

# 2006G2

## OPERATING INSTRUCTIONS

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2006G2 Pressure-Vacuum Hand Pump

July 2011

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The 2006G2 Pressure Vacuum Hand Pumps provide versatile, simple tools for many servicing and calibrating operations on our various tensiometers. They supply a source of vacuum for our soil water samplers and portable extractors.

## UNPACKING

The 2006G2 Pressure -Vacuum Hand Pump shipped to you is completely assembled and has been thoroughly tested before shipment. When packed, it was in perfect working order. Unpack with care being sure to remove all packing material.

Follow the instructions carefully in order to assure long trouble-free service.

**NOTICE: ANY DAMAGE FOUND UPON RECEIPT, SHOULD BE REPORTED IMMEDIATELY TO THE TRANSPORT CARRIER FOR CLAIM. IT IS IMPORTANT THAT YOU SAVE SHIPPING CONTAINER AND ALL EVIDENCE TO SUPPORT YOUR CLAIM.**

Be sure to read all operating instructions thoroughly before operating the unit.

## ACQUAINT YOURSELF WITH THE PARTS

The 2006G2 Pressure-Vacuum Hand Pump is used for calibrating other vacuum dial gauges as used on our tensiometers, and for pulling a vacuum in our soil water samplers, portable extractors, and other units.

The vacuum dial gauge is a Bourdon Tube-type gauge and measures the vacuum in the unit. It is graduated 0-100 centibars (or 1 Bar) of soil suction. The vacuum dial gauge was hermetically sealed at the factory, at sea level. If you live at a high elevation, the pointer on the dial gauge may be reading higher than zero. This is due to the lower atmospheric pressure at your elevation. Before putting the unit to use, vent the dial gauge by momentarily removing the vent screw in the clear plastic gauge cover, see Fig. 1. Use a small screwdriver for this purpose. After venting, return the vent screw to the gauge cover.

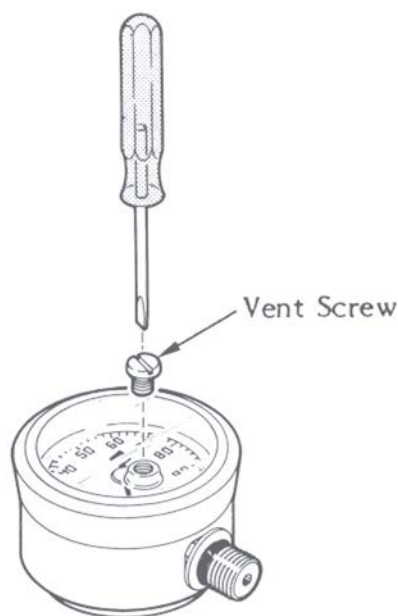


Figure 2

the valve body by way of two 1/4-20 by 1-1/4 long stainless steel hex head cap screws. Both units measure approximately 22" in height and will store easily in most any space.

The Handle is made from laminated hardwood and is 10" long by 1" diameter. The Top Cap is made from grey PVC and incorporates an air vent hole to vent the air from the tube while pulling a vacuum.

The Tube is made from a low leaded brass tube and is chrome plated for corrosion resistance. The Leather Cup Washers and Steel Washers combine to make a vacuum and pressure seal on the inside walls of the tube during the pumping action. The Valve Body is made from grey PVC which has machined cavities to hold the polypropylene check valves and the vacuum and pressure fittings.

The Vacuum Fittings and Pressure Fittings are 1/4" NPT by 1/4" tube brass fittings which are chrome plated for corrosion resistance. The Base is made from laminated hardwood, the same type as used on the handle and measures 3" wide by 12" long by 3/4" thick, and is held to

## REQUIREMENTS PRIOR TO USE

An Inline Air Filter is supplied with the Pressure Vacuum Hand Pump to filter out any debris that might get into air lines while using the pump. Place the filter in the air line between the pump and the unit with the arrow on the filter pointing in the direction of flow.

## REMOVAL OF AIR FROM TENSIOMETERS USING PRESSURE/VACUUM HAND PUMP

The adapter fitting should be assembled into the 3/16" I.D. rubber hose and the hose pushed on the vacuum fitting of the hand pump. Hold the adapter fitting firmly against the "O" ring seal in the filter end of the tensiometer body to create a seal, as shown in Fig. 2.

As the pump handle is pulled up, the vacuum created within the tensiometer will cause the air to bubble from the vacuum dial gauge stem and up to the surface of the water. After each pumping, to release the vacuum, tilt the adapter fitting slightly to slowly break the seal between the adapter fitting and "O" ring seal, as shown in Fig. 3

Fig. 2



Fig. 3



This will enable the gauge needle to return to zero slowly