™	48186	1			
		48187		1		
		48188			1	
		48189				1
230	Injection Check Valve Body	48618	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge	25636-16	1	1*		
	8XXSI ONLY	10342-16		1#	1	1
	Tubing, Suction & Discharge	28636-16	1	1*		
	8XXSU ONLY	27342-16		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1
354	Tubing, 4FV	25636-06	1	1	1	1
440	Bleed Nut	48622	1	1	1	1
602	Suction	48678	1			
	Check Valve	48680		1	1	1
603	Cartridge Valve	48545	4			
		48546		4	4	4
604	FastPrime™	48551	1			
	Cartridge Valve	48552		1	1	1
605	FastPrime™ Valve	48700	1	1	1	1
606	Liquid End Hardware	48703	1	1	1	1
607	Foot Valve	48724	1			
		48725		1	1	1
608	Injection Valve	48732	1	1	1	1
613	Tubing Connection Kit	77382	4	4*		
	8XXSI and 8XXSU	77383		4#	4	4
	Tubing Connection Kit	77378	4	4*		
	8XXSM ONLY	77379		4#	4	4
615	Single Ball Check Valve Fitting	48789	2	2	2	2
616	Double Ball Check Valve Fitting	48793	1	1	1	1
617	Injection Valve Cartridge	48795	1	1	1	1
620	4FV Assembly	48800	1	1*		
		48755		1#	1	1
621	4FV Fitting Assembly	49256	1	1	1	1

ROYTRONIC® Series A pumps
* ROYTRONIC™ EXCEL Series A+ pumps

LE-8X3SX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607
100
260
270
DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.
90
DEPENDING ON CARTRIDGE DESIGN,
AN O-RING MAY BE PRESENT AS PART
OF THE ASSEMBLY.

D. PRIMING WITH ROYTRONIC® 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. PRIMING WITH FastPrime™ VALVE

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

F. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

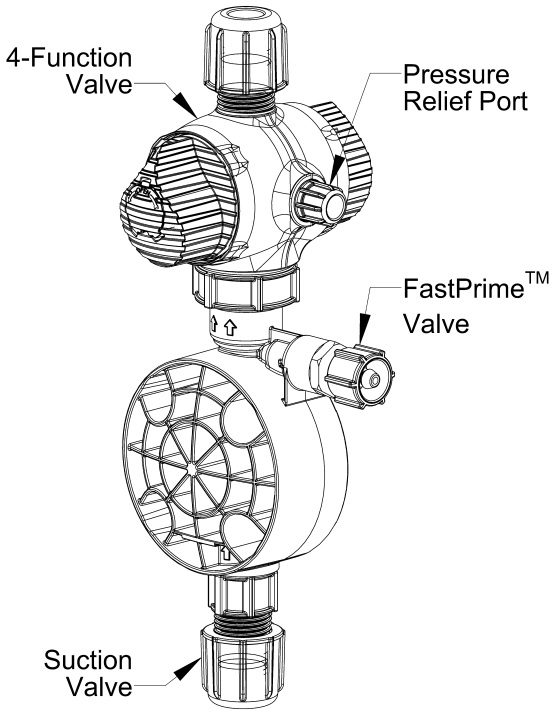

FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-91S / LE-92S / LE-95S

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE

1. The purpose of the injection check valve is to prevent backflow from the treated line.
2. A 1/2" NPT female fitting with sufficient depth will accept the injection check valve.
3. To insure correct seating of the ball inside the injection check valve, the injection check valve should be installed upwards (vertically) into bottom of the pipe.

B. CONNECTING DISCHARGE TUBING

NOTE: *Cut tubing to length needed for discharge line.*

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Slide the small end of the coupling nut onto tubing, then slide on the clamp ring.
3. Push tubing on the valve housing nozzle so that tubing flares out and butts up against valve housing and will not go any further.
4. Slide the clamp ring and coupling nut to the threads and engage. While pushing the tubing on to the valve housing nozzle, tighten the coupling nut by hand until tubing is held securely in place.

Excessive force will crack or distort fittings. DO NOT USE PIPE WRENCH.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5 m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (see **B. Connecting Discharge Tubing**).

D. PRIMING

1. Connect pressure relief tubing to pressure relief port on the four function valve.
2. Route tubing to solution reservoir and anchor with a plastic tie. Do not submerge tubing in solution.
3. Start pump. Set at 80% speed and 100% stroke.
4. Pull on Pressure Relief knob (red or black knob), holding knob out until solution is visible through translucent return tubing.
5. The pump is now primed.

NOTE:

(a) Pump is normally self-priming if suction lift is not more than 5 ft (1.5 m), valves in the pump are wet with water (pump is shipped from factory with water in pump head) and the above steps ***(D. Priming)*** *are followed.*

(b) If the pump does not self prime, remove discharge valve housing and ball and pour water or solution slowly into discharge port until head is filled. Follow step ***D. Priming*** *thereafter.*

E. DEPRESSURIZING DISCHARGE LINE

1. It is possible to depressurize the discharge line and pump head without removal of tubing or loosening of fittings.

Be sure injection check valve is properly installed and is operating. If a gate valve or globe has been installed downstream of injection check valve, it should be closed. Be certain relief tubing from the four function valve is connected and run to solution reservoir.

2. Pull on both anti-syphon and relief knobs.
3. The discharge line is now depressurized.
4. If injection check valve is of higher elevation than pump head, disconnecting tubing at injection check valve end will allow air to enter and cause solution to drain back to tank.

LMI
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A unit of Sundstrand Corporation

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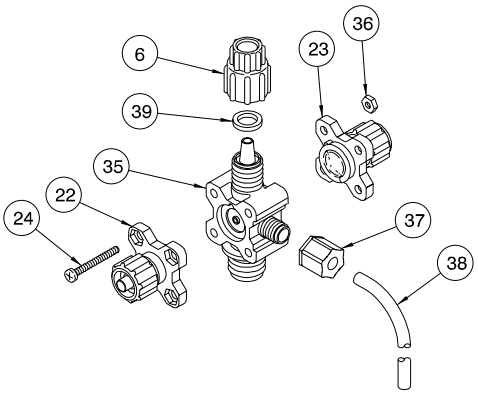
FAX: (508) 264-9172
http://www.lmipumps.com

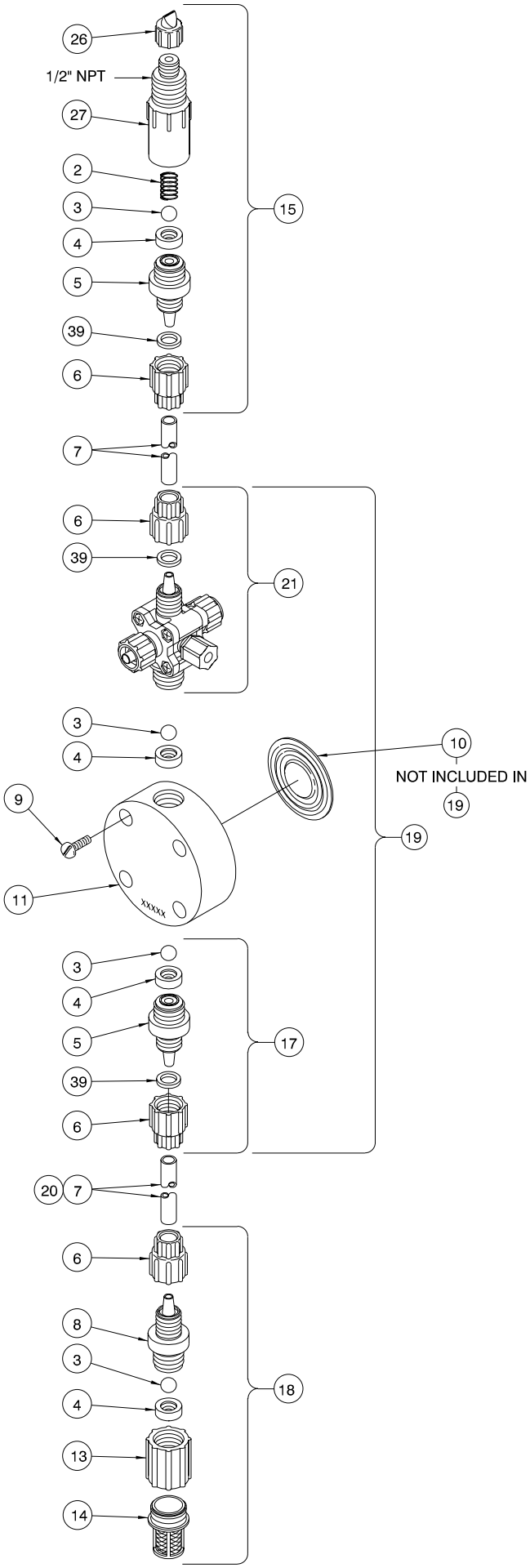
Replaces same of Rev I 12/94
1424.I 1/97

KEY NO.	PART NO.	DESCRIPTION	QUANTITY		
			LE-91S	LE-92S	LE-95S
2	29339	Spring, Polyethylene	1		
	10339*	Spring, PVDF		1	1
3	10338*	Ball, .375" Ceramic	4	4	4
4	10407*	Seal Ring, Teflon	4	4	4
5	10292	Valve Seat, PVC	2	2	
	10392	Valve Seat, Polypropylene			2
6	10299	Coupling Nut, Polypropylene	4	4	4
7	10342-10	Tubing, .375" O.D. Polyethylene	1		
	10342-16	Tubing, .375" O.D. Polyethylene		1	1
8	10293	Valve Housing, PVC	1	1	
	10393	Valve Housing, Polypropylene			1
9	10340	Screw, 10-24 x 3/4" SS	4	4	4
10	30917*	Liquifram®, 0.9 SI, Fluorofilm	1	1	1
11	10113	Head, 0.9 SI, Acrylic	1		
	10213	Head, 0.9 SI, PVC		1	
	10313M	Head, 0.9 SI Polypropylene			1
13	10978	Foot Valve Seat	1	1	1
14	10123	Strainer, Polypropylene	1	1	1
15	10501	Injection Check/Valve Assembly	1		
	25233	Injection Check/Valve Assembly		1	
	25073	Injection Check/Valve Assembly			1
17	25232	Suction Valve Assembly	1	1	
	25075	Suction Valve Assembly			1
18	25234	Foot Valve Assembly	1	1	
	25076	Foot Valve Assembly			1
19	25696	Head Assembly, LE-91S	1		
	25697	Head Assembly, LE-92S		1	
	25832	Head Assembly, LE-95S			1
20	10469-06	Tubing, .375" O.D. Vinyl	1		
21	33050	Anti-Syphon/Pressure Release Valve Asm.	1		
	27048	Anti-Syphon/Pressure Release Valve Asm.		1	
	28022	Anti-Syphon/Pressure Release Valve Asm.			1
22	33024	Pressure Relief Cap Assembly	1		
	28447	Pressure Relief Cap Assembly		1	
	28446	Pressure Relief Cap Assembly			1
23	31138	Anti-Syphon Cap Assembly	1		
	27045	Anti-Syphon Cap Assembly		1	
	25838	Anti-Syphon Cap Assembly			1
24	25627	Screw, 6-32 x 1 1/4" SS	4	4	4
26	27352	Flapper Valve	1	1	
27	10294	Injector Fitting, PVC	1		
	26841	Injector Fitting, PVDF		1	
	10394	Injector Fitting, PPGF			1
35	30425	Valve Body, PVC	1		
	26847	Valve Body, PVDF		1	
	25869	Valve Body, PPGF			1
36	25628	Nut, 6-32 Hex SS	4	4	4
37	25631	Nut, Ferrule	1	1	1
38	25636-10	Tubing, .250" O.D. Polyethylene	1	1	1
39	26136	Clamp Ring	3	3	3
---	32293	Suction Tubing Straightener (not shown)	1	1	1

*Parts included in Spare Parts Kit SP-U1



Note:
Threaded connections into pump head are 3/4" - 16 straight threads. **DO NOT USE TEFLON TAPE.** These joints are sealed by seal ring valve seats (Item 4 on exploded view).



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Liquid End Sheet

LE-9X0AX, 9X8AX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

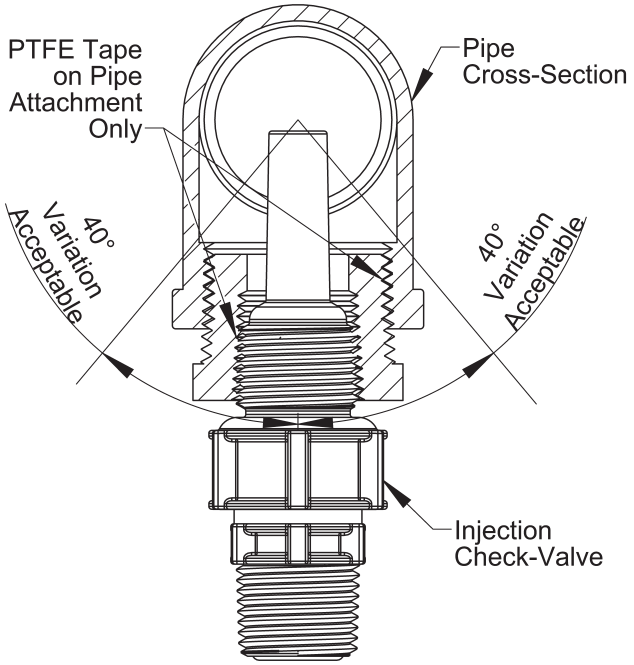

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Please note: The chemical discharges through the discharge valve which is mounted to the front of the AUTOPRIME™ liquid end, as seen in Figure 3.

Note: *Cut tubing to length needed for discharge line.*

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

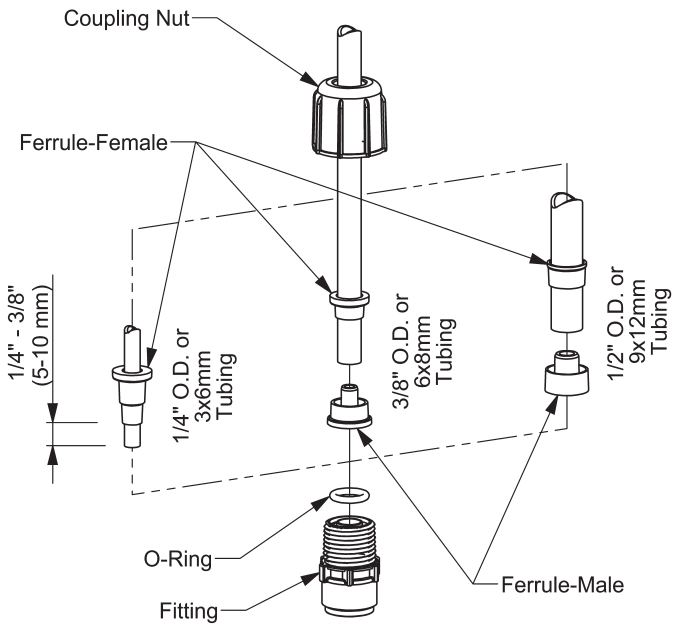

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP.

