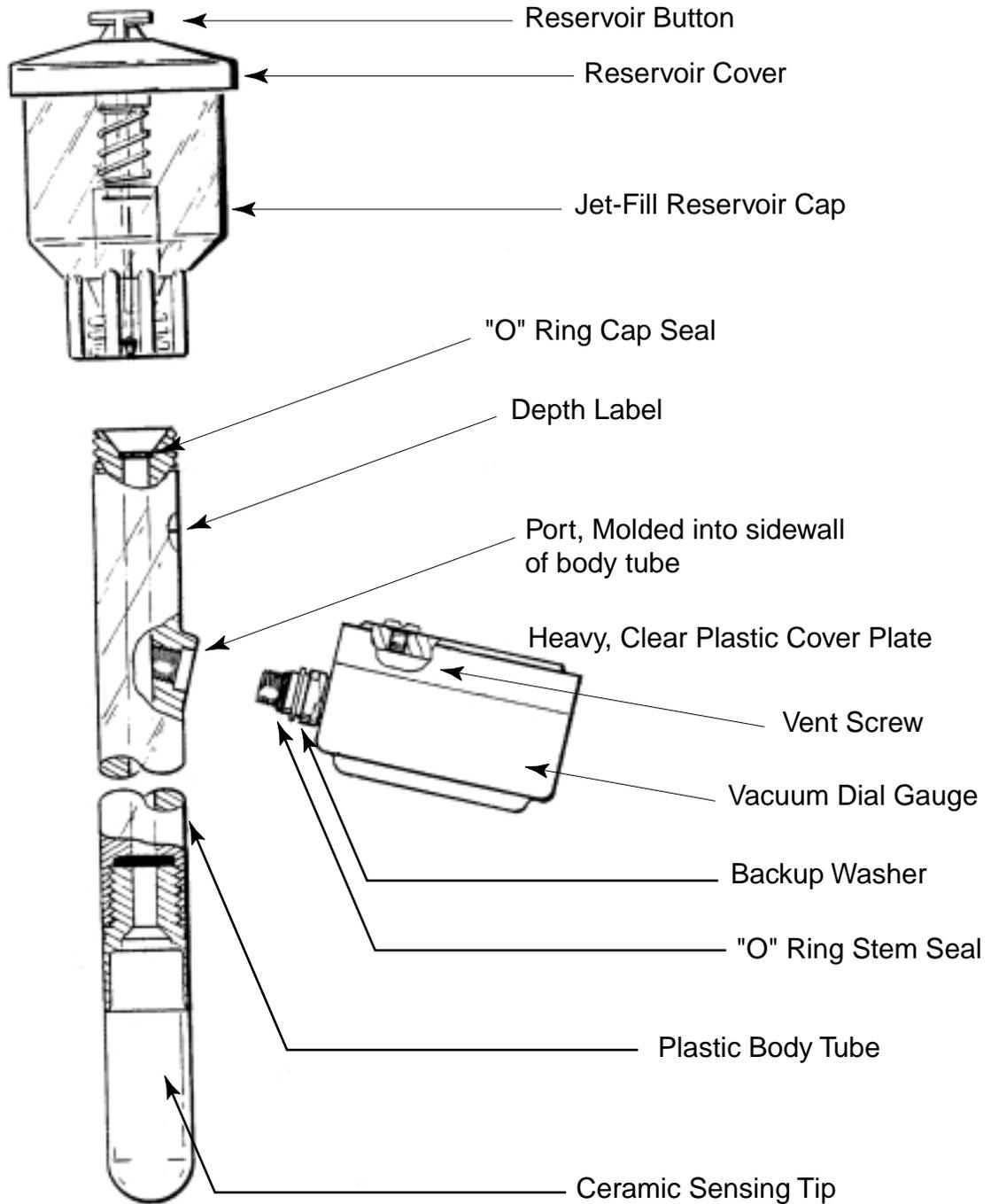


# 2725A

# OPERATING INSTRUCTIONS

2725 JET FILL TENSIO METER

August 1997



**SOILMOISTURE EQUIPMENT CORP.**

P.O. Box 30025, Santa Barbara, California 93105 USA

Phone: (805) 964-3525 • Fax: (805) 683-2189

e-mail: sales@soilmoisture.com • Web: <http://www.soilmoisture.com>



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## UNPACKING

Remove all packing material carefully. Do not bump or drop the dial gauge or ceramic sensing tip or they could break and will need to be replaced. Take care not to let the sensing tip come in contact with grease or any other similar material that could clog the pores of the ceramic.

On small orders, the tensiometer is usually shipped completely assembled. On large orders or export orders, the units are shipped broken down to reduce shipping costs and to minimize damage in shipment.

If this is an initial order, you should have requested a 2710K1 Service Kit which is required for normal servicing of these tensiometers.

The tensiometer dial gauge is hermetically sealed at the factory at sea level. If you live at a higher elevation, the pointer on the dial gauge may read higher than zero when you unpack it. This is due to the lower atmospheric pressure at your elevation. Before use, using the screwdriver from your Service Kit or an 1/8" Allen wrench, vent the dial gauge by removing the vent screw in the center of the clear plastic dial gauge cover plate (see Fig. 2). After venting, return the vent screw to the cover plate.

