MM-76500-30 PISTON PUMP

NATIONAL INSTRUMENT COMPANY Part No. 8655, FKS-60-75 Pump with O-Ring Piston
For filling free flowing* to semi viscous** liquids

* Free-Flowing = aqueous solutions, water-thin reagents
** Semi-Viscous = thin oils, conditioner, shampoo, thin syrup, saturated solutions, agar, hand/body lotion

INSTRUCTIONS

NATIONAL INSTRUMENT COMPANY, INC.
4119 FORDLEIGH ROAD • BALTIMORE, MARYLAND 21215-2292, U.S.A. • PHONE: (410) 764-0900 • www.filamatic.com
Instructions

A. Instructions for pump assembly

1. Read these instructions before proceeding
2. Remove the piston pump from the shipping packaging,
3. Review the schematic diagram of the piston pump assembly.
4. Verify that all of the parts are present.
5. Loosen the bearing cap and pull the piston rod and bearing cap from the cylinder.
6. Wet the o-ring on the piston with the product to be filled or (if acceptable) with a product compatible lubricant (oil or grease).
7. Push the piston pack into the cylinder and tighten the bearing cap against the cylinder. Be careful not to cross thread the bearing cap against the cylinder.
8. Verify that the cylinder head, suck back valve, lower valve and upper valves are assembled per the schematic diagram.
9. Open the upper and lower valve assemblies to verify that the valve balls and springs are correctly installed. Refer to diagram B for proper valve ball and spring configurations. The valve springs must be installed with the large ends oriented in the “up” position and the small end down against the ball. Do not place the valve ball on top of the spring or damage to the pump and filling machine can occur.
10. Make certain that all of the teflon gaskets and washers are in good condition.
11. After assembly the spring tension should be tight enough to prevent the balls from rattling when the pump is turned upside down. If the balls do rattle stretch the springs slightly to increase spring tension. Tighten all of the threaded connections to prevent external air from being drawn into the pump during use.
12. Assemble the intake hose and intake sinker to the hose barb on the lower valve. Use appropriate hose clamps to secure the hose to the hose barbs so that air is not allowed to be drawn into the hose from the tubing to those barb interfaces.
13. Assemble the discharge hose to the upper valve hose barb.
14. Assemble the filling nozzle hose barb to the end of the discharge hose.
15. Use appropriate hose clamps to secure the hose to the hose barbs so that air is not allowed to be drawn into the hose from the tubing to those barb interfaces.

DIAGRAM B (VALVE ASSEMBLY)
MM-76500-30 PISTON PUMP ASSEMBLY DIAGRAM A (PUMP EXPLODED)

NATIONAL INSTRUMENT COMPANY Part No. 8655, FKS-60-75 Pump with O-Ring Piston

18-221-222 DISCHARGE TUBING
  BRAID REINFORCED PVC
  3/8" ID x 1/8" WALL x 3' LG

18-102-036 HOSE CLAMP

7030-2 NOZZLE DN-130
  3/8" OD x 2-1/2" LG

09-707-409 WASHER

5500-5 NUT

1892 ADJUSTMENT STEM

1809 ADJUSTING COLLAR

09-502-458 DOWEL PIN

1807 SUCKBACK VALVE

5510-8 TEFLO WAXER (qty 2)

1166 CLEANOUT SCREW

5510-5 TEFLO WAXER (qty 2)

5510-8 TEFLO WAXER (qty 2)

02-000-015 VALVE SPRING

01-036-109 VALVE BALL

1206 LOWER VALVE

18-103-037 HOSE CLAMP

18-224-226 INTAKE TUBING
  BRAID REINFORCED PVC
  3/4" ID x 3/16" WALL x 5' LG

18-103-037 HOSE CLAMP

1853 INTAKE SINKER

1008 THUMBSCREW

02-000-040 SPRING

09-347-799 SET SCREW

1172 UPPER SWIVEL

1018-1 SWIVEL PIN WITH
  09-606-014 RETAINING RINGS

1269-1 CYLINDER HEAD

04-806-045 GASKET (TEFLON)

1330-1 CYLINDER

04-214-278 O-RING
  (SILICONE)

2994-4 PISTON HEAD
  (KYANAR)

04-114-287 O-RING
  (SILICONE)

2993-1 PISTON ROD

1132 BEARING CAP

1018-1 SWIVEL PIN WITH
  09-606-014 RETAINING RINGS

1002 LOWER SWIVEL

09-347-799 SET SCREW

02-000-040 SPRING

1008 THUMBSCREW

U.S. & FOREIGN PATENTS
ISSUED AND PENDING

FOR TYPICAL SPARE PARTS,
ORDER SERVICE KIT:
COLE PARMER #MM-76500-31
NATIONAL INSTRUMENT #28546

IMPORTANT NOTES:
* SMALL END OF VALVE SPRING SHOULD BE
  DOWNWARD AGAINST VALVE BALL.

National Instrument Company, Inc.

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B. Installation of the piston pump on the National Instrument Company bench top filling machine:

1. Loosen the side set screw in the upper swivel to allow the thumbscrew to be loosened. Loosen the thumbscrew on the upper swivel. Make certain that the retaining spring is always present under the thumbscrew.

2. Slide the upper swivel assembly over the roller bearing sleeve on the top pump post of the filling machine.

3. Tighten the thumbscrew to prevent the pump from falling off of the machine. Retighten the side set screw in the upper swivel to hold the thumbscrew in its tightened position.

4. Manually slide the piston in the cylinder. Verify that the piston moves smoothly. If the piston does not move smoothly, replace the piston o-ring, wet the new o-ring with the product or acceptable lubricant and reassemble the piston in the cylinder.