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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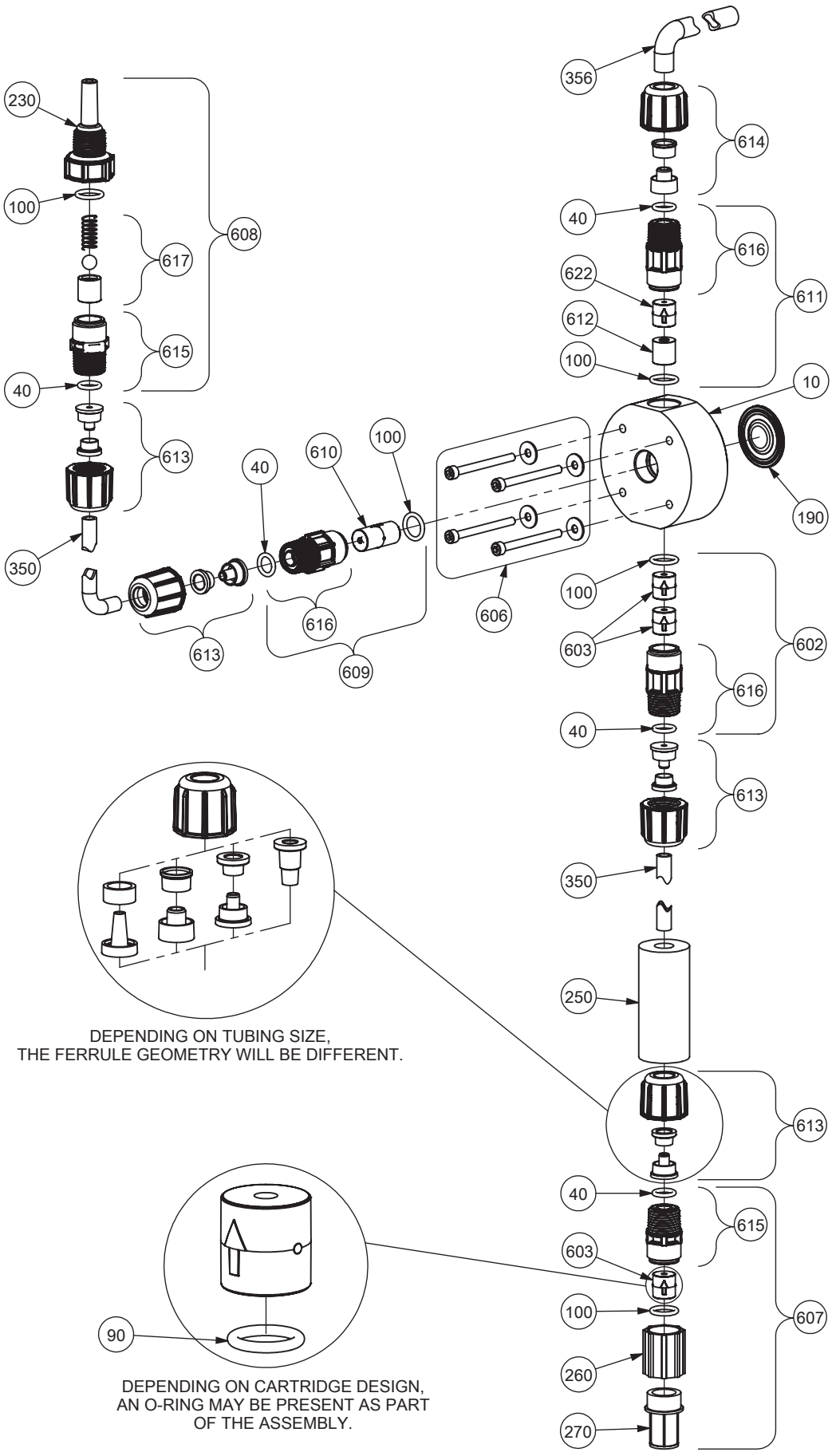
LE - 9X0AX, 9X8AX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			910AX	920AX	930AX	940AX	918AX	928AX	938AX	948AX
10	Pump Head AutoPrime™	48422	1							
		48423					1			
		48425		1						
		48426						1		
		48428			1					
		48429							1	
		48431				1				
		48432								1
40	O-Ring	48349	5	5	5	5	5	5	5	5
90	O-Ring	39413	6	6	6	6	6	6	6	6
100	O-Ring	36103	5	5	5	5	5	5	5	5
190	Liquifram™	48186	1				1			
		48187		1				1		
		48188			1				1	
		48189				1				1
230	Injection Check Valve Body	48617	1	1	1	1	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **9XXAI ONLY**	25636-16	1	1*			1	1*		
		10342-16		1#	1	1		1#	1	1
	Tubing, Suction & Discharge **9XXAU ONLY**	28636-16	1	1*			1	1*		
		27342-16		1#	1	1		1#	1	1
356	Tubing, AutoPrime™	10142-10	1	1	1	1	1	1	1	1
602	Suction Check Valve	49166	1				1			
		49163		1	1	1		1	1	1
603	Cartridge Valve	48545	3				3			
		48546		3	3	3		3	3	3
606	Liquid End Hardware	48702	1	1	1	1	1	1	1	1
607	Foot Valve	49164	1				1			
		49165		1	1	1		1	1	1
608	Injection Valve	48728	1	1	1	1	1	1	1	1
609	AutoPrime™ Disch. Check Valve	48704	1				1			
		48705		1	1	1		1	1	1
610	AutoPrime™ Disch. Cartridge Valve	48706	1				1			
		48707		1	1	1		1	1	1
611	AutoPrime™ Shuttle Valve	48708	1	1	1	1	1	1	1	1
612	AutoPrime™ Cartridge Valve	48709	1	1	1	1	1	1	1	1
613	Tubing Connection Kit **9XXAI and 9XXAU**	77382	4	4*			4	4*		
		77383		4#	4	4		4#	4	4
	Tubing Connection Kit **9XXAM ONLY**	77378	4	4*			4	4*		
		77379		4#	4	4		4#	4	4
614	Tubing Connection Kit **9XXAI and 9XXAU**	77384	1	1	1	1	1	1	1	1
	Tubing Connection Kit **9XXAM ONLY**	77380	1	1	1	1	1	1	1	1
615	Single Ball Check Valve Fitting	48787	2	2	2	2	2	2	2	2
616	Double Ball Check Valve Fitting	48791	3	3	3	3	3	3	3	3
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1
622	Cartridge Valve	48545	1	1	1	1	1	1	1	1

Roytronic Series A pumps

* Roytronic EXCEL Series AD pumps

LE-9X0AX, 9X8AX



D. CONNECTING AUTOPRIME™ TUBING

1. Using ½" O.D. polyethylene tubing, cut AUTOPRIME™ tubing to length so that it returns to the solution tank. This tubing must not be submerged in the solution.
2. Follow the same procedure in connecting AUTOPRIME™ tubing to the AUTOPRIME™ valve (*see* **B. Connecting Discharge Tubing**).

E. PRIMING FOR AUTOPRIME™ LIQUID ENDS

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

1. Plug in or switch the pump on.
2. While the pump is running, set at 100% speed and 100% stroke length.
3. The suction tubing should begin to fill with solution from the tank.
4. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the AUTOPRIME™ valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and AUTOPRIME™ valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

F. DEPRESSURIZING THE DISCHARGE LINE AND PUMP HEAD

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1 and 2 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.
2. **Line Depressurization:**
   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a ROYTRONIC® 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

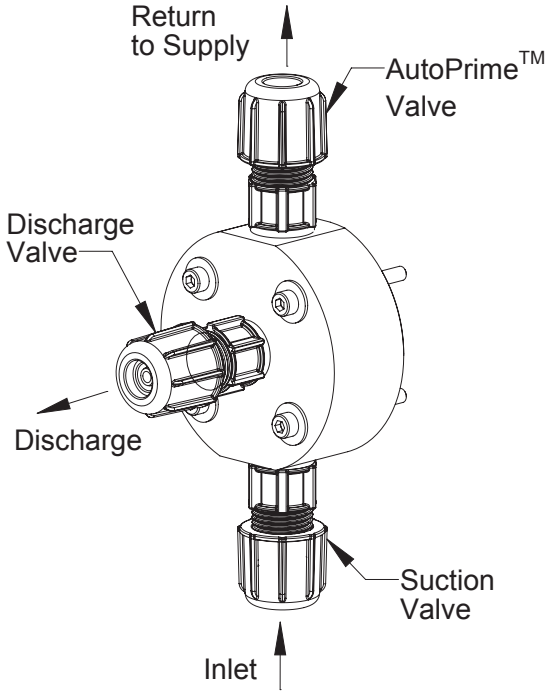


FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-9X0HX, 9X8HX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

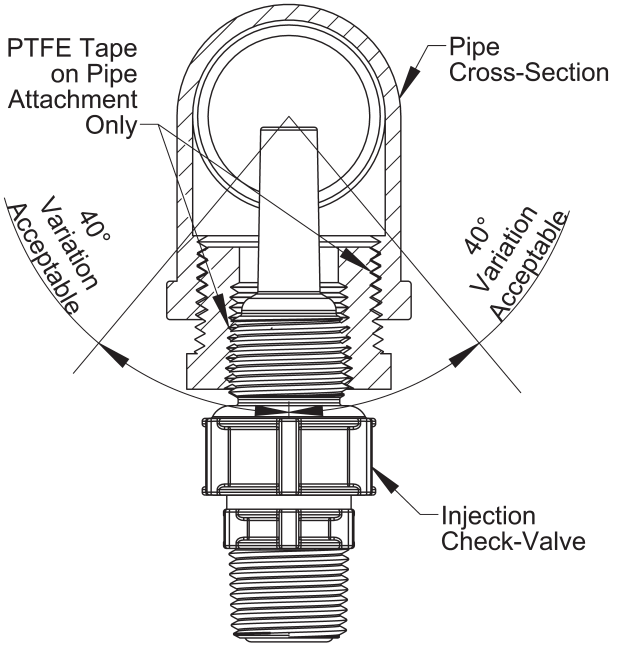


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Please note: The chemical discharges through the ROYTRONIC® 4-function valve which is mounted to the front of the AUTOPRIME™ liquid end, as seen in Figure 3.

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

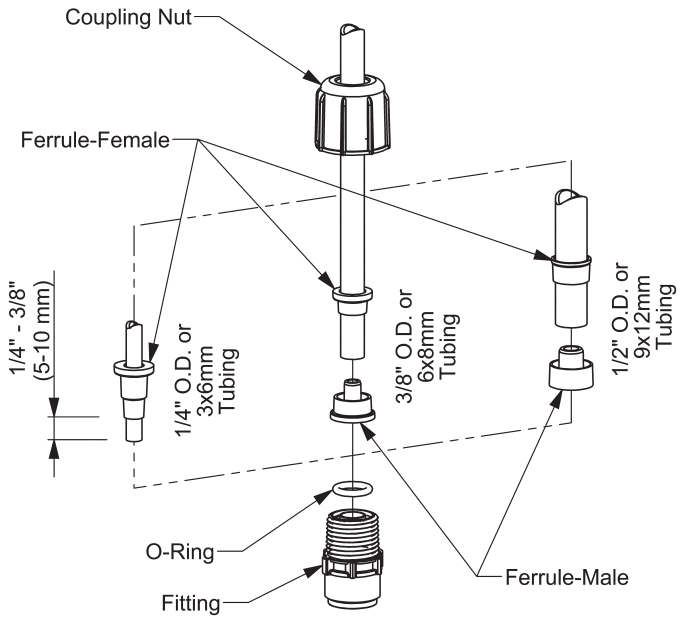


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP.

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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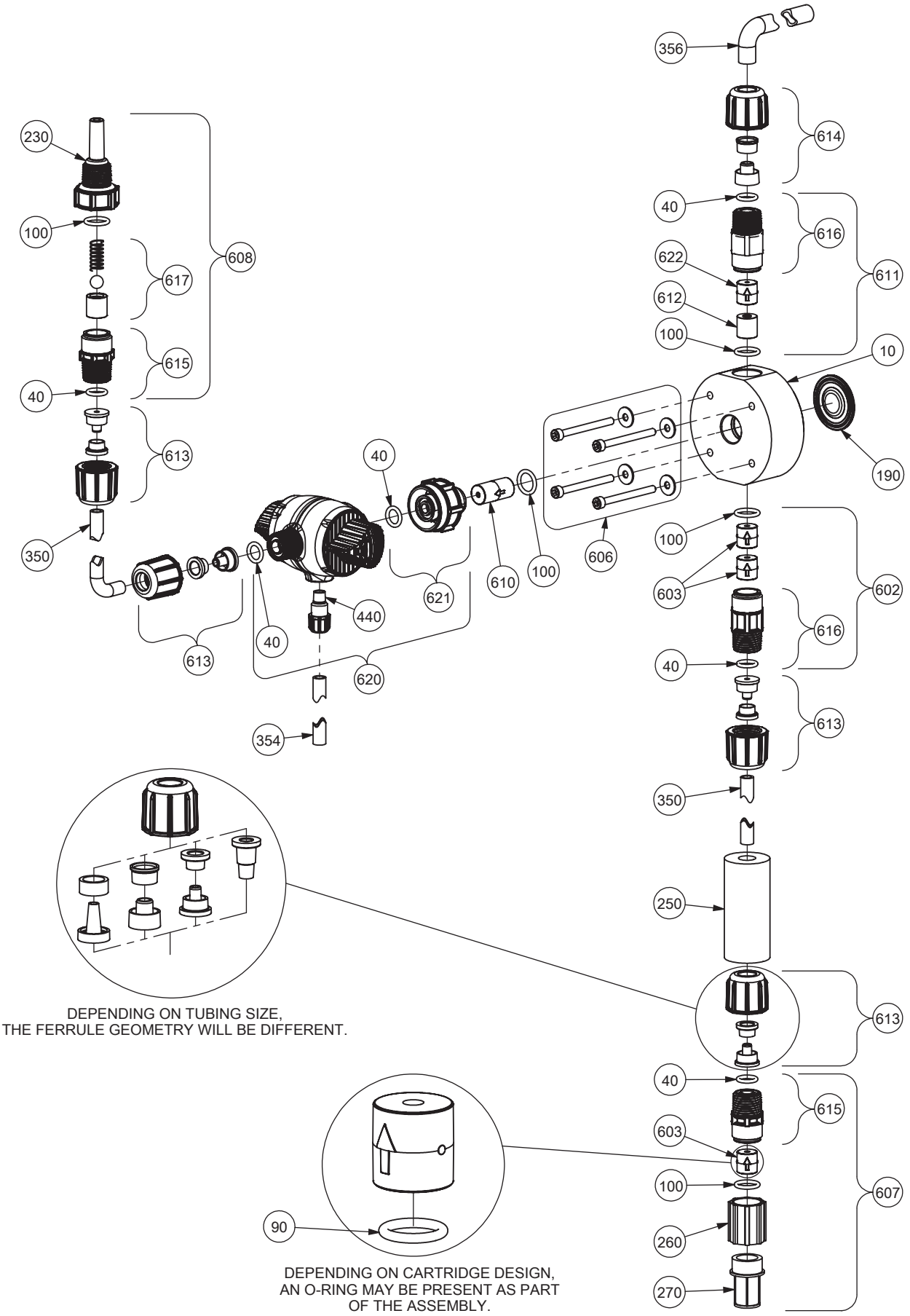
LE- 9X0HX, 9X8HX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			910HX	920HX	930HX	940HX	918HX	928HX	938HX	948HX
10	Pump Head AutoPrime™	48422	1							
		48423					1			
		48425		1						
		48426						1		
		48428			1					
		48429							1	
		48431				1				
		48432								1
40	O-Ring	48349	6	6	6	6	6	6	6	6
90	O-Ring	39413	5	5	5	5	5	5	5	5
100	O-Ring	36103	5	5	5	5	5	5	5	5
190	Liquifram™	48186	1				1			
		48187		1				1		
		48188			1				1	
		48189				1				1
230	Injection Check Valve Body	48617	1	1	1	1	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **9XXHI ONLY**	25636-16	1	1			1	1		
		10342-16		1	1	1		1	1	1
	Tubing, Suction & Discharge **9XXHU ONLY**	28636-16	1	1			1	1		
		27342-16		1	1	1		1	1	1
354	Tubing, 4FV	25636-06	1	1	1	1	1	1	1	1
356	Tubing, AutoPrime™	10142-10	1	1	1	1	1	1	1	1
440	Bleed Nut	48622	1	1	1	1	1	1	1	1
602	Suction Check Valve	49166	1				1			
		49163		1	1	1		1	1	1
603	Cartridge Valve	48545	3				3			
		48546		3	3	3		3	3	3
606	Liquid End Hardware	48702	1	1	1	1	1	1	1	1
607	Foot Valve	49164	1				1			
		49165		1	1	1		1	1	1
608	Injection Valve	48728	1	1	1	1	1	1	1	1
610	AutoPrime™ Disch. Cartridge Valve	48706	1				1			
		48707		1	1	1		1	1	1
611	AutoPrime™ Shuttle Valve	50042	1	1	1	1	1	1	1	1
612	AutoPrime™ Cartridge Valve	50026	1	1	1	1	1	1	1	1
613	Tubing Connection Kit **9XXHI and 9XXHU**	77382	4	4			4	4		
		77383		4	4	4		4	4	4
	Tubing Connection Kit **9XXHM ONLY**	77378	4	4			4	4		
		77379		4	4	4		4	4	4
614	Tubing Connection Kit **9XXHI and 9XXHU**	77384	1	1	1	1	1	1	1	1
	Tubing Connection Kit **9XXHM ONLY**	77380	1	1	1	1	1	1	1	1
615	Single Ball Check Valve Fitting	48787	2	2	2	2	2	2	2	2
616	Double Ball Check Valve Fitting	48791	2	2	2	2	2	2	2	2
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1
620	4FV Assembly	48798	1	1			1	1		
		48753		1	1	1		1	1	1
621	4FV Fitting Assembly	49254	1	1	1	1	1	1	1	1
622	Cartridge Valve	48543	1	1	1	1	1	1	1	1

LE-9X0HX, 9X8HX



DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.

DEPENDING ON CARTRIDGE DESIGN,
AN O-RING MAY BE PRESENT AS PART
OF THE ASSEMBLY.

D. CONNECTING AUTOPRIME™ TUBING

1. Using 1/2" O.D. polyethylene tubing, cut AUTOPRIME™ tubing to length so that it returns to the solution tank. This tubing must not be submerged in the solution.

2. Follow the same procedure in connecting AUTOPRIME™ tubing to the AUTOPRIME™ valve (*see* **B. Connecting Discharge Tubing**).

E. PRIMING WITH ROYTRONIC® 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.

3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.

4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the AUTOPRIME™ valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and AUTOPRIME™ valve and repeat steps above.