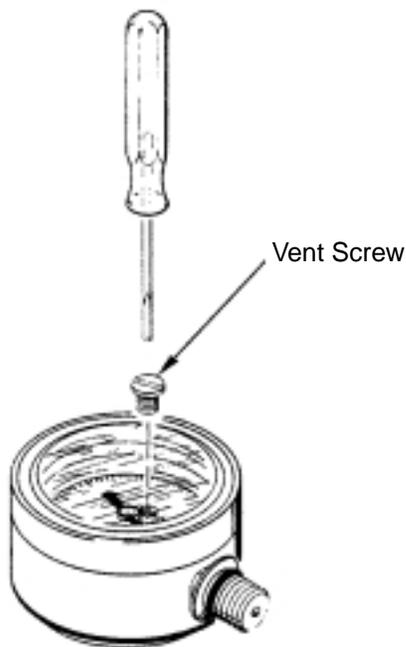


Fig. 2 - Venting the Vacuum Dial Gauge

## ASSEMBLY

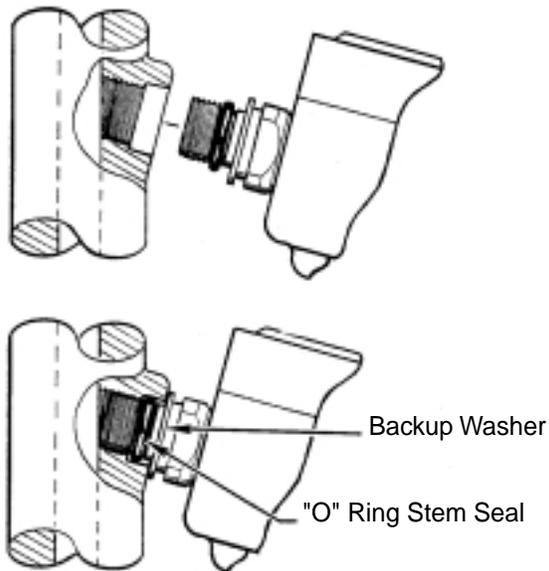


Fig. 3 - Do not overtighten Gauge

## FILLING YOUR TENSIO- METER

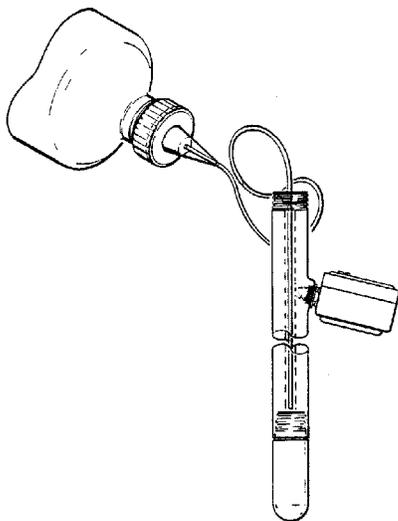


Fig. 4 - Filling the tensiometer

To assemble the unit, invert the tensiometer and insert the "O" ring into the threaded end of the body tube, making sure that it is seated properly in the hole. Next, screw the ceramic sensing tip into the body tube until it makes a tight seal on the "O" ring. Do not over tighten. The "O" ring makes the vacuum seal, not the threads. Damage to the threads will occur as a result of excessive tightening.

Next, screw the dial gauge into the threaded angle port in the side of the body tube. Be sure that the threads on the dial gauge stem line up properly with the threads of the angle port on the tensiometer body. Screw the dial gauge in until the backup washer on the stem touches the body tube and then unscrew dial gauge slightly until the face of the dial gauge is facing up and in the desired position for easy reading. Do not over tighten the dial gauge. The "O" ring on the stem of the dial gauge makes the vacuum seal, not the threads (see Fig. 3).

The Jet Fill reservoir cap is shipped completely assembled and is screwed in place when you are ready to fill it with water.

Included with your Service Kit is a bottle of SEC Blue Fluid Concentrate (2034). This Blue Fluid inhibits algae growth inside the tensiometer and the blue color makes it easier to see accumulated air inside the tensiometer. You can also use plain water without the blue additive if you like. Follow the instructions on the bottle to prepare the solution. We include a 16-ounce plastic filler bottle in the Service Kit to use for preparing the solution. Once the solution is ready, screw the service cap with the attached clear plastic tubing onto the filler bottle. Run the plastic tubing down to the bottom of the tensiometer. Squeeze the filler bottle and fill the tensiometer full of fluid (see Fig. 4).

Keep the tensiometer in a vertical position until the ceramic sensing tip becomes saturated and fluid drips from the ceramic tip. If you need to fill several tensiometers at once, place them together in a deep sink or empty bucket for support during the filling process. Allow the fluid to drip from the ceramic tips for about 5 minutes to be sure they are thoroughly wetted.