5. Push the piston into the cylinder until the lower swivel is aligned with the lower (eccentric) pump post on the filling machine.

6. Loosen the side set screw in the lower swivel to allow the thumbscrew to be loosened. Loosen the thumbscrew on the lower swivel. Make certain that the retaining spring is always present under the thumbscrew.

7. Slide the lower swivel over the roller bearing on the lower (eccentric) pump post.

8. Tighten the thumbscrew. Retighten the side set screw in the lower swivel to hold the thumbscrew in its tightened position.

Retaining Springs must be used both with the upper and lower thumbscrews. If the retaining spring is not used, the thumbscrew may loosen during operation. A Nylon tipped set screw provides added insurance against loosening of the thumbscrew.

After installing the Filling Unit tighten the Set Screws in the upper and lower swivels to press the Nylon friction plug in each swivel against the thumbscrew.
9. Position the product supply reservoir so that the liquid height is lower than the height of the end of the filling nozzle. The product reservoir should be positioned at no lower than 1 foot below the hose barb of the lower valve.

10. The product supply reservoir should be a simple container open to atmospheric pressure. Pressure feed (even by gravity) is not recommended without advance experimentation to verify that the product will not be pushed past the lower and upper valves. Excessive pressure can result in dripping from the nozzle or in severe cases, large uncontrollable product flow.

11. Place the intake hose sinker into the product reservoir.

12. Position the nozzle over a receptacle to catch the liquid.

13. Turn the “suck-back” adjustment knob counter clockwise until the end of the “suck-back stem is retracted out from under the valve ball. Do not completely loosen the knob or air external of the pump will enter through the “suck-back” packing gland and lower fill accuracy.

14. Follow the instructions in the filling machine manual to begin to pump cycling. Run the filler at very low speeds until the pump is primed.

15. Cycle the machine so that the product rises in the intake hose, fills the pump cylinder, and flow through the discharge hose and out of the nozzle. After the system is filled with product, continue to cycle the machine to expel air trapped in the cylinder and hoses.

16. If air appears to form in the system after priming is complete, tighten all of the threaded connections.

17. Follow the instructions in the machine manual to adjust the micrometer controls to yield the desired dispense volume.

18. If dripping or if the product flow continues at the end of the nozzle occurs after the pump discharge stroke is finished, the “suck-back” adjustment can be used to use some of the suction of the pump to pull back product from the end of the nozzle tip. To increase the “suck-back, turn the “suck-back” adjustment knob clockwise. Turn the knob only to a point where the adequate amount of “suck-back” is achieved. Do not over tighten the knob. The dispensed volume is affected when the suck back setting is changed.
C. Pump disassembly and cleaning

1. As parts are removed from the pump, place them into an appropriately sized pan or basin to prevent loss of the parts. Note that many of the screws, valve balls, springs, and other parts are very small and are easily misplaced.

2. After filling, remove the pump from the filling machine by loosening the side set screw on the upper and lower swivel and loosening the thumbscrews.

3. Remove the tubing from the nozzle hose barb, upper valve hose barb and the lower valve hose barb.

4. Loosen and unscrew the threaded connections on the upper and lower valve assemblies. Remove the internal valve balls, springs, and gaskets.

5. Manually pull the piston out to it’s fully extended position.

6. Carefully loosen the bearing cap and the cylinder head from the cylinder. Use a fabric style strap wrench to hold the cylinder wall while removing the cylinder head and the bearing cap. Do not use a vise, pipe wrench, or other tool that can crush the cylinder. The flatted sides of the cylinder head may be clamped in a vise to facilitate loosening of the head from the cylinder. During handling of the cylinder, be careful not to damage the fine threads or the interior finely finished surfaces of the cylinder.

7. After the bearing cap is unscrewed from the cylinder, carefully pull the piston straight out and free from the cylinder. Do not angle the piston rod. This may bind the piston in the cylinder.

8. Use an appropriate cleaning solution to hand clean each of the parts. Soft bottle style brushes of various sizes may be used to facilitate cleaning. If brushes are used, do not allow the center metal section of the brush to scratch the internal surfaces of the cylinder or the various gasket seats and valve ball seats in the pump parts.

9. Thoroughly rinse all of the parts with water. Set the parts aside to dry.

10. Reassemble the pump following the guidelines in section A. During all assembly procedures, be careful to prevent damage to the threaded portions of the pump. Cross threading of parts is particularly to be avoided.

National Instrument Company, Inc.
### Chemical Compatibility Table for National Instrument Company

**Piston Pumps Sold Through Cole Parmer**

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<thead>
<tr>
<th>Chemical</th>
<th>Kynar (PVDF)</th>
<th>Silicone</th>
<th>Teflon</th>
<th>316 Stainless Steel</th>
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<td>Sodium Hydroxide Solution (weak)</td>
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<td>Sulfuric Acid</td>
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</tbody>
</table>

* Note: Data is intended as an indicator of compatibility only. Actual compatibility should be tested by the end user.

For additional data consult the chemical compatibility tables in the Cole-Parmer catalog or other technical manuals.

### D. Autoclaving of the Pumps

1. Pumps may be autoclaved for repeated cycles of approximately 121 degrees Centigrade for 30 or more minutes.
2. It is typical for the plastic portions of the pump to show some deterioration from repeated autoclaving. These parts, such as hose, gaskets, o-rings, and the kynar piston end should be replaced if deterioration, discoloration, cracking, or dimensional shrinkage occur of many autoclave cycles.