2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

F. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

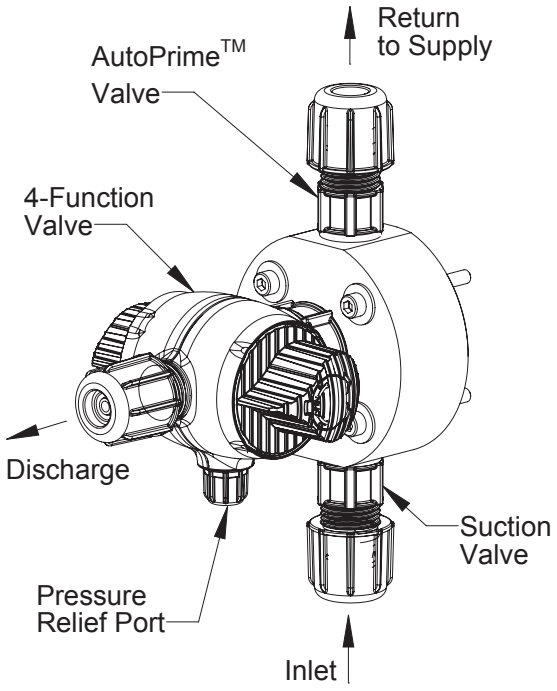


FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-9X0NX, LE-9X8NX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

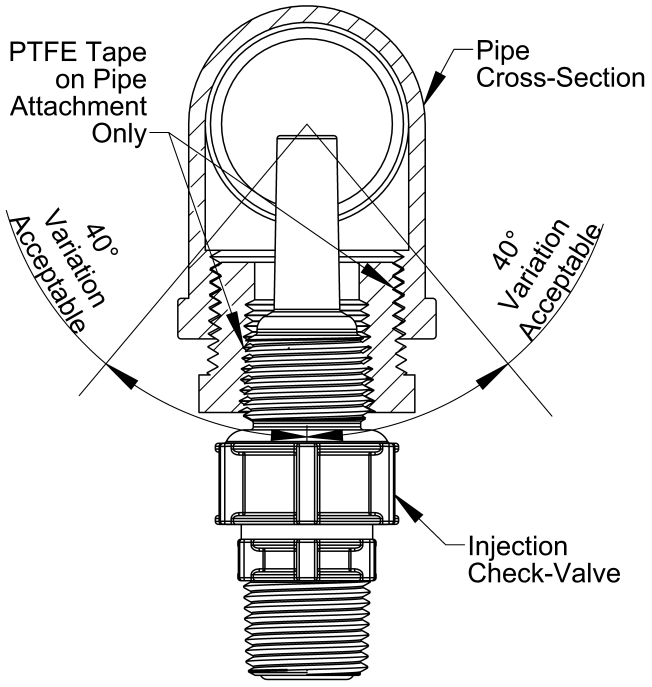


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

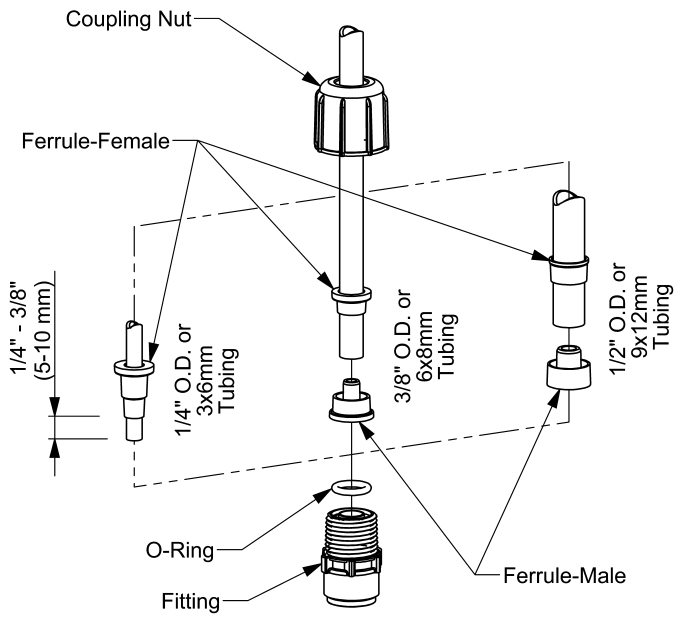


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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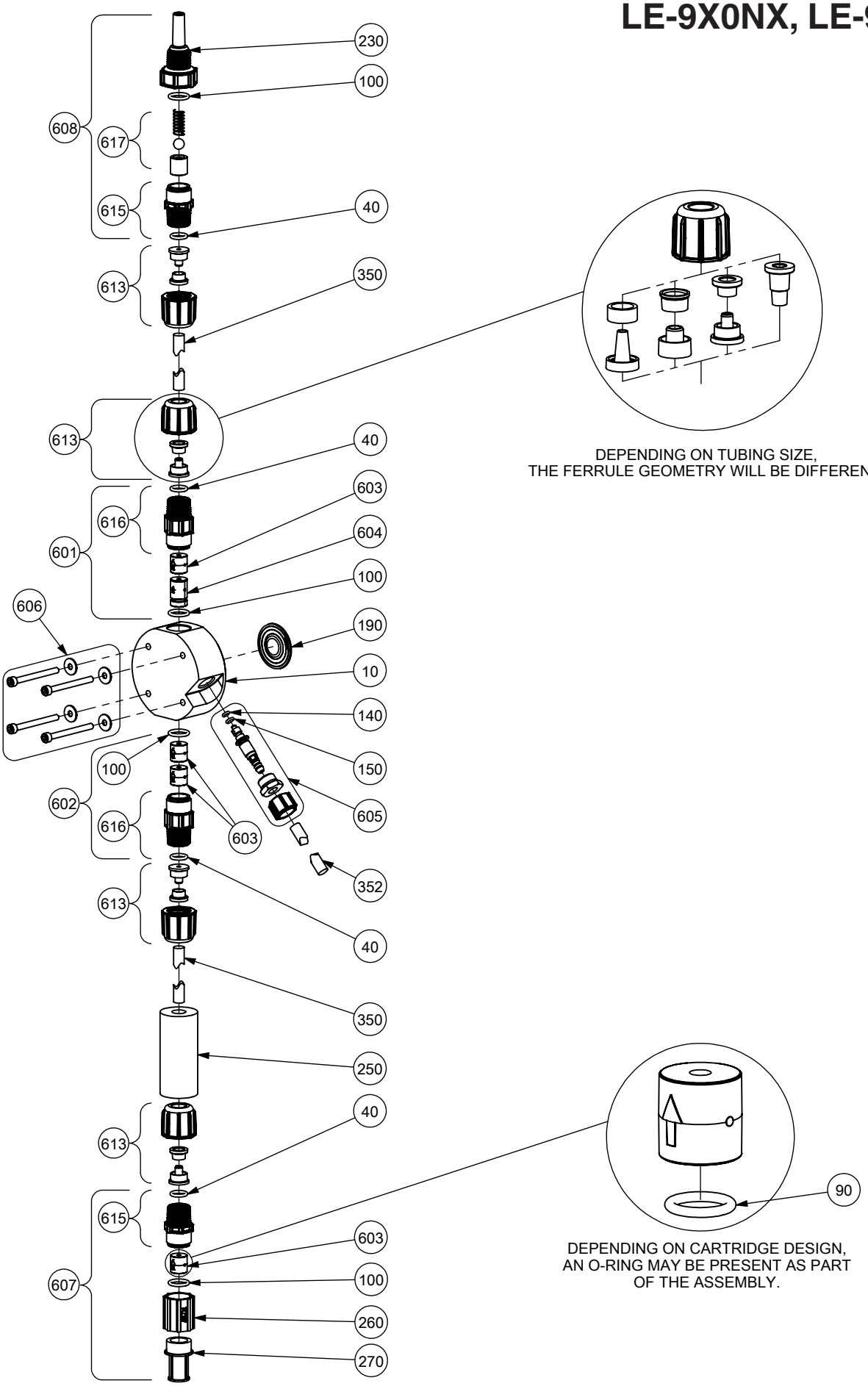
2012.A 12/2009

LE-9X0NX, LE-9X8NX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			910NX	920NX	930NX	940NX	918NX	928NX	938NX	948NX
10	Pump Head Machined FastPrime™	48214	1							
		48215					1			
		48218		1						
		48219						1		
		48222			1					
		48223							1	
		48226				1				
		48227								1
40	Tube Connect O-Ring	48349	4	4	4	4	4	4	4	4
90	O-Ring	39413	5	5	5	5	5	5	5	5
100	Cartridge Valve O-Ring	36103	4	4	4	4	4	4	4	4
140	FastPrime™ Valve Gasket	48590	1	1	1	1	1	1	1	1
150	FastPrime™ Valve O-Ring	48347	1	1	1	1	1	1	1	1
190	Liquifram™	48186	1				1			
		48187		1				1		
		48188			1				1	
		48189				1				1
230	Injection Check Valve Body	48617	1	1	1	1	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **9XXNI ONLY**	25636-16	1	1*			1	1*		
		10342-16		1#	1	1		1#	1	1
	Tubing, Suction & Discharge **9XXNU ONLY**	28636-16	1	1*			1	1*		
		27342-16		1#	1	1		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1	1	1	1	1
601	FastPrime™ Discharge Check Valve	48669	1				1			
		48672		1	1	1		1	1	1
602	Suction Check Valve	48681	1				1			
		48684		1	1	1		1	1	1
603	Cartridge Valve	48542	4				4			
		48543		4	4	4		4	4	4
604	FastPrime™ Cartridge Valve	48548	1				1			
		48549		1	1	1		1	1	1
605	FastPrime™ Valve	48848	1	1	1	1	1	1	1	1
606	Liquid End Hardware	48702	1	1	1	1	1	1	1	1
607	Foot Valve	48718	1				1			
		48721		1	1	1		1	1	1
608	Injection Valve	48728	1	1	1	1	1	1	1	1
613	Tubing Connection Kit **9XXNI and 9XXNU**	77382	4	4*			4	4*		
		77383		4#	4	4		4#	4	4
	Tubing Connection Kit **9XXNM ONLY**	77378	4	4*			4	4*		
		77379		4#	4	4		4#	4	4
615	Single Ball Check Valve Fitting	48787	2	2	2	2	2	2	2	2
616	Double Ball Check Valve Fitting	48791	2	2	2	2	2	2	2	2
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1

ROYTRONIC® Series A pumps
* ROYTRONIC EXCEL™ Series A+ pumps

LE-9X0NX, LE-9X8NX



D. PRIMING FOR FastPrime™ LIQUID ENDS

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the discharge valve and discharge cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and discharge valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. DEPRESSURIZING THE DISCHARGE LINE AND PUMP HEAD

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1, 2 and 3 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.
2. **Line Depressurization:**
   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a ROYTRONIC® 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.
3. **Pump Head Depressurization:**
   Be sure your relief tubing is connected to your FastPrime™ valve and runs back to your solution drum or tank.
   Turn the FastPrime™ knob one-and-a-half turns counter-clockwise ↺. The Pump Head is now depressurized. Keep the valve open until solution drains into the solution drum or tank. Then turn the FastPrime™ knob clockwise ↻ to tighten the knob to a closed position.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

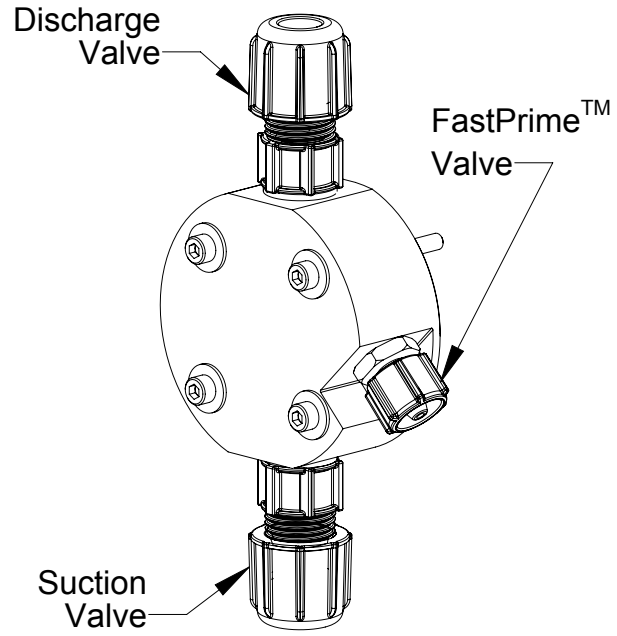


FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-9X0SX, LE-9X8SX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

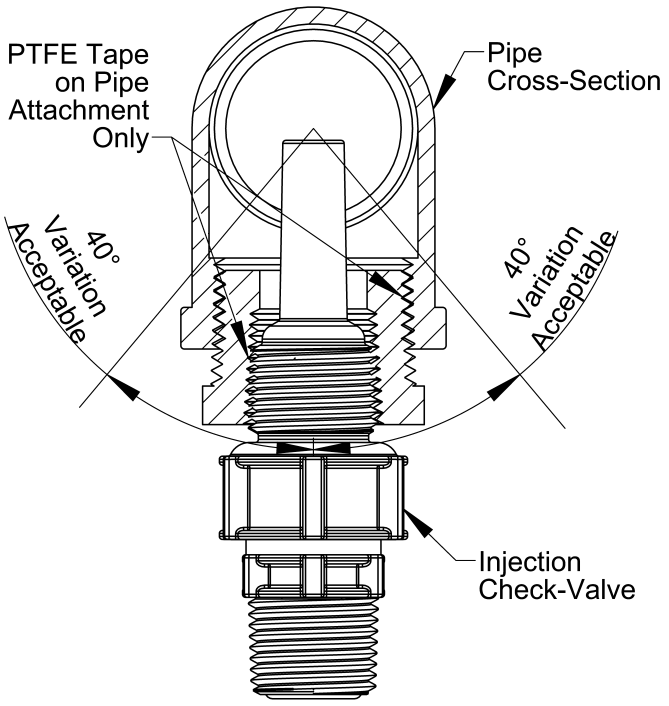


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

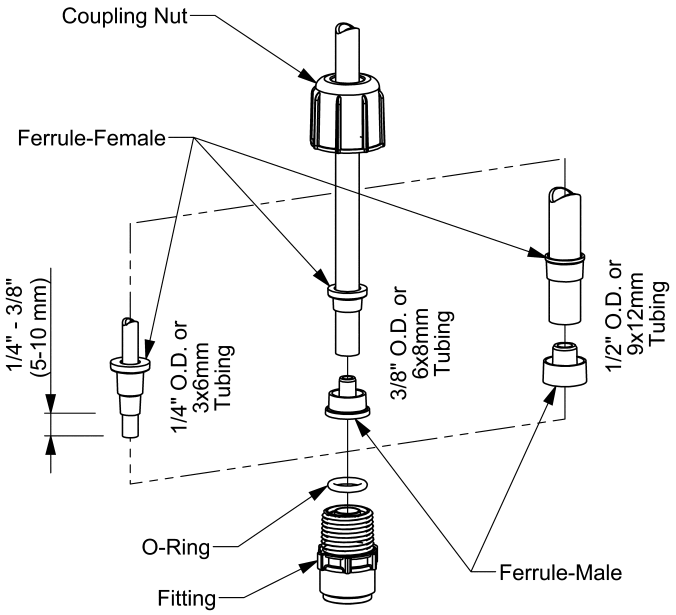


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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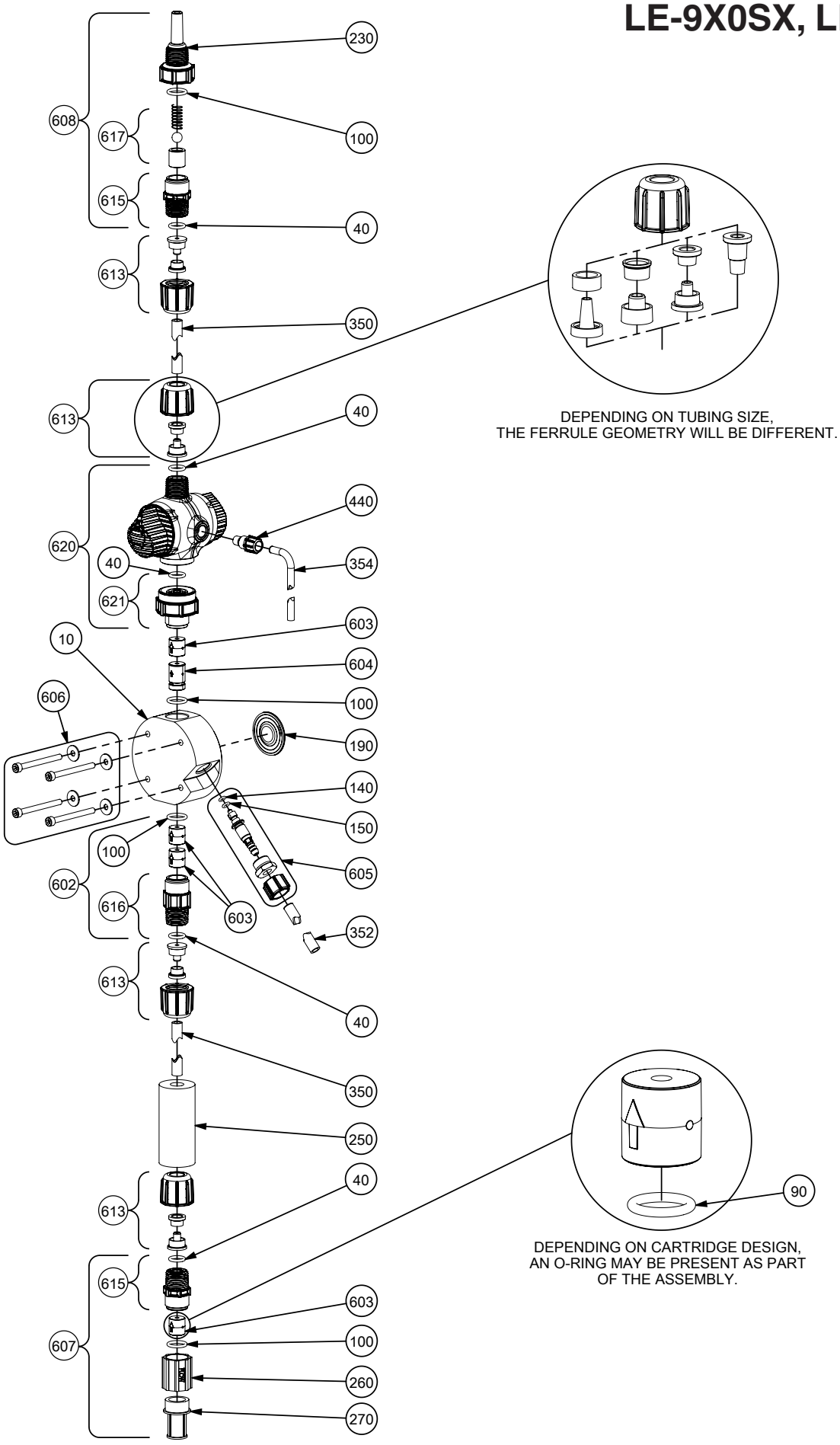
2011.A 12/2009