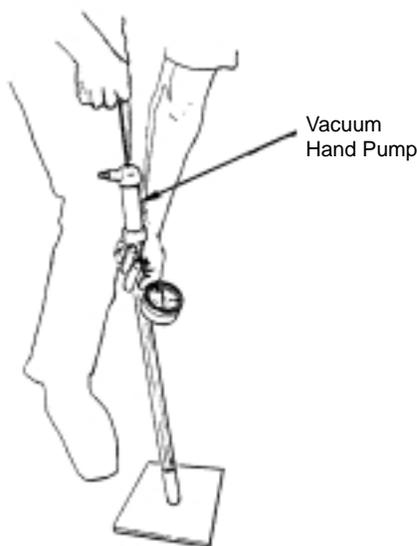


Fig. 5 - Pulling a vacuum on the tensiometer

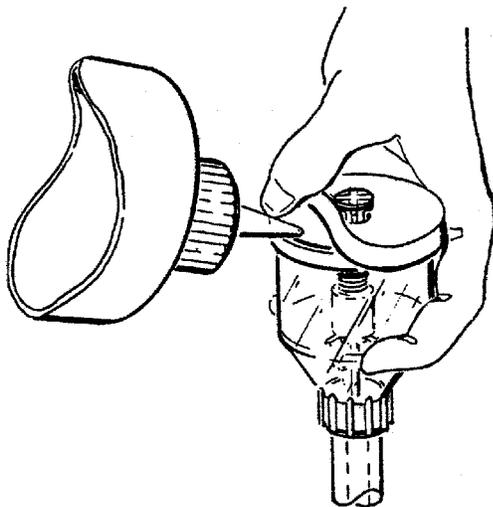


Fig. 6 - Filling the Jet Fill Reservoir Cap

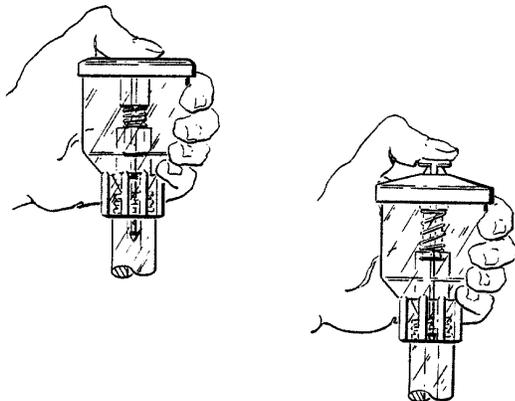


Fig. 7 - Pumping the Jet Fill Reservoir Cap

Next, fill the unit completely to the top and pull a vacuum inside the tensiometer using the vacuum hand pump from service kit. With the unit held vertically, gently set the ceramic tip on a counter or board for support while the rubber end of the vacuum hand pump is held in tight contact with the "O" ring cap seal of the tensiometer (see Fig. 5). Pulling up on the pump handle creates a vacuum inside the tensiometer. You will see air bubbling out of the interior stem of the dial gauge. After each pumping, refill the tensiometer with completely to the top with water or blue fluid solution. Repeat the pumping operation four or five times until no more air bubbles from the stem of the dial gauge. When the unit is ready, seal the tensiometer by screwing on the plastic service cap or Jet Fill Reservoir in place.

To fill the reservoir cap, peel the neoprene reservoir cover back from the top of the reservoir and fill it 3/4 full with SEC Blue Fluid Solution or water (see Fig. 6). With your thumb, press down several times on the reservoir button as far as it will go. This pumping action will remove air from inside the reservoir pump cylinder and any accumulated air from inside the tensiometer.

If you don't have a hand vacuum pump handy, you can also remove air from the dial gauge by pumping the reservoir button repeatedly after the tensiometer and reservoir have been filled (See Fig. 7). Push the button down quickly 50 to 60 times over a period of a minute or so, while observing the interior stem of the dial. Continue pumping until no more air bubbles come from the interior gauge stem. To let the air escape more easily from the gauge stem, tip the tensiometer at an angle with the dial gauge pointing down while pumping.

**NOTE:** If you are not able to install the tensiometer immediately after filling, cover the sensing tip with a plastic bag to prevent evaporation of water from the sensing tip.



