

Precision Designs for Research

Micropositioner Refilling Instructions

World Standard of Excellence.....

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Refilling the Hydraulic System

(Part I)

The Model 640 and 650 Micropositioners will need periodic refilling. Distilled water is used because of its rapid response, lack of compression, and excellent temperature qualities. **DO NOT SUBSTITUTE OTHER FLUIDS OR DAMAGE WILL OCCUR TO THE DIAPHRAGM.**

It is imperative that the following steps be followed precisely to insure proper filling and to prevent possible damage to the instrument. **PLEASE READ ALL INSTRUCTIONS BEFORE PROCEEDING!**

NOTE: CYLINDERS ARE NOT TO BE REMOVED FROM THE DRIVE UNIT.

1. Drive the hydraulic drive forward until the slave cylinder is fully extended. (25000 microns.)
2. A plastic syringe must be used in this refilling procedure. Fill the 5 cc plastic syringe (DKI part # 8181) with distilled water and purge the air from the syringe.
3. Place the tip at the bottom of the refill valve reservoir and fill the reservoir to the brim, purging all air pockets.
4. Insert the syringe into the refill valve. (CAUTION: IT IS IMPERATIVE THAT THERE BE NO AIR POCKETS BETWEEN THE SYRINGE AND THE REFILL VALVE)
5. Carefully remove springs from the slave cylinder. Place thumb over the end of the slave cylinder piston. Gently depress cylinder with thumb and using the wrench supplied, loosen the refill valve on master cylinder until the water flows into the syringe. Allow the syringe to fill to approximately two-thirds capacity. Hold the syringe in this position for 15-20 seconds to allow any air bubbles to come to the top.
6. Depress syringe replacing the water in the cylinder until the slave cylinder moves to the fully extended position, 25 to 28 mm. The guide rod must remain in its slot and should be flush with its guide. Tighten refill valve (clockwise) and remove syringe.
7. If air bubbles are visible in transfer tube, repeat above steps 1 through 6.
8. If it is impossible to remove air bubbles, refer to part II.



Replacement of Transfer Tube And Total Refilling Under Water

(Part II)

UNDER NO CIRCUMSTANCE SHOULD THE CYLINDER ASSEMBLIES BE DISASSEMBLED OUTSIDE OF THE DAVID KOPF INSTRUMENTS FACTORY!

In the event the transfer tube is broken or leaks; it must be replaced with a Kopf Replacement Tubing Kit (P/N 607-N). DO NOT SUBSTITUTE ANY OTHER TYPE OF TUBING OR LEAKAGE WILL OCCUR.

It is imperative that the following steps be followed precisely to insure proper filling and to prevent possible damage to the instrument. PLEASE READ ALL INSTRUCTIONS BEFORE PROCEEDING.

Equipment Needed:

2 gallons of distilled water

3 gallon tub

bulb syringe

plastic syringe

valve stem wrench (supplied with 650)

1/4" or smaller shaft 3" in length

5/16" end wrench

5/16" allen wrench

1. Remove master cylinder from drive unit. Use the allen wrench to loosen the single thumb screw located at the top of the front mounting face.
2. Remove slave cylinder springs and submerge both cylinders and tube assembly in the water.

NOTE: THE FOLLOWING STEPS MUST BE DONE WITH ALL PARTS FULLY SUBMERGED IN WATER.



Filling

Transfer Tube:

3. Remove transfer tube by loosening the fittings with 5/16" wrench.
4. Submerge the new transfer tube; fill the bulb syringe with water, and force water through the tube purging all air.
5. Fill the bulb syringe and force water around the fittings eliminating all air bubbles.

Slave Cylinder:

6. Place thumb over end of the electrode holder attached to the end of the piston, then using the bulb syringe, force water into the slave cylinder filling it to its fullest extent. (While cylinder is being filled, maintain light pressure on piston with thumb.) Press piston back into the cylinder, thus pumping the water out. Repeat this process several times to clear the cylinder of air bubbles. Hold cylinder so that guide rod can be seen and tube fitting is in upright position. Do not let guide rod go beyond the limits of its guide.

Master Cylinder:

7. Using the valve wrench, open refill valve 1/8 to 1/4 turn (counter clockwise). Place the 1/4" x 3" shaft in the back of the master cylinder (to be used as a plunger). Put your thumb on the plunger and purge the air bubbles in the same manner as described in step 6.
8. Using valve stem wrench, close refill valve (do not over-tighten) and again, purge the air bubbles in the same manner as described above.
9. Fill master cylinder to fullest extent and attach transfer tube. (CAUTION) DO NOT OVERTIGHTEN

Re-assembly:

10. Fill Slave cylinder to fullest extent making sure guide rod remains in its guide; loosely attach the transfer tube.

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11. Depress the plunger on the slave cylinder, allowing the water to escape until electrode holder is 2 – 3 mm from the cylinder.
12. Tighten tube fitting at the slave cylinder. Do not over-tighten or leakage will occur.
13. Remove cylinder from the water, replace the slave cylinder springs and reassemble on drive unit front mounting face.
14. Let set for two hours and repeat refill procedure (page 5). This is to completely fill system and purge any air possibly remaining in the system.
15. It will take 2 – 3 hours for the system to stabilize after refilling via the above steps. For maximum accuracy, wait at least this period of time before using.
16. If damage other than to the transfer tube occurs, the hydraulic system should be sent to factory. Rebuilt exchange, master and slave cylinders are available.



Replacement of Diaphragms

(Part III)

It is recommended that both the diaphragms and the transfer tube be replaced at the same time. To do this use the following procedure in conjunction with PART II "Replacement of Transfer Tube & Total Refilling Under Water" instructions.

Read ALL Instructions Before Proceeding

1. Remove hydraulic system from drive unit. Loosen the thumb single set at the top of the mounting face.
2. Loosen valve stem to allow the internal water pressure to drop completely.
3. Remove the slave cylinder springs.
4. Remove the transfer tube assembly.
5. Remove 4 cap-screws, and save, from the master cylinder and separate so that the old diaphragm can be removed.
6. Remove 4 cap-screws, and save, from the slave cylinder assembly and separate so that the old diaphragm can be removed.
7. Very carefully roll diaphragms, using 1/4 dia. X 3 inch shaft, so that when installed the fabric side is against the piston in both the slave & master cylinders.
8. Carefully install diaphragms onto pistons and into cylinders (both master & slave) and reassemble with cap-screws from steps 5 & 6.

THE FOLLOWING STEPS MUST BE DONE WITH ALL PARTS FULLY SUBMERGED IN WATER

9. Follow instructions for Filling from step 4 onto completion.
10. Exercise hydraulic system by running its full travel in both directions several times.