LE-9X0SX, LE-9X8SX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			910SX	920SX	930SX	940SX	918SX	928SX	938SX	948SX
10	Pump Head Machined FastPrime™	48214	1							
		48215					1			
		48218		1						
		48219						1		
		48222			1					
		48223							1	
		48226				1				
		48227								1
40	Tube Connect O-Ring	48349	5	5	5	5	5	5	5	5
90	O-Ring	39413	5	5	5	5	5	5	5	5
100	Cartridge Valve O-Ring	36103	4	4	4	4	4	4	4	4
140	FastPrime™ Valve Gasket	48590	1	1	1	1	1	1	1	1
150	FastPrime™ Valve O-Ring	48347	1	1	1	1	1	1	1	1
190	Liquifram™	48186	1				1			
		48187		1				1		
		48188			1				1	
		48189				1				1
230	Injection Check Valve Body	48617	1	1	1	1	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **9XXSI ONLY**	25636-16	1	1*			1	1*		
		10342-16		1#	1	1		1#	1	1
	Tubing, Suction & Discharge **9XXSU ONLY**	28636-16	1	1*			1	1*		
		27342-16		1#	1	1		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1	1	1	1	1
354	Tubing, 4FV	25636-06	1	1	1	1	1	1	1	1
440	Bleed Nut	48622	1	1	1	1	1	1	1	1
602	Suction Check Valve	48681	1				1			
		48684		1	1	1		1	1	1
603	Cartridge Valve	48542	4				4			
		48543		4	4	4		4	4	4
604	FastPrime™ Cartridge Valve	48548	1				1			
		48549		1	1	1		1	1	1
605	FastPrime™ Valve	48848	1	1	1	1	1	1	1	1
606	Liquid End Hardware	48702	1	1	1	1	1	1	1	1
607	Foot Valve	48718	1				1			
		48721		1	1	1		1	1	1
608	Injection Valve	48728	1	1	1	1	1	1	1	1
613	Tubing Connection Kit **9XXSI and 9XXSU**	77382	4	4*			4	4*		
		77383		4#	4	4		4#	4	4
	Tubing Connection Kit **9XXSM ONLY**	77378	4	4*			4	4*		
		77379		4#	4	4		4#	4	4
615	Single Ball Check Valve Fitting	48787	2	2	2	2	2	2	2	2
616	Double Ball Check Valve Fitting	48791	1	1	1	1	1	1	1	1
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1
620	4FV Assembly	48798	1	1*			1	1*		
		48753		1#	1	1		1#	1	1
621	4FV Fitting Assembly	49254	1	1	1	1	1	1	1	1

ROYTRONIC® Series A pumps
* ROYTRONIC EXCEL™ Series A+ pumps

LE-9X0SX, LE-9X8SX



D. PRIMING WITH ROYTRONIC® 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. PRIMING WITH FastPrime™ VALVE

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

F. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

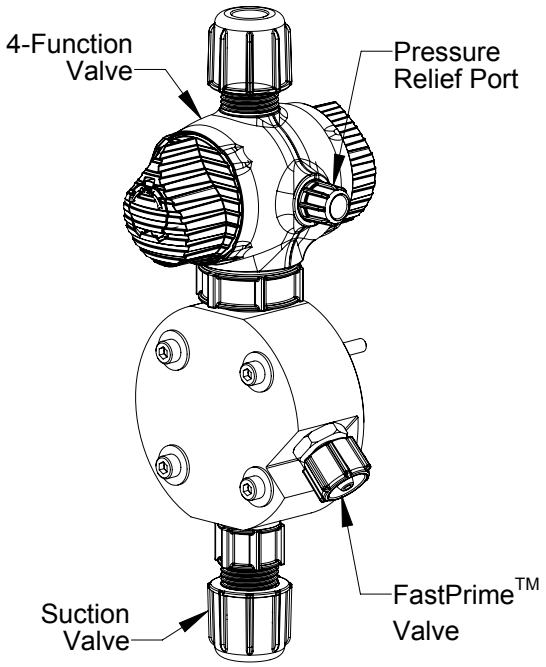


FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-9X5NX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

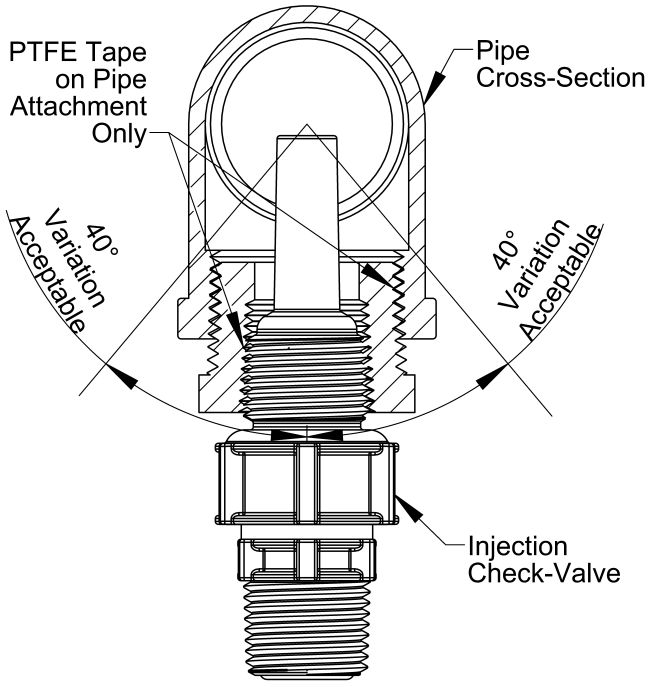


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

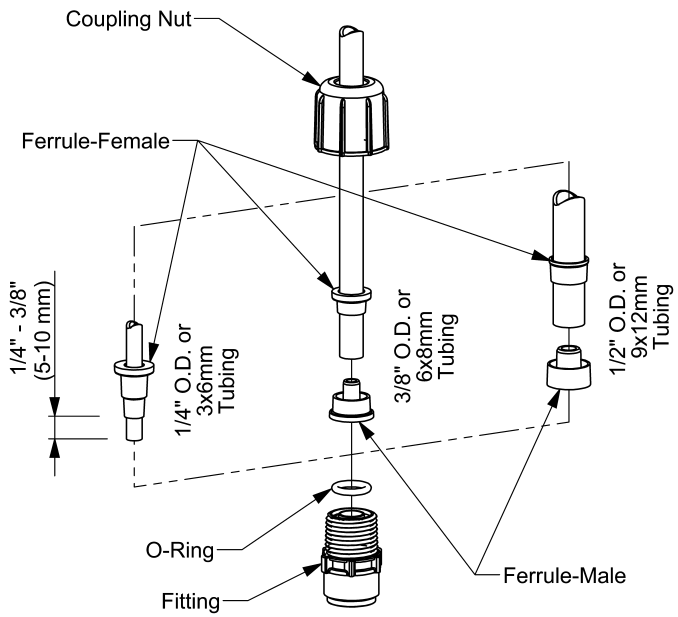


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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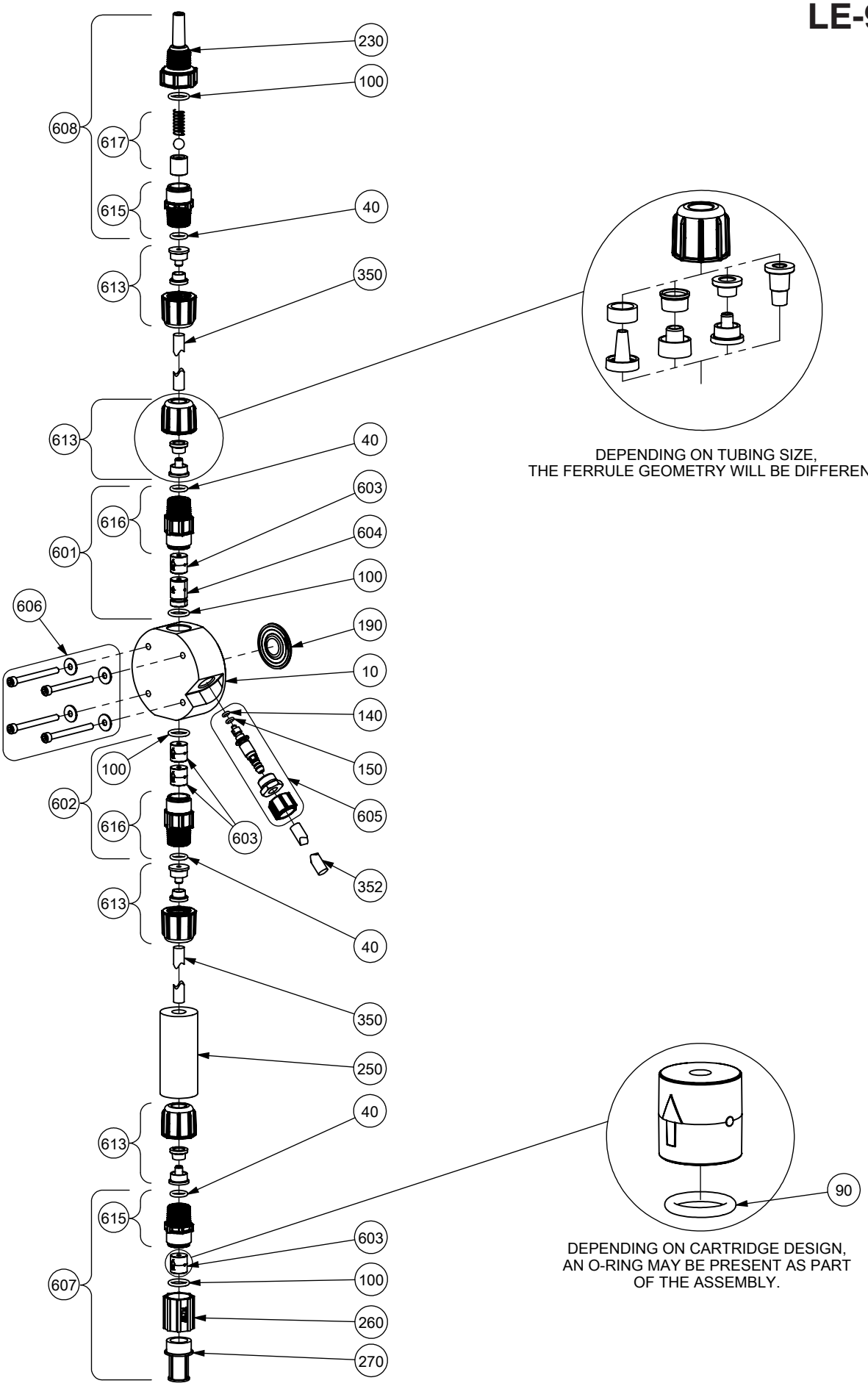
2008.A 12/2009

LE-9X5NX

Key Number	Description	Part Number	QUANTITY			
			915NX	925NX	935NX	945NX
10	Pump Head Machined FastPrime™	48216	1			
		48220		1		
		48224			1	
		48228				1
40	O-Ring	48591	4	4	4	4
90	O-Ring	39413	5	5	5	5
100	O-Ring	48589	4	4	4	4
140	O-Ring	48590	1	1	1	1
150	O-Ring	48347	1	1	1	1
190	Liquifram™ Size Code	48186	1			
		48187		1		
		48188			1	
		48189				1
230	Injection Check Valve Body	48619	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge **9XXNI ONLY**	25636-16	1	1*		
		10342-16		1#	1	1
	Tubing, Suction & Discharge **9XXNU ONLY**	28636-16	1	1*		
		27342-16		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1
601	FastPrime™ Discharge Check Valve	48670	1			
		48673		1	1	1
602	Suction Check Valve	48682	1			
		48685		1	1	1
603	Cartridge Valve	48545	4			
		48546		4	4	4
604	FastPrime™ Cartridge Valve	48551	1			
		48552		1	1	1
605	FastPrime™ Valve	48701	1	1	1	1
606	Liquid End Hardware	48702	1	1	1	1
607	Foot Valve	48726	1			
		48727		1	1	1
608	Injection Valve	48729	1	1	1	1
613	Tubing Connection Kit **9XXNI and 9XXNU**	77382	4	4*		
		77383		4#	4	4
	Tubing Connection Kit **9XXNM ONLY**	77378	4	4*		
		77379		4#	4	4
615	Single Ball Check Valve Fitting	48790	2	2	2	2
616	Double Ball Check Valve Fitting	48794	2	2	2	2
617	Injection Valve Cartridge	48795	1	1	1	1

ROYTRONIC® Series A pumps
* ROYTRONIC EXCEL™ Series A+ pumps

LE-9X5NX



DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.

DEPENDING ON CARTRIDGE DESIGN,
AN O-RING MAY BE PRESENT AS PART
OF THE ASSEMBLY.

D. PRIMING FOR FastPrime™ LIQUID ENDS

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

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E. DEPRESSURIZING THE DISCHARGE LINE AND PUMP HEAD

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   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a ROYTRONIC® 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.
3. **Pump Head Depressurization:**
   Be sure your relief tubing is connected to your FastPrime™ valve and runs back to your solution drum or tank.
   Turn the FastPrime™ knob one-and-a-half turns counter-clockwise ↺. The Pump Head is now depressurized. Keep the valve open until solution drains into the solution drum or tank. Then turn the FastPrime™ knob clockwise ↻ to tighten the knob to a closed position.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

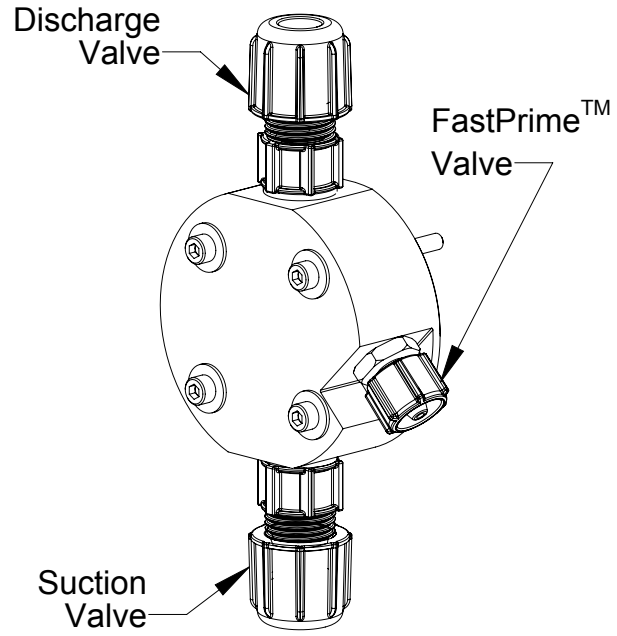

FIGURE 3

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Liquid End Sheet

LE-9X5SX

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3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