## Installation

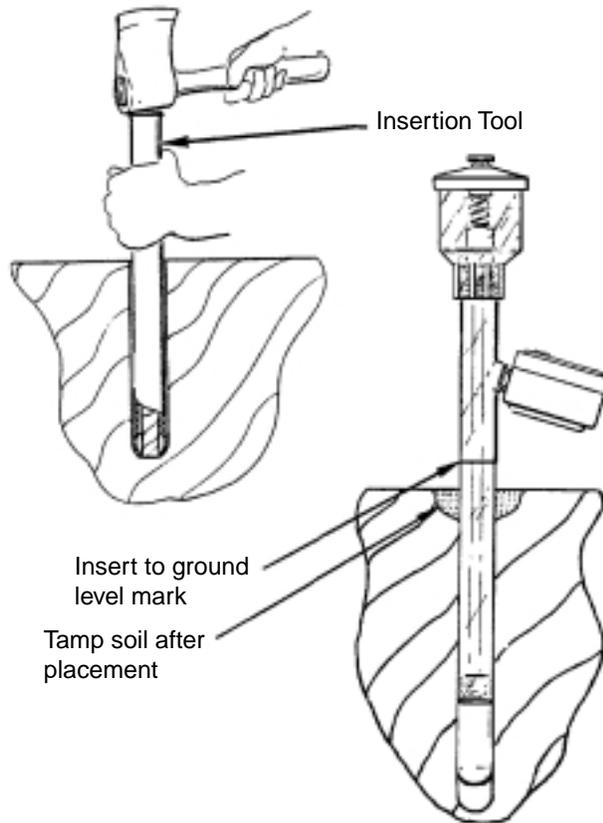


Fig. 8 - Installing the Jet Fill Tensiometer

In firm soils, core a hole to insert the tensiometer. Our insertion tools, available in several lengths should be used. The hole cored by the insertion tool is the right size to ensure a snug fit between the ceramic sensing tip and the soil. The insertion tool is driven into the soil by a mallet or hammer to the required depth (see Fig. 7).

The body tube and the sensing tip are 7/8" in diameter. In the event our insertion tool is not available, a length of standard 1/2" water pipe may be used in its place to core a hole. Keep in mind that the ceramic sensing tip must be in intimate contact with the soil in order for the tensiometer to function properly.

If you encounter a rock or other impediment, move your coring hole position slightly to avoid damaging the ceramic sensing tip upon insertion.

Push the tensiometer down into the cored hole until the "ground level mark" on the tensiometer body is in line with the soil surface. Tamp the soil at the surface around the tensiometer to prevent surface water from running down the hole and around the body tube (see Fig. 8).

For shallow depths, you can simply dig a hole for the tensiometer. Make sure to pack the soil firmly around the tensiometer after installation.

In loose cultivated soils, such as are frequently encountered in commercial row crops, it is possible to simply push the tensiometer into the soil without coring a hole first. This method of installation is completely satisfactory where applicable. Here again, be sure that the surface soil is packed firmly around the body tube after installation.

In rocky soils, a soil auger such as our 0230 Series Soil Augers can be used to core out a hole for the tensiometer. In this case, you will need to screen the soil to remove large pebbles and rocks. Then use the screened to backfill around the tensiometer. A 1/4" mesh screen is usually suitable for screening the soil.

In difficult installations, such as in rocky soils or deep installations, a slurry of water and soil can be

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## Servicing Your Tensiometers in the Field

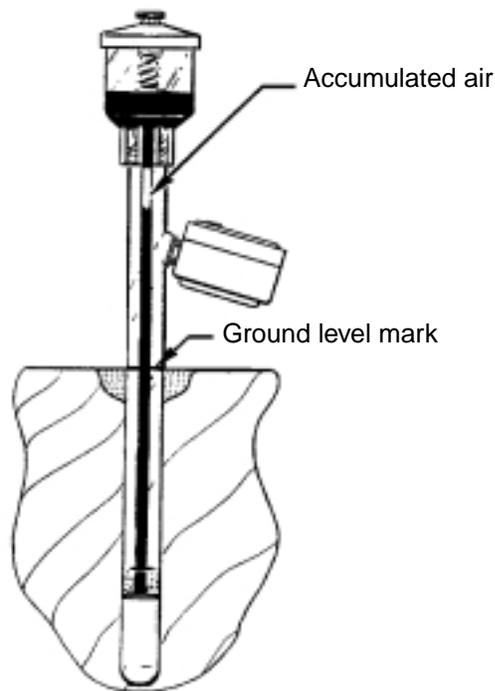


Fig. 9 - Remove Accumulated Air from the Tensiometer

made up and poured into the bottom of the hole. The sensing tip of the tensiometer is then pushed into the slurry to ensure good contact between the tip and the soil. Large holes cored to accept the tensiometer are always backfilled and the soil at the surface tamped tightly around the body tube.

After installation, the tensiometer may require several hours before it reads the correct soil suction value. This is due to the disturbance to the soil caused by the installation procedure. The correct reading will be reached more quickly in moist soils than in dry soils.