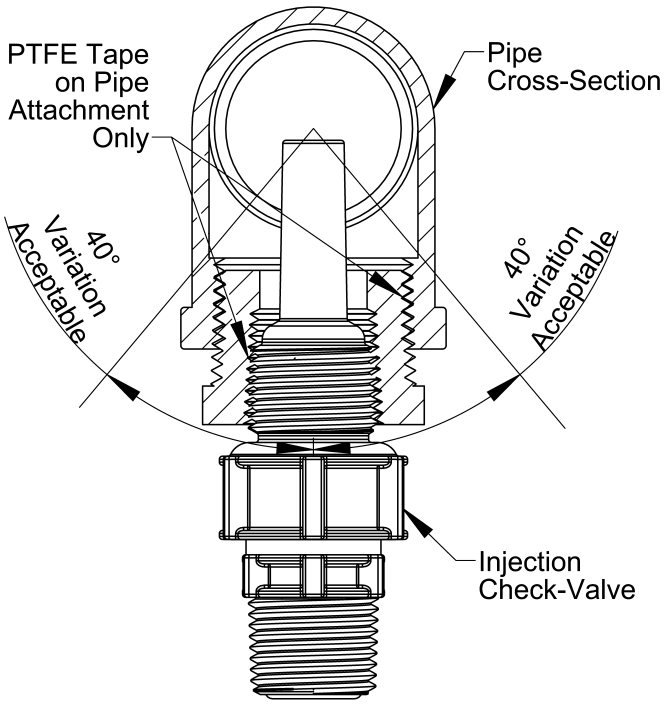

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

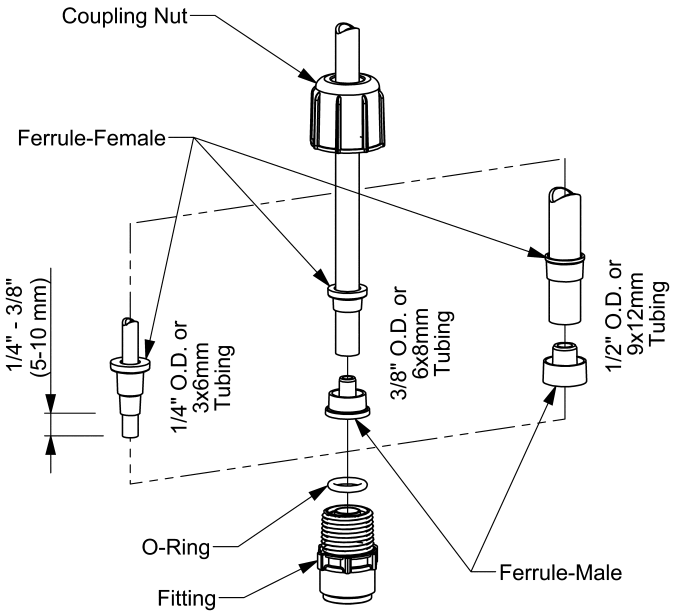

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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Key Number	Description	Part Number	QUANTITY			
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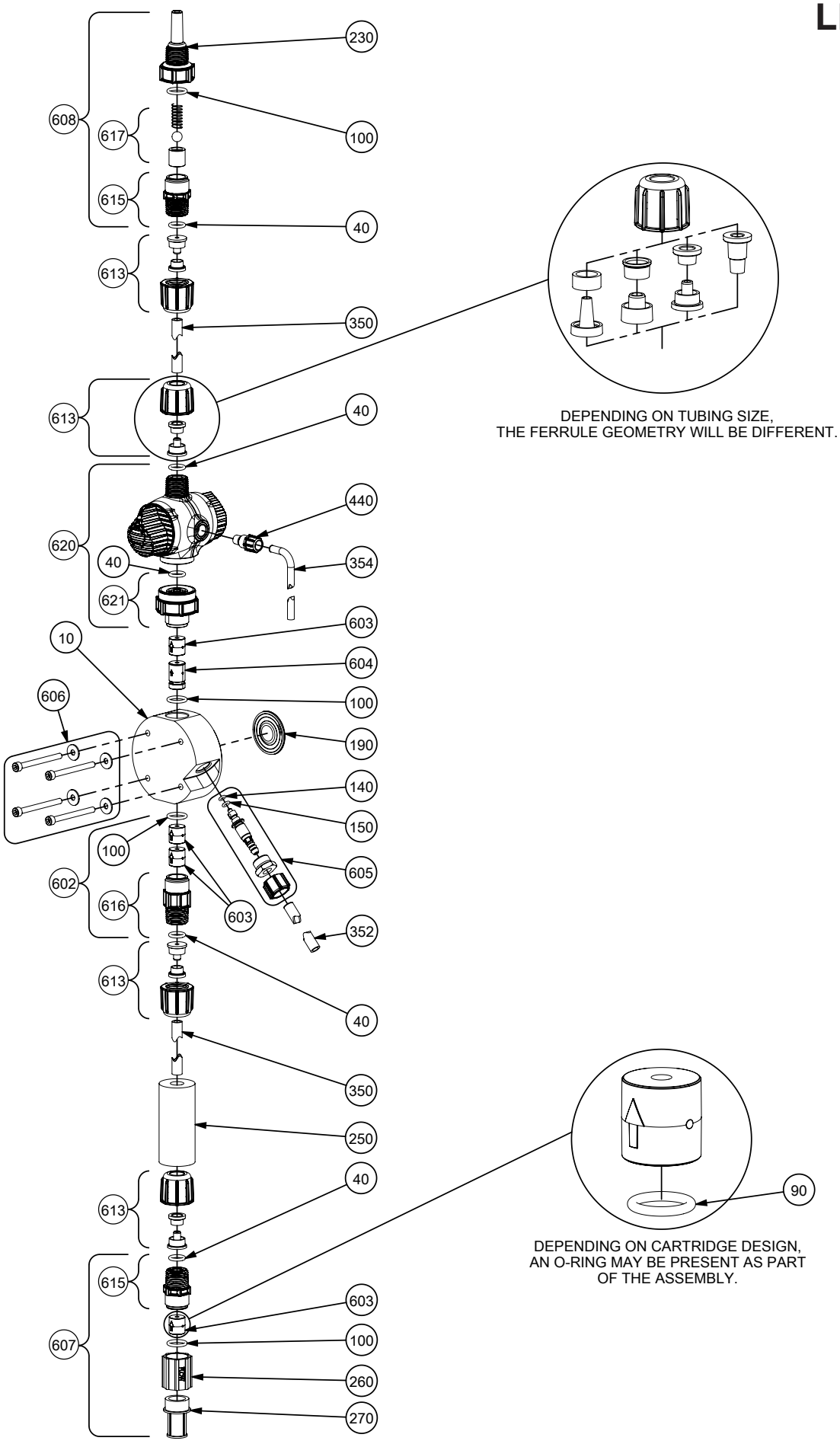
		48220		1		
		48224			1	
		48228				1
40	O-Ring	48591	5	5	5	5
90	O-Ring	39413	5	5	5	5
100	O-Ring	48589	4	4	4	4
140	O-Ring	48590	1	1	1	1
150	O-Ring	48347	1	1	1	1
190	Liquifram™ Size Code	48186	1			
		48187		1		
		48188			1	
		48189				1
230	Injection Check Valve Body	48619	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge	25636-16	1	1*		
	9XXSI ONLY	10342-16		1#	1	1
	Tubing, Suction & Discharge	28636-16	1	1*		
	9XXSU ONLY	27342-16		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1
354	Tubing, 4FV	25636-06	1	1	1	1
440	Bleed Nut	48622	1	1	1	1
602	Suction Check Valve	48682	1			
		48685		1	1	1
603	Cartridge Valve	48545	4			
		48546		4	4	4
604	FastPrime™ Cartridge Valve	48551	1			
		48552		1	1	1
605	FastPrime™ Valve	48701	1	1	1	1
606	Liquid End Hardware	48702	1	1	1	1
607	Foot Valve	48726	1			
		48727		1	1	1
608	Injection Valve	48729	1	1	1	1
613	Tubing Connection Kit	77382	4	4*		
	9XXSI and 9XXSU	77383		4#	4	4
	Tubing Connection Kit	77378	4	4*		
	9XXSM ONLY	77379		4#	4	4
615	Single Ball Check Valve Fitting	48790	2	2	2	2
616	Double Ball Check Valve Fitting	48794	1	1	1	1
617	Injection Valve Cartridge	48795	1	1	1	1
620	4FV Assembly	48801	1	1*		
		48756		1#	1	1
621	4FV Fitting Assembly	49257	1	1	1	1

ROYTRONIC® Series A pumps
* ROYTRONIC EXCEL™ Series A+ pumps

LE-9X5SX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DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.
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DEPENDING ON CARTRIDGE DESIGN,
AN O-RING MAY BE PRESENT AS PART
OF THE ASSEMBLY.

D. PRIMING WITH ROYTRONIC® 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. PRIMING WITH FastPrime™ VALVE

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

F. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

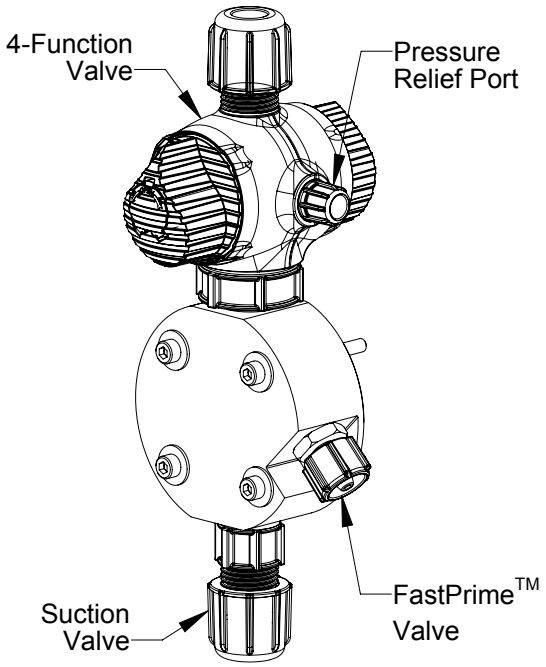

FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-9X7NP

When pumping solutions, make certain that all tubing and piping is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. A ¼˝ NPT female fitting with sufficient depth will accept the injection check valve.
3. PTFE tape must be used on tapered pipe threads so that there is a leak-proof seal.
4. To insure correct seating of the ball inside the injection check valve, the injection check valve should be positioned so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

B. CONNECTING DISCHARGE PIPE

NOTE: ***Corrosion resistant ¼˝ Schedule 80 or Schedule 120 pipe should be used. DO NOT USE SMALLER PIPE SIZES.***

1. The discharge valve has a ¼˝ NPT male outlet. A short ¼˝ NPT union should be connected to both discharge and suction valves so that the metering pump may be removed without disturbing the piping.
2. PTFE tape must be used on tapered pipe threads so that there is a leak-proof seal.
3. Do not use PTFE tape on the straight thread which connects the discharge fitting with the pump head.

NOTE: ***Excessive force will crack or distort fittings. DO NOT OVERTIGHTEN.***

C. CONNECTING SUCTION PIPE

1. Using the same size and material pipe as used on the discharge line, cut the suction pipe to length so that the foot valve is positioned just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5 m).
2. PTFE tape must be used on tapered pipe threads so that there is a leak-proof seal. Suction side leaks are invisible, but if present will cause pump to suck in air during each pump stroke.

D. PRIMING

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

1. Plug in or switch the pump on.
2. While the pump is running, set at 100% speed and 100% stroke length.
3. Turn the bleeder plug 1 to 2 turns counter-clockwise.
4. A small amount of solution will begin to discharge through the bleeder plug. Once this happens, turn the knob clockwise and snug tighten with a wrench. Shut the pump off.
5. The pump is now primed.

NOTE: ***Excessive force will crack or distort the bleeder plug. DO NOT OVERTIGHTEN.***

NOTE: ***The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:***

1. Remove the discharge valve and slowly pour water or solution into the pump head until it is filled. Replace discharge valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

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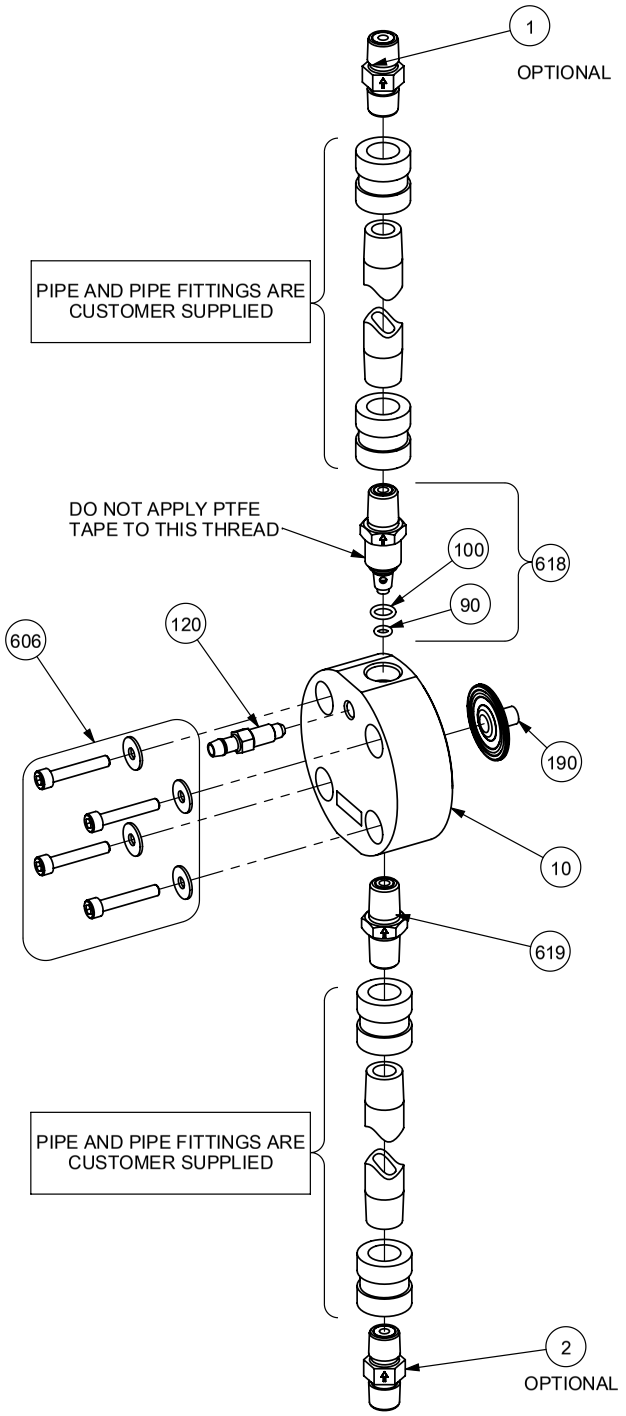
2019.A 12/2009

LE-9X7NP

Key Number	Description	Part Number	Quantity			
			917NP	927NP	937NP	947NP
1*	Injection Check Valve Asm.	32514	(1)	(1)	(1)	(1)
2*	Foot Valve Asm.	32515	(1)	(1)	(1)	(1)
10	Pump Head	48471	1			
		48472		1		
		48473			1	
		48474				1
90	O-ring	48966	1	1	1	1
100	O-ring	48760	1	1	1	1
120	Bleeder Plug	BV202139	1	1	1	1
190	Liquifram™	48186	1			
		48187		1		
		48188			1	
		48189				1
606	Liquid End Hardware	48703	1	1	1	1
618	Check Valve Asm, Discharge	48767	1	1	1	1
619	Check Valve Asm, Suction	48768	1	1	1	1

* Quantities shown in ( ) indicate optional valve assemblies not included with standard Liquid Handling Assemblies



Liquid End Sheet

LE-9X9NX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

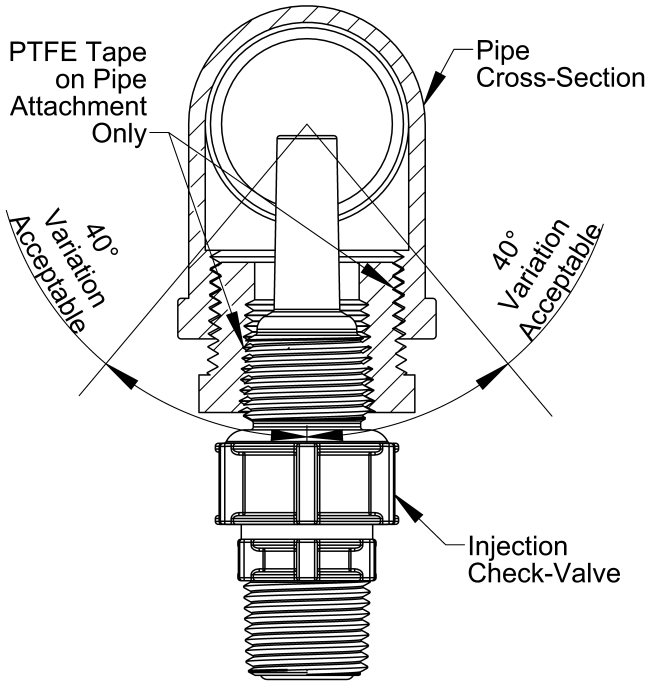


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

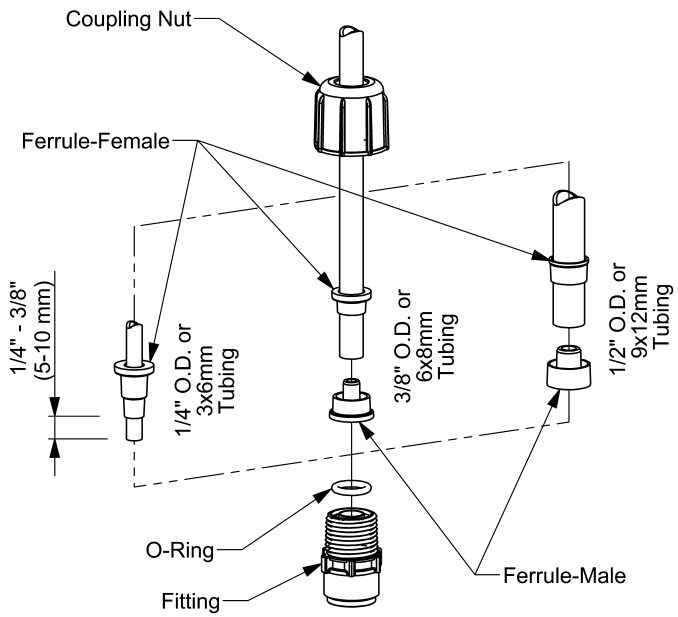


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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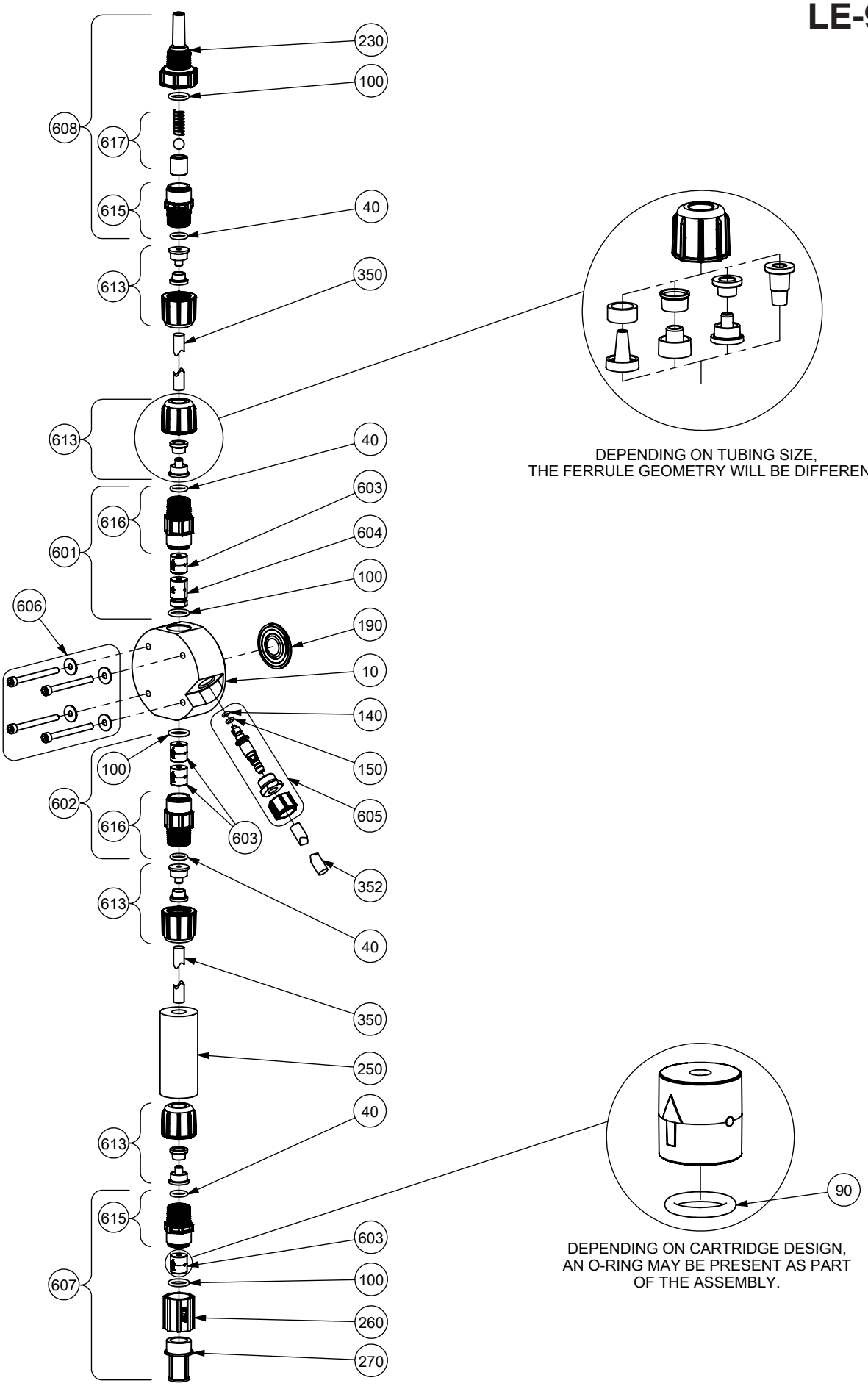
2010.A 12/2009

LE-9X9NX

Key Number	Description	Part Number	QUANTITY			
			919NX	929NX	939NX	949NX
10	Pump Head Machined FastPrime™	48214	1			
		48218		1		
		48222			1	
		48226				1
40	Tube Connect O-Ring	48349	4	4	4	4
90	O-Ring	39413	5	5	5	5
100	Cartridge Valve O-Ring	36103	4	4	4	4
140	FastPrime™ Valve Gasket	48590	1	1	1	1
150	FastPrime™ Valve O-Ring	48347	1	1	1	1
190	Liquifram™	48186	1			
		48187		1		
		48188			1	
		48189				1
230	Injection Check Valve Body	48618	1	1	1	1
250	Tubing Straightener	32293	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge **9XXNI ONLY**	25636-16	1	1*		
		10342-16		1#	1	1
	Tubing, Suction & Discharge **9XXNU ONLY**	28636-16	1	1*		
		27342-16		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1
601	FastPrime™ Discharge Check Valve	48671	1			
		48674		1	1	1
602	Suction Check Valve	48683	1			
		48686		1	1	1
603	Cartridge Valve	48691	4			
		48692		4	4	4
604	FastPrime™ Cartridge Valve	48697	1			
		48698		1	1	1
605	FastPrime™ Valve	48700	1	1	1	1
606	Liquid End Hardware	48702	1	1	1	1
607	Foot Valve	48719	1			
		48722		1	1	1
608	Injection Valve	48730	1	1	1	1
613	Tubing Connection Kit **9XXNI and 9XXNU**	77382	4	4*		
		77383		4#	4	4
	Tubing Connection Kit **9XXNM ONLY**	77378	4	4*		
		77379		4#	4	4
615	Single Ball Check Valve Fitting	48788	2	2	2	2
616	Double Ball Check Valve Fitting	48792	2	2	2	2
617	Injection Valve Cartridge	48796	1	1	1	1

ROYTRONIC® Series A pumps
* ROYTRONIC EXCEL™ Series A+ pumps

LE-9X9NX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DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.
90
DEPENDING ON CARTRIDGE DESIGN,
AN O-RING MAY BE PRESENT AS PART
OF THE ASSEMBLY.

D. PRIMING FOR FastPrime™ LIQUID ENDS

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the discharge valve and discharge cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and discharge valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. DEPRESSURIZING THE DISCHARGE LINE AND PUMP HEAD

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1, 2 and 3 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.
2. **Line Depressurization:**
   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a ROYTRONIC® 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.
3. **Pump Head Depressurization:**
   Be sure your relief tubing is connected to your FastPrime™ valve and runs back to your solution drum or tank.
   Turn the FastPrime™ knob one-and-a-half turns counter-clockwise ↺. The Pump Head is now depressurized. Keep the valve open until solution drains into the solution drum or tank. Then turn the FastPrime™ knob clockwise ↻ to tighten the knob to a closed position.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

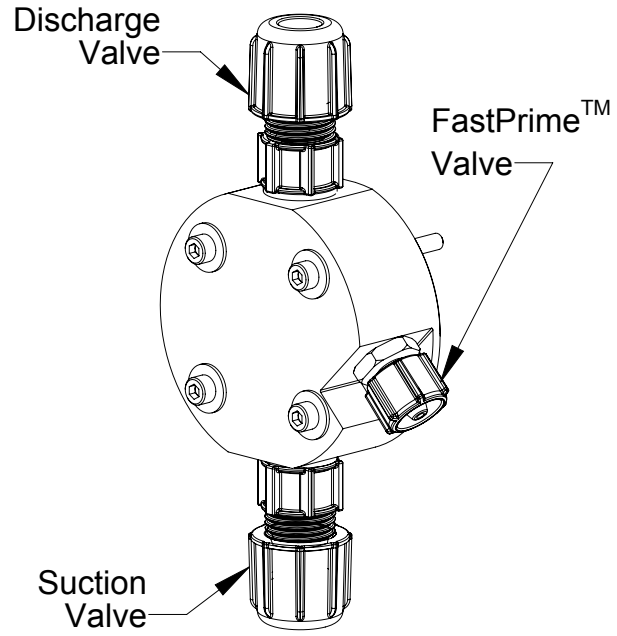

FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-9X9SX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

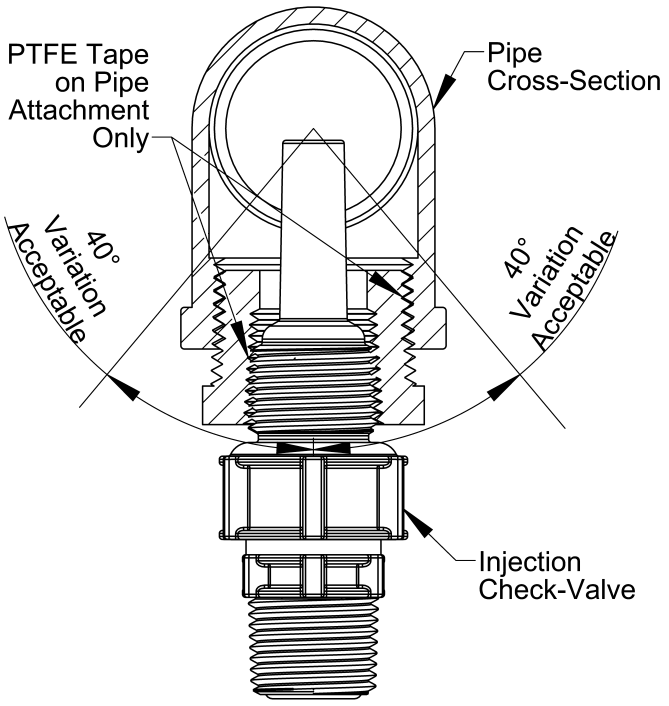

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

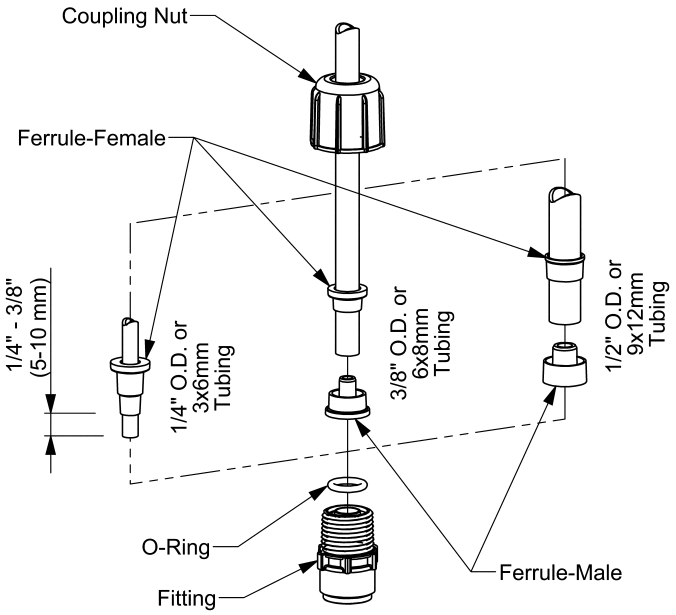

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP. ***The pressure created by the pump can rupture vinyl tubing, which is only for connection to the return line of the FastPrime™ fitting.***

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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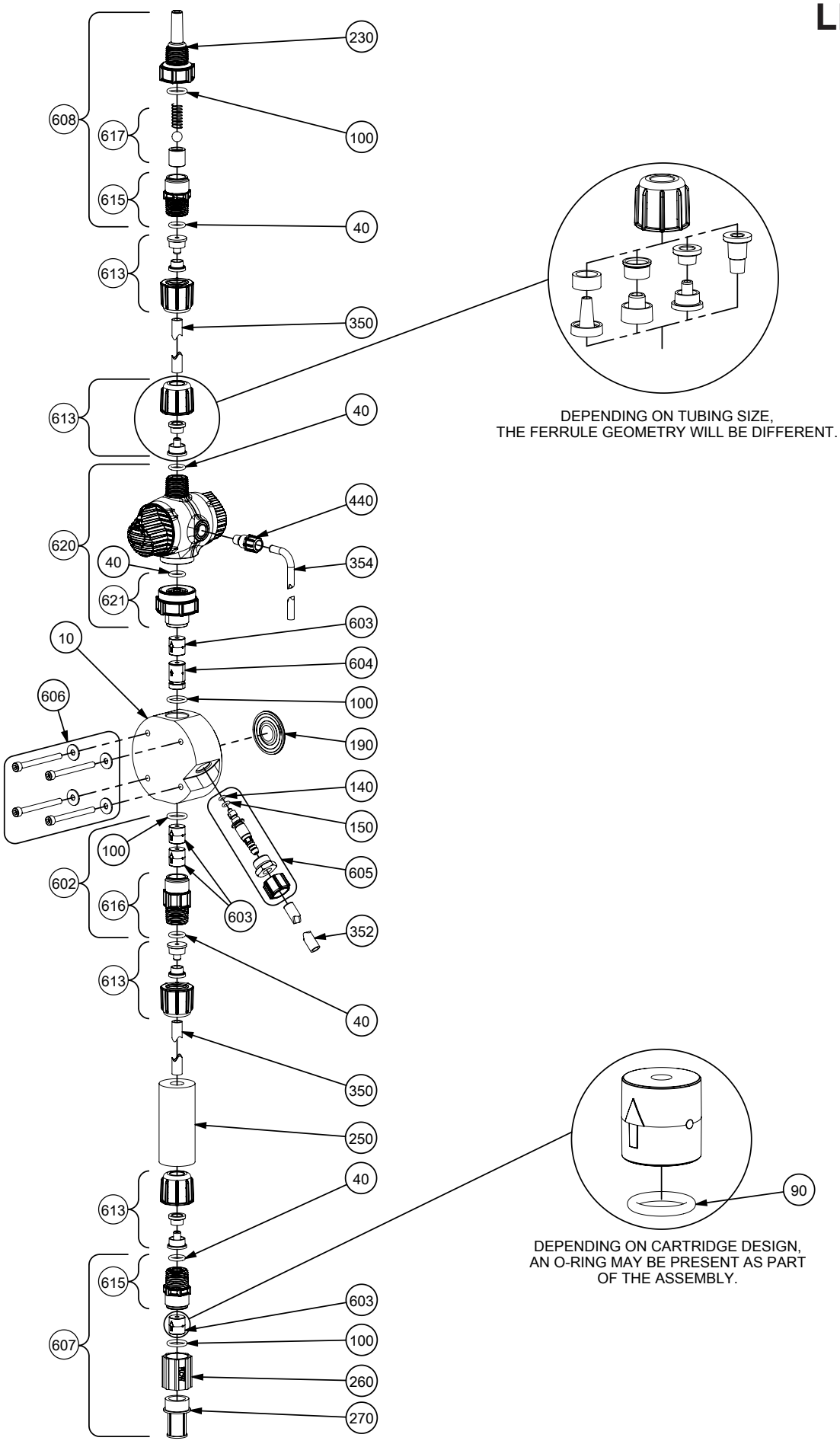
2009.A 12/2009

LE-9X9SX

Key Number	Description	Part Number	QUANTITY			
			919SX	929SX	939SX	949SX
10	Pump Head Machined FastPrime™	48214	1			
		48218		1		
		48222			1	
		48226				1
40	Tube Connect O-Ring	48349	5	5	5	5
90	O-Ring	39413	5	5	5	5
100	Cartridge Valve O-Ring	36103	4	4	4	4
140	FastPrime™ Valve Gasket	48590	1	1	1	1
150	FastPrime™ Valve O-Ring	48347	1	1	1	1
190	Liquifram™	48186	1			
		48187		1		
		48188			1	
		48189				1
230	Injection Check Valve Body	48618	1	1	1	1
250	Tubing Straightener	32293	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1
350	Tubing, Suction & Discharge	25636-16	1	1*		
	9XXSI ONLY	10342-16		1#	1	1
	Tubing, Suction & Discharge	28636-16	1	1*		
	9XXSU ONLY	27342-16		1#	1	1
352	Tubing, FastPrime™	10469-06	1	1	1	1
354	Tubing, 4FV	25636-06	1	1	1	1
440	Bleed Nut	48622	1	1	1	1
602	Suction Check Valve	48683	1			
		48686		1	1	1
603	Cartridge Valve	48691	4			
		48692		4	4	4
604	FastPrime™ Cartridge Valve	48697	1			
		48698		1	1	1
605	FastPrime™ Valve	48700	1	1	1	1
606	Liquid End Hardware	48702	1	1	1	1
607	Foot Valve	48719	1			
		48722		1	1	1
608	Injection Valve	48730	1	1	1	1
613	Tubing Connection Kit	77382	4	4*		
	9XXSI and 9XXSU	77383		4#	4	4
	Tubing Connection Kit	77378	4	4*		
	9XXSM ONLY	77379		4#	4	4
615	Single Ball Check Valve Fitting	48788	2	2	2	2
616	Double Ball Check Valve Fitting	48792	1	1	1	1
617	Injection Valve Cartridge	48796	1	1	1	1
620	4FV Assembly	48799	1	1*		
		48754		1#	1	1
621	4FV Fitting Assembly	49255	1	1	1	1

ROYTRONIC® Series A pumps
* ROYTRONIC EXCEL™ Series A+ pumps

LE-9X9SX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DEPENDING ON TUBING SIZE,
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90
DEPENDING ON CARTRIDGE DESIGN,
AN O-RING MAY BE PRESENT AS PART
OF THE ASSEMBLY.

D. PRIMING WITH ROYTRONIC® 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.
3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.
4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the 4-function valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and 4-function valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

E. PRIMING WITH FastPrime™ VALVE

1. Connect the ⅜" outer diameter clear vinyl tubing provided with the pump to the FastPrime™ Valve barbed nozzle (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Plug in or switch the pump on.
3. While the pump is running, set at 100% speed and 100% stroke length.
4. Turn The FastPrime™ knob 1 to 2 turns counter-clockwise ↺.
5. The suction tubing should begin to fill with solution from the tank.
6. A small amount of solution will begin to discharge out the return line of the FastPrime™ valve. Once this happens, turn the knob clockwise ↻ until hand tight and **SHUT THE PUMP OFF.**
7. The pump is now primed.

F. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

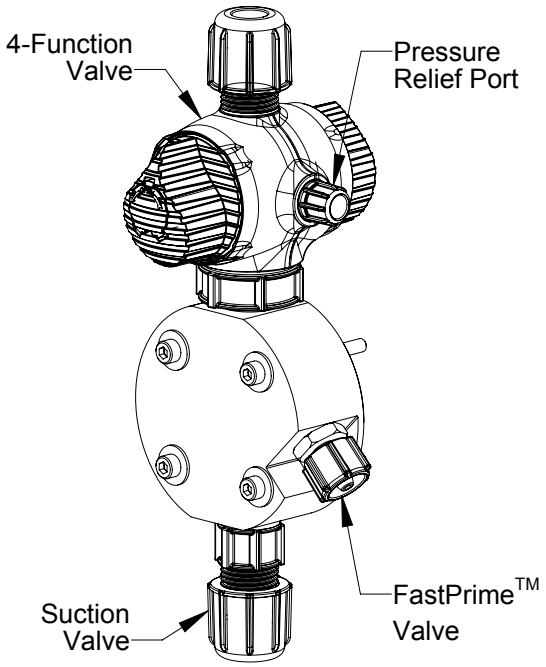

FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-DX0AX, DX8AX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

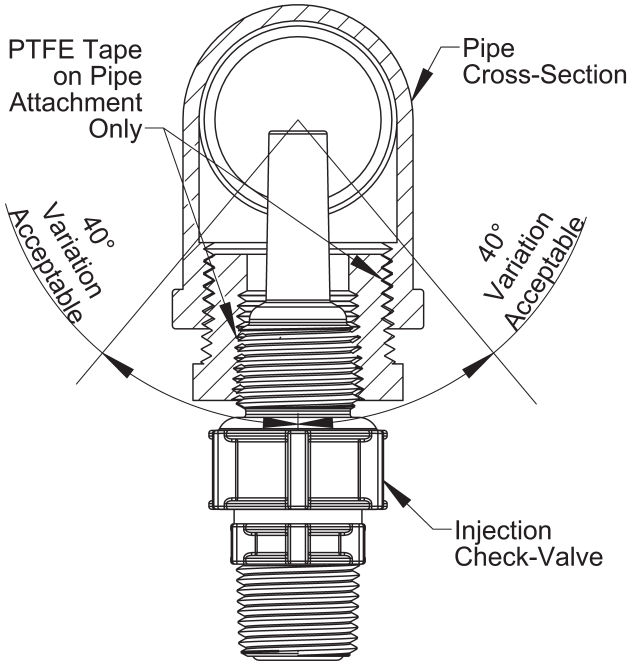

FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Please note: The chemical discharges through the discharge valve which is mounted to the front of the AUTOPRIME™ liquid end, as seen in Figure 3.

Note: *Cut tubing to length needed for discharge line.*

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

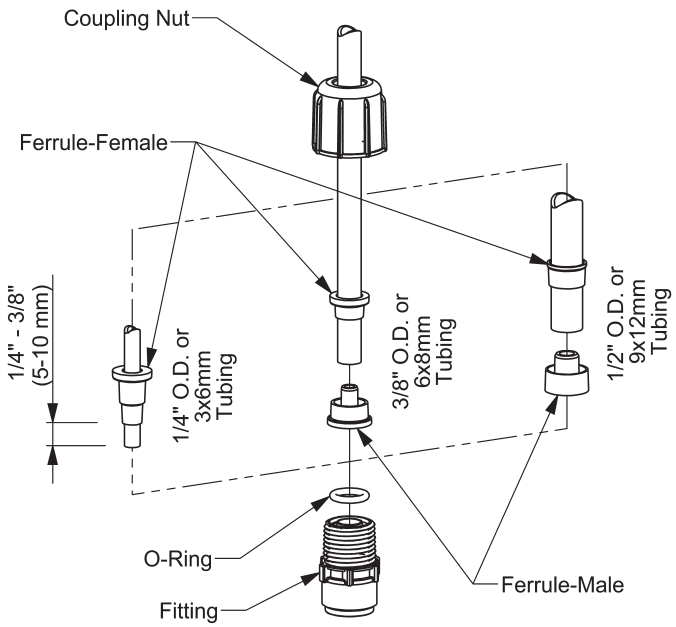

FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP.