After this initial installation period, the tensiometer will accurately indicate the soil suction value and will follow closely changes in the soil suction from hour to hour.

SEC tensiometers are weatherproof and require little servicing other than occasionally refilling the tensiometer with solution using the filler bottle from your service kit or by pumping the button on the JetFill reservoir cap to remove accumulated air within the tensiometer.

If the soil in which the tensiometer has been installed is moist and the soil suction readings are low, very little air will accumulate in the body tube of the tensiometer. If, however, the tensiometer has been installed in relatively dry soil and soil suction values are in the range of 40 to 60 centibars, air will accumulate rather quickly for the first few days after installation. This initial accumulation of air is due to air coming out of solution and detaching itself from the internal walls of the tensiometer when exposed to high vacuum for the first time (see Fig. 9).

After initial installation, check the tensiometer every day or two and remove accumulated air from the 2725 Jet Fill Tensiometer by pushing the Jet Fill Reservoir Button.

After the first few air removal servicing operations using the vacuum hand pump in the field, the rate of air accumulation will drop off markedly, and air removal servicing will then be required only on a weekly or longer basis.

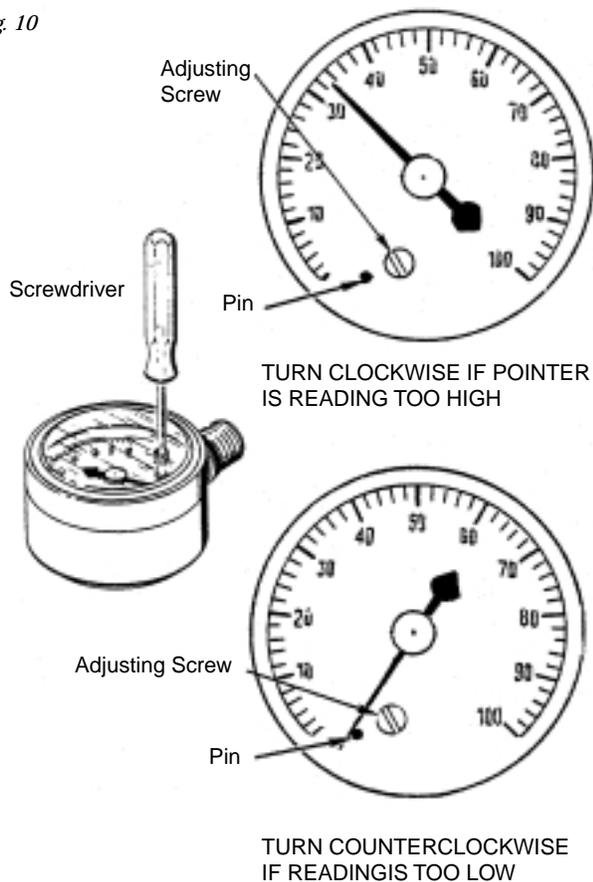
## PRECAUTION - Avoid Freezing Conditions

Tensiometers should be removed from the field prior to the onset of freezing conditions. Since a tensiometer is a water-filled system, it is essential that the unit be stored and used at temperatures above freezing. Freezing temperatures, of course, will cause the water within the unit to freeze and expand as ice is formed. This can cause breakage of the ceramic tip and distort or rupture the thin-walled Bourdon tube within the dial gauge.

## Adjusting the Pointer on the Dial Gauge

If the Bourdon tube is ruptured, the dial gauge cannot be repaired and will have to be replaced. If the Bourdon tube is distorted but not ruptured, it may be possible to reset the pointer on the gauge to correct the change in calibration caused by freezing.

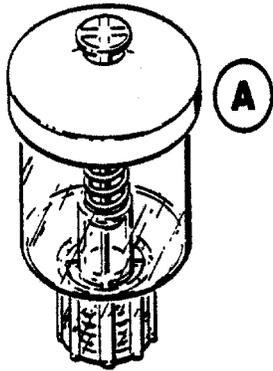
Fig. 10



First, remove the vent screw from the dial gauge (Fig. 10) and insert the screwdriver through the hole in the gauge cover plate to engage the slot in the adjusting screw.