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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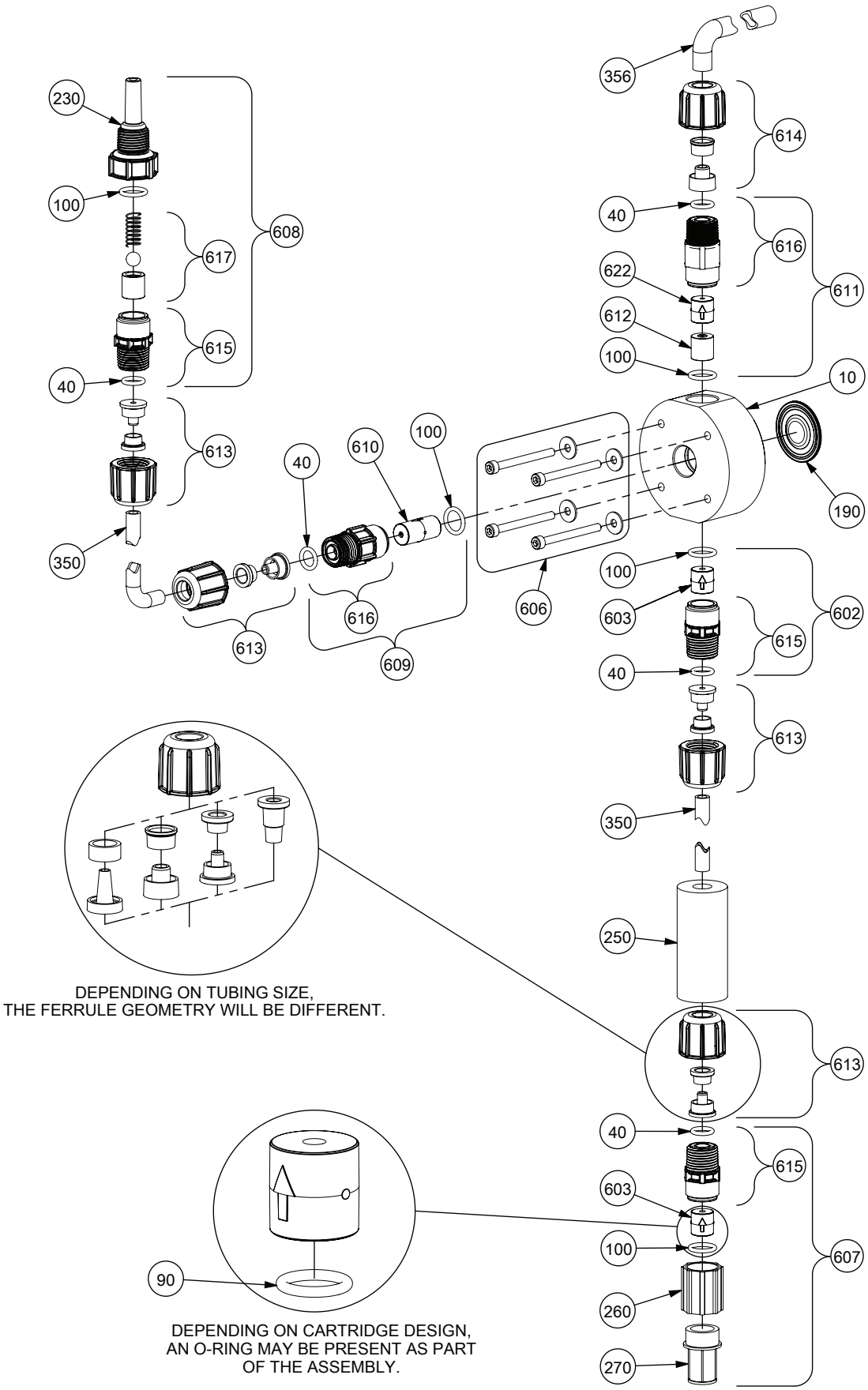
2020.D 9/2012

LE - DX0AX, DX8AX

Key Number	Description	Part Number	QUANTITY							
			D10AX	D50AX	D60AX	D90AX	D18AX	D58AX	D68AX	D98AX
10	Pump Head AutoPrime™	48743		1						
		48746						1		
		48744				1				
		48747								1
		48745			1					
		48748							1	
		50529	1							
		50530					1			
40	O-Ring	48349	5	5	5	5	5	5	5	5
90	O-Ring	39413	2	2	2	2	2	2	2	2
100	O-Ring	36103	5	5	5	5	5	5	5	5
190	Liquifram™	30916		1				1		
		30917				1				1
		31420			1				1	
		31419	1				1			
230	Injection Check Valve Body	48617	1	1	1	1	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **DXXAI ONLY**	25636-16		1				1		
		10342-16			1	1			1	1
		10142-16	1				1			
	Tubing, Suction & Discharge **DXXAU ONLY**	28636-16		1				1		
		27342-16			1	1			1	1
		27142-16	1				1			
356	Tubing, AutoPrime™	10142-10	1	1	1	1	1	1	1	1
602	Suction Check Valve	49087		1				1		
		49088	1		1	1	1		1	1
603	Cartridge Valve	37335		2				2		
		37338	2		2	2	2		2	2
606	Liquid End Hardware	49109		1	1	1		1	1	1
		49110	1				1			
607	Foot Valve	49099		1				1		
		49100	1		1	1	1		1	1
608	Injection Valve	48728	1	1	1	1	1	1	1	1
609	AutoPrime™ Disch. Check Valve	48705		1				1		
		49098	1		1	1	1		1	1
610	AutoPrime™ Disch. Cartridge Valve	48707		1				1		
		49097	1		1	1	1		1	1
611	AutoPrime™ Shuttle Valve	48708	1	1	1	1	1	1	1	1
612	AutoPrime™ Cartridge Valve	48709	1	1	1	1	1	1	1	1
613	Tubing Connection Kit **DXXAI and DXXAU**	77382		4				4		
		77383			4	4			4	4
		77384	4				4			
	Tubing Connection Kit **DXXAM ONLY**	77378		4				4		
		77379			4	4			4	4
		77380	4				4			
614	Tubing Connection Kit **DXXAI and DXXAU**	77384	1	1	1	1	1	1	1	1
	Tubing Connection Kit **DXXAM ONLY**	77380	1	1	1	1	1	1	1	1
615	Single Ball Check Valve Fitting	48787	3	3	3	3	3	3	3	3
616	Double Ball Check Valve Fitting	48791	2	2	2	2	2	2	2	2
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1
622	Cartridge Valve	48543	1	1	1	1	1	1	1	1

LE-DX0AX, DX8AX



D. CONNECTING AUTOPRIME™ TUBING

1. Using ½" O.D. polyethylene tubing, cut AUTOPRIME™ tubing to length so that it returns to the solution tank. This tubing must not be submerged in the solution.
2. Follow the same procedure in connecting AUTOPRIME™ tubing to the AUTOPRIME™ valve (*see* **B. Connecting Discharge Tubing**).

E. PRIMING FOR AUTOPRIME™ LIQUID ENDS

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

1. Plug in or switch the pump on.
2. While the pump is running, set at 100% speed and 100% stroke length.
3. The suction tubing should begin to fill with solution from the tank.
4. The pump is now primed.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the AUTOPRIME™ valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and AUTOPRIME™ valve and repeat steps above.
2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

F. DEPRESSURIZING THE DISCHARGE LINE AND PUMP HEAD

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Read steps 1 and 2 below before proceeding.

1. Be sure the Injection Check Valve is properly installed and is operating. If a shut off valve has been installed downstream of the Injection Valve, it should be closed.
2. **Line Depressurization:**
   To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability. Installing a ROYTRONIC® 4-Function Valve is one way to include this capability. Refer to the operating instructions of the valve or device.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

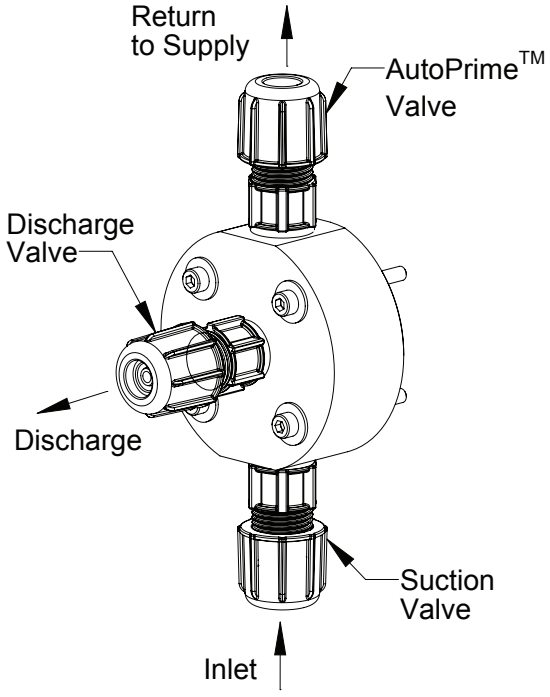


FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-DX0HX, DX8HX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

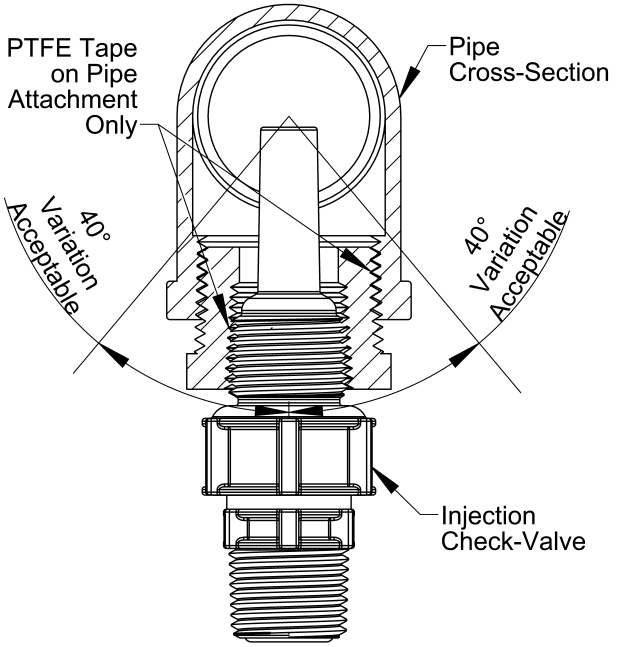


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Please note: The chemical discharges through the ROYTRONIC® 4-function valve which is mounted to the front of the AUTOPRIME™ liquid end, as seen in Figure 3.

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

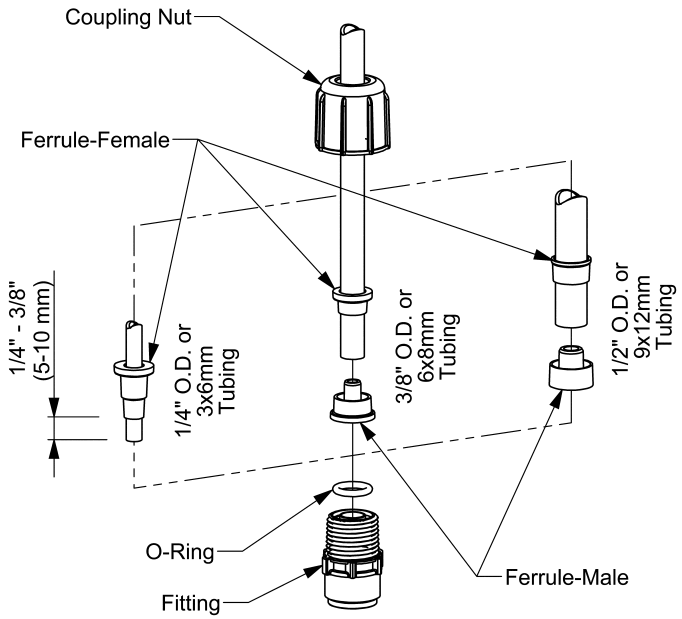


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP.

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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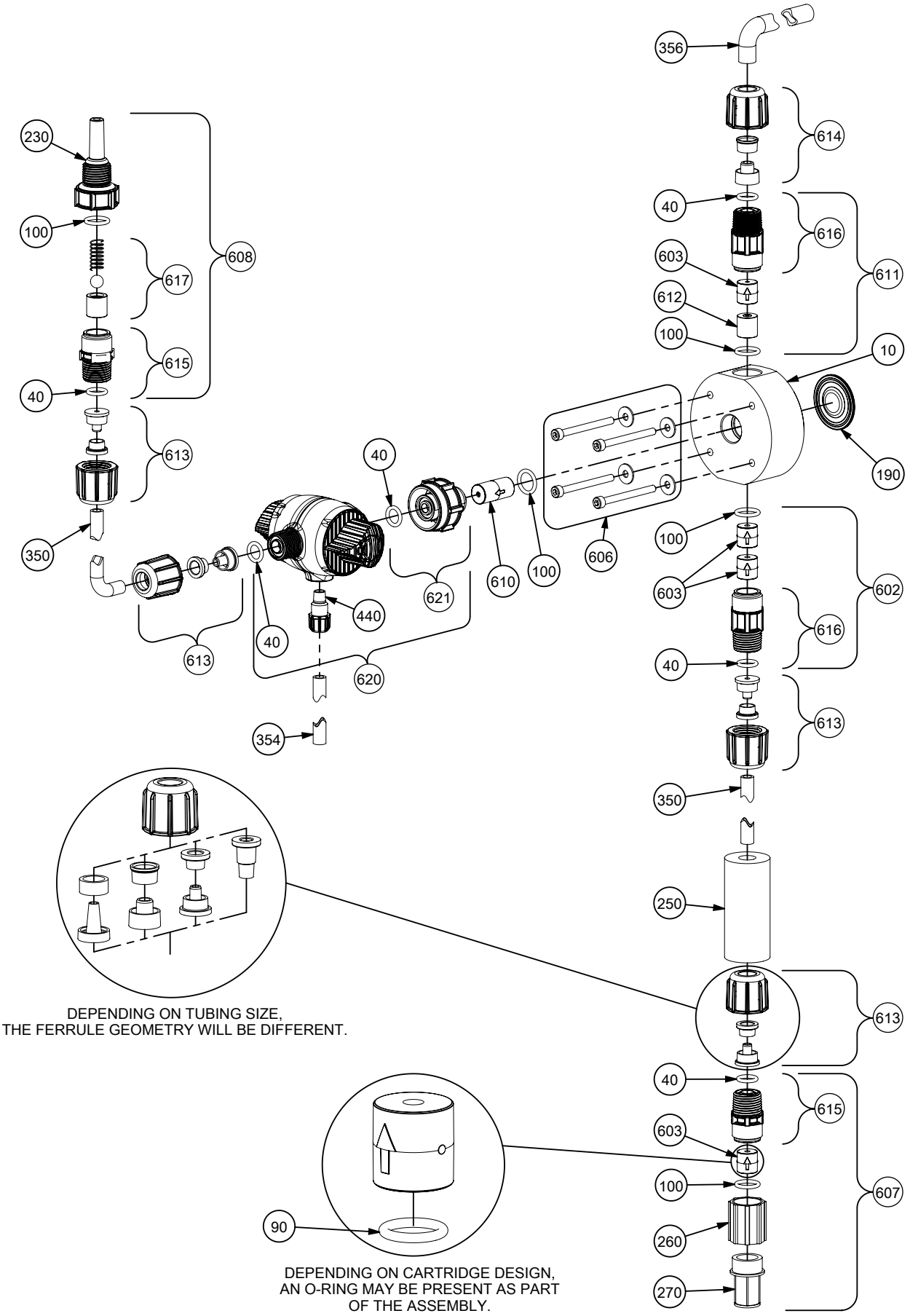
2021.A 12/2009

LE-DX0HX, DX8HX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			D50HX	D90HX	D60HX	D10HX	D58HX	D98HX	D68HX	D18HX
10	Pump Head AutoPrime™	48743	1							
		48746					1			
		48744		1						
		48747						1		
		48745			1					
		48748							1	
		50529				1				
		50530								1
40	O-Ring	48349	6	6	6	6	6	6	6	6
90	O-Ring	39413	6	6	6	6	6	6	6	6
100	O-Ring	36103	5	5	5	5	5	5	5	5
190	Liquifram™	30916	1				1			
		30917		1				1		
		31420			1				1	
		31419				1				1
230	Injection Check Valve Body	48617	1	1	1	1	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **DXXHI ONLY**	25636-16	1				1			
		10342-16		1	1			1	1	
		10142-16				1				1
	Tubing, Suction & Discharge **DXXHU ONLY**	28636-16	1				1			
		27342-16		1	1			1	1	
		27142-16				1				1
354	Tubing, 4FV	25636-06	1	1	1	1	1	1	1	1
356	Tubing, AutoPrime™	10142-10	1	1	1	1	1	1	1	1
440	Bleed Nut	48622	1	1	1	1	1	1	1	1
602	Suction Check Valve	49087	1				1			
		49088		1	1	1		1	1	1
603	Cartridge Valve	37335	4				4			
		37338		4	4	4		4	4	4
606	Liquid End Hardware	49109	1	1	1	1	1	1	1	1
607	Foot Valve	49099	1				1			
		49100		1	1	1		1	1	1
608	Injection Valve	48728	1	1	1	1	1	1	1	1
610	AutoPrime™ Disch. Cartridge Valve	48707	1				1			
		49097		1	1	1		1	1	1
611	AutoPrime™ Shuttle Valve	48708	1	1	1	1	1	1	1	1
612	AutoPrime™ Cartridge Valve	48709	1	1	1	1	1	1	1	1
613	Tubing Connection Kit **DXXHI and DXXHU**	77382	4				4			
		77383		4	4			4	4	
		77384				4				4
	Tubing Connection Kit **DXXHM ONLY**	77378	4				4			
		77379		4	4			4	4	
		77380				4				4
614	Tubing Connection Kit **DXXHI and DXXHU**	77384	1	1	1	1	1	1	1	1
	Tubing Connection Kit **DXXHM ONLY**	77380	1	1	1	1	1	1	1	1
615	Single Ball Check Valve Fitting	48787	2	2	2	2	2	2	2	2
616	Double Ball Check Valve Fitting	48791	2	2	2	2	2	2	2	2
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1
620	4FV Assembly	48798	1				1			
		48753		1	1	1		1	1	1
621	4FV Fitting Assembly	49254	1	1	1	1	1	1	1	1

LE-DX0HX, DX8HX



D. CONNECTING AUTOPRIME™ TUBING

1. Using 1/2" O.D. polyethylene tubing, cut AUTOPRIME™ tubing to length so that it returns to the solution tank. This tubing must not be submerged in the solution.

2. Follow the same procedure in connecting AUTOPRIME™ tubing to the AUTOPRIME™ valve (*see* **B. Connecting Discharge Tubing**).

E. PRIMING WITH ROYTRONIC® 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.

3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.

4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the AUTOPRIME™ valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and AUTOPRIME™ valve and repeat steps above.

2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

F. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

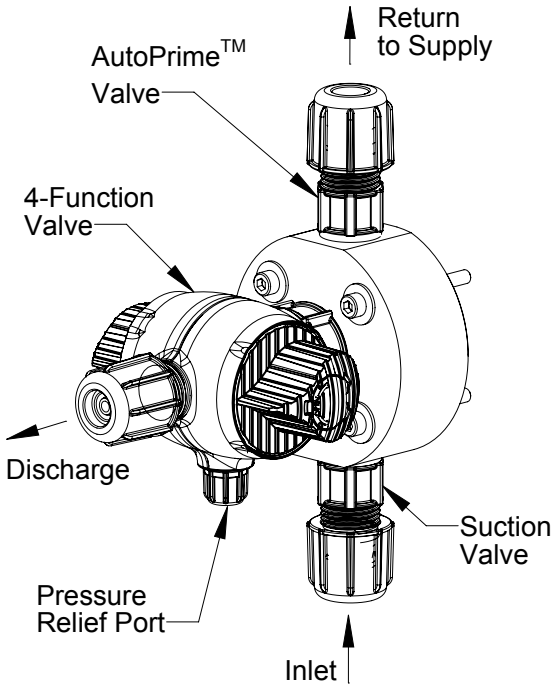


FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**

Liquid End Sheet

LE-DX0HX, DX8HX

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE (FIGURE 1)

1. The Injection Check Valve prevents backflow from a treated line. Install the injection check valve at the location where chemical is being injected into the system.
2. Any size Female NPT fitting or pipe tee with a reducing bushing to ½" Female NPT will accept the injection check valve. PTFE tape should only be used on threads that are connected with pipes.
3. When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations 40° left and right are acceptable.

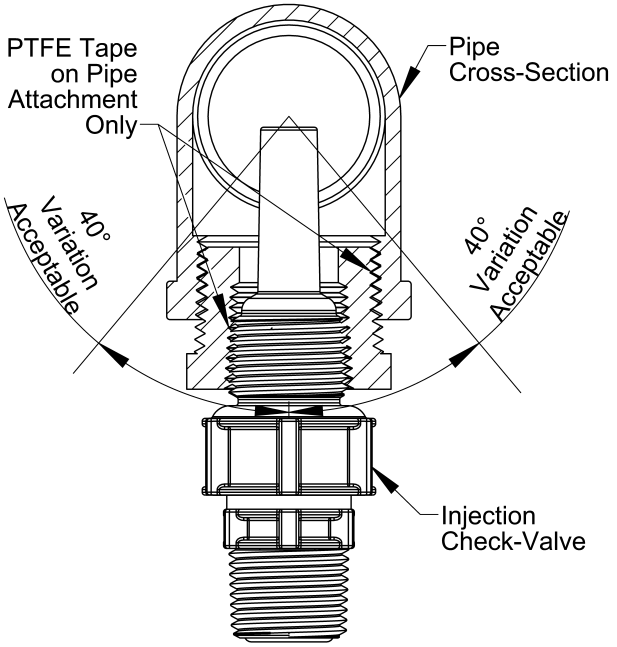


FIGURE 1

B. CONNECTING DISCHARGE TUBING (FIGURE 2)

Please note: The chemical discharges through the ROYTRONIC® 4-function valve which is mounted to the front of the AUTOPRIME™ liquid end, as seen in Figure 3.

Note: ***Cut tubing to length needed for discharge line.***

1. Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.
2. Put coupling nut over tubing.
3. Position female Ferrule about one inch (25 mm) from end of tubing.
4. For ¼" or 6 mm OD tubing, cut tubing so that ¼" to ⅜" (5-10 mm) protrudes from the female Ferrule. For all other tubing push the tube to the bottom of the groove in the male Ferrule. Then slide the female Ferrule down into the male Ferrule.
5. Firmly hand tighten the coupling nut onto the fitting.

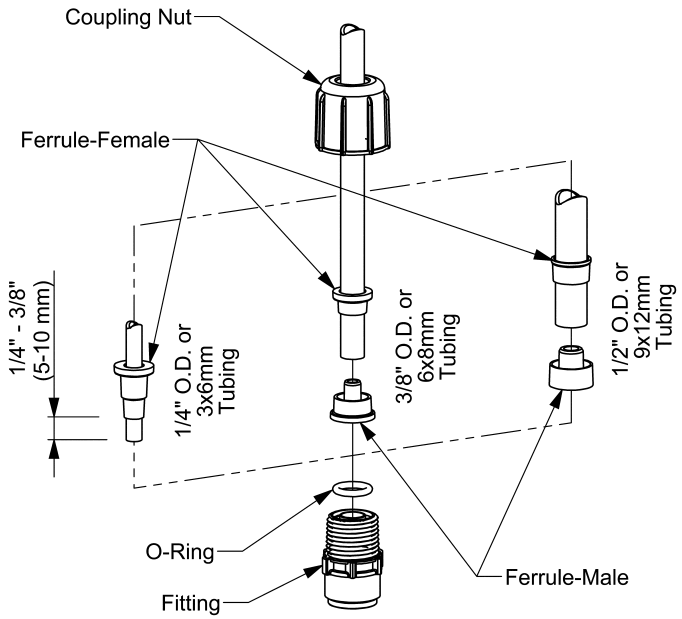


FIGURE 2

DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP.

DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

C. CONNECTING SUCTION TUBING

1. Cut suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 ft (1.5m).
2. Follow same procedure in connecting suction tubing to suction valve and foot valve (*see* **B. Connecting Discharge Tubing**).

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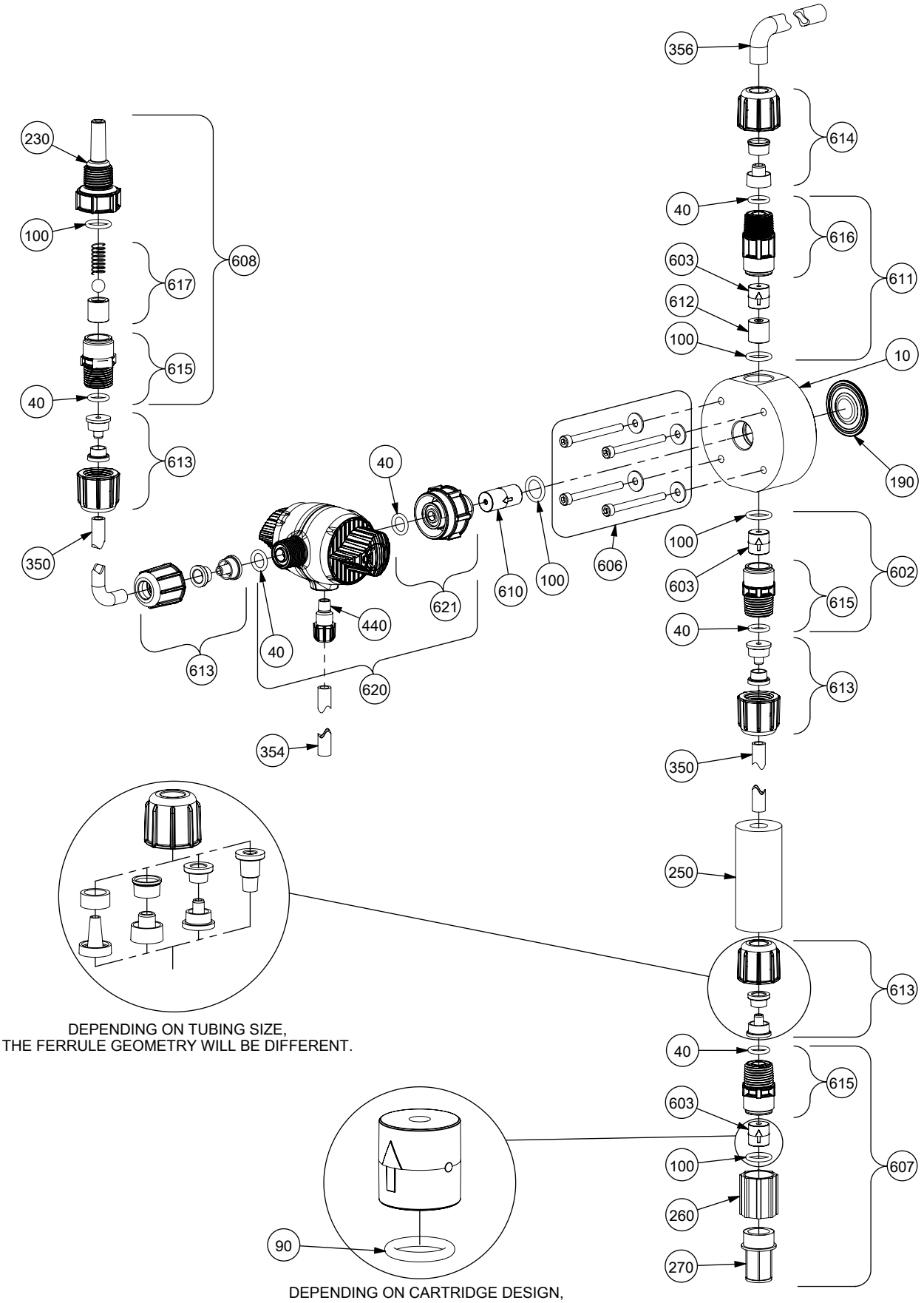
LE- DX0HX, DX8HX

Key Number	Description	Part Number	QUANTITY				QUANTITY			
			D10HX	D50HX	D60HX	D90HX	D18HX	D58HX	D68HX	D98HX
10	Pump Head AutoPrime™	48743		1						
		48746						1		
		48744				1				
		48747								1
		48745			1					
		48748							1	
		50529	1							
		50530					1			
40	O-Ring	48349	6	6	6	6	6	6	6	6
90	O-Ring	39413	6	6	6	6	6	6	6	6
100	O-Ring	36103	5	5	5	5	5	5	5	5
190	Liquifram™	30916		1				1		
		30917				1				1
		31420			1				1	
		31419	1				1			
230	Injection Check Valve Body	48617	1	1	1	1	1	1	1	1
250	Ceramic Weight	10322	1	1	1	1	1	1	1	1
260	Foot Valve Coupling	36204	1	1	1	1	1	1	1	1
270	Foot Valve Strainer	10123	1	1	1	1	1	1	1	1
350	Tubing, Suction & Discharge **DXXHI ONLY**	25636-16		1				1		
		10342-16			1	1			1	1
		10142-16	1				1			
	Tubing, Suction & Discharge **DXXHU ONLY**	28636-16		1				1		
		27342-16			1	1			1	1
		27142-16	1				1			
354	Tubing, 4FV	25636-06	1	1	1	1	1	1	1	1
356	Tubing, AutoPrime™	10142-10	1	1	1	1	1	1	1	1
440	Bleed Nut	48622	1	1	1	1	1	1	1	1
602	Suction Check Valve	49087		1				1		
		49088	1		1	1	1		1	1
603	Cartridge Valve	37335		3				3		
		37338	3		3	3	3		3	3
606	Liquid End Hardware	49109	1	1	1	1	1	1	1	1
607	Foot Valve	49099		1				1		
		49100	1		1	1	1		1	1
608	Injection Valve	48728	1	1	1	1	1	1	1	1
610	AutoPrime™ Disch. Cartridge Valve	48707		1				1		
		49097	1		1	1	1		1	1
611	AutoPrime™ Shuttle Valve	48708	1	1	1	1	1	1	1	1
612	AutoPrime™ Cartridge Valve	48709	1	1	1	1	1	1	1	1
613	Tubing Connection Kit **DXXHI and DXXHU**	77382		4				4		
		77383			4	4			4	4
		77384	4				4			
	Tubing Connection Kit **DXXHM ONLY**	77378		4				4		
		77379			4	4			4	4
		77380	4				4			
614	Tubing Connection Kit DXXHI and DXXHU	77384	1	1	1	1	1	1	1	1
	Tubing Connection Kit **DXXHM ONLY**	77380	1	1	1	1	1	1	1	1
615	Single Ball Check Valve Fitting	48787	3	3	3	3	3	3	3	3
616	Double Ball Check Valve Fitting	48791	1	1	1	1	1	1	1	1
617	Injection Valve Cartridge	48795	1	1	1	1	1	1	1	1
620	4FV Assembly	48798		1				1		
		48753	1		1	1	1		1	1
621	4FV Fitting Assembly	49254	1	1	1	1	1	1	1	1

LE-DX0HX, DX8HX



DEPENDING ON TUBING SIZE,
THE FERRULE GEOMETRY WILL BE DIFFERENT.

DEPENDING ON CARTRIDGE DESIGN,
AN O-RING MAY BE PRESENT AS PART
OF THE ASSEMBLY.

D. CONNECTING AUTOPRIME™ TUBING

1. Using 1/2" O.D. polyethylene tubing, cut AUTOPRIME™ tubing to length so that it returns to the solution tank. This tubing must not be submerged in the solution.

2. Follow the same procedure in connecting AUTOPRIME™ tubing to the AUTOPRIME™ valve (*see* **B. Connecting Discharge Tubing**).

E. PRIMING WITH ROYTRONIC® 4-FUNCTION VALVE

1. Connect pressure relief tubing to the pressure relief port (Figure 3). Route tubing to the solution tank. This tubing must not be submerged in the solution.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

2. Turn black knob about ⅛ turn CCW to stop point to open bypass port.

3. Set pump at 100% speed and 100% stroke length. Start pump. When fluid has been flowing through the bypass port tubing for 10-20 seconds, the pump is primed.

4. Stop pump and return black knob to normal position.

Note: *The pumps are normally self priming if suction lift is less than 5 feet (1.5 meters), check valves are wet (there is usually water in the pump head when shipped from the factory), and the steps above are followed. If the pump does not self prime, you can choose one of 2 ways to help prime:*

1. Remove the AUTOPRIME™ valve and cartridges and slowly pour water or solution into the pump head until it is filled. Replace cartridges and AUTOPRIME™ valve and repeat steps above.

2. Temporarily improve suction conditions by pumping from a container closer to or above pump.

F. DEPRESSURIZING THE DISCHARGE LINE

ALWAYS wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

When preparing to maintain the pump or any component in the discharge line, the 4-function valve is used to depressurize the line. Be sure an injection check valve is properly installed and is operating, and that all tubing connections on the 4-function valve are secure.

Be sure your relief tubing is connected to your pressure relief port on the 4-function valve and runs back to your solution drum or tank.

1. Turn off the pump.
2. If any valves have been installed downstream of the pump, close them.
3. If the supply tank for the pump is higher than the pump head, fluid will flow through unless a suction line valve is closed.
4. Turn the black knob on the 4-function valve about ⅛ turn CCW to its open position. This relieves pressure between the pump and the 4-function valve.
5. To release line pressure, while the black knob is in the open position, turn the yellow knob and hold open until fluid flow though the bypass port stops.

When tubing connections are loosened, chemical will drain from the line. Use appropriate safety precautions to avoid contact with chemical.

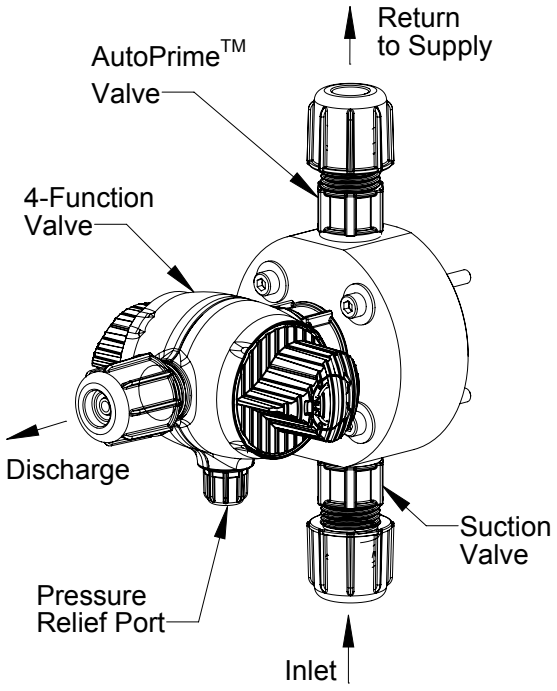


FIGURE 3

REFER TO YOUR ELECTRONIC METERING PUMP INSTRUCTION MANUAL FOR ADDITIONAL INSTRUCTIONS AND PRECAUTIONS. You may contact your local LMI Distributor for additional information or visit LMI on the web at **www.lmipumps.com**