If the gauge was reading high, turn the screwdriver clockwise an estimated amount to correct the error. If the gauge reads low, turn the screwdriver counterclockwise an estimated amount to correct the error. Repeat the process if necessary until the pointer is on zero.

# JET FILL TENSIOMETER REPLACEMENT PARTS

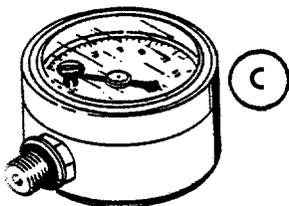
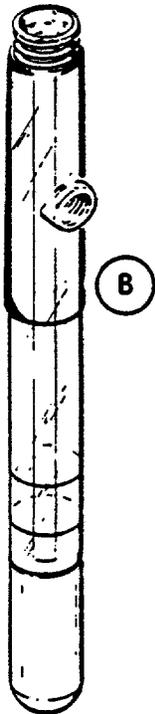


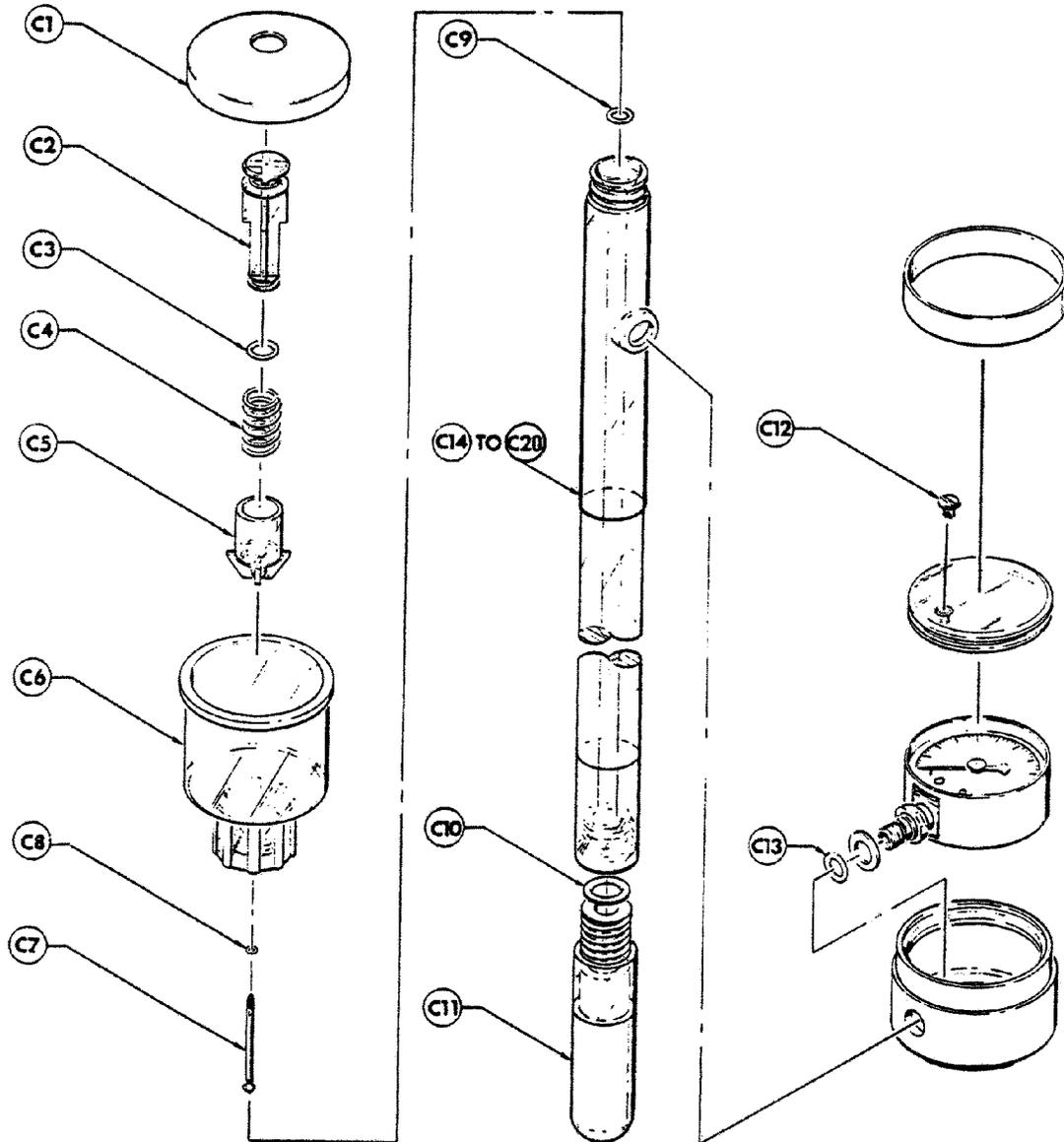
| Item | Model | Description |
|------|-------|-------------|
|------|-------|-------------|

|   |      |                              |
|---|------|------------------------------|
| A | 2075 | Jet Fill Reservoir, Complete |
|---|------|------------------------------|

|   |           |   |
|---|-----------|---|
| B | 2630AL06K | Body Tube and ceramic cup, 6 inch length  |
| B | 2630AL12K | Body Tube and ceramic cup, 12 inch length |
| B | 2630AL18K | Body Tube and ceramic cup, 18 inch length |
| B | 2630AL24K | Body Tube and ceramic cup, 24 inch length |
| B | 2630AL36K | Body Tube and ceramic cup, 36 inch length |
| B | 2630AL48K | Body Tube and ceramic cup, 48 inch length |
| B | 2630AL60K | Body Tube and ceramic cup, 60 inch length |

|   |         |   |
|---|---------|---|
| C | 2060FG4 | Bourdon Vacuum Dial Gauge, 2 inches, recalibrator-style |
|---|---------|---|





| Item   | Model      | Description          |
|--------|------------|----------------------|
| C1     | 2075-001   | Reservoir Cover      |
| C2     | 2075-003   | Piston               |
| C3A *  | M801X001   | O-Ring Seal          |
| C3B ** | Mx802X012  | O-Ring Seal          |
| C4     | MSM002-003 | Spring               |
| C5     | 2075-004   | Pump Cylinder        |
| C6     | 2075-002   | Reservoir Body       |
| C7     | 2075-100   | Piston Stem Assembly |
| C8     | M802X003   | O-Ring Seal          |
| C9     | M802X010   | O-Ring Seal          |
| C10    | M802X111   | O-Ring Seal          |
| C11    | 2630A-100  | Porous Ceramic Cup   |
| C12    | Q1032CAM04 | Vent Screw           |
| C13    | M802X013   | O-Ring Seal          |

| Item | Model        | Description                           |
|------|--------------|---------------------------------------|
| C14  | 2630A-200L06 | Tensiometer Body only, 6 inch length  |
| C15  | 2630A-200L12 | Tensiometer Body only, 12 inch length |
| C16  | 2630A-200L18 | Tensiometer Body only, 18 inch length |
| C17  | 2630A-200L24 | Tensiometer Body only, 24 inch length |
| C18  | 2630A-200L36 | Tensiometer Body only, 36 inch length |
| C19  | 2630A-200L48 | Tensiometer Body only, 48 inch length |
| C20  | 2630A-200L60 | Tensiometer Body only, 60 inch length |

\* For models made before Nov. 1979, use seal M801X011

\*\* For models made after Nov. 1979, use seal M802X012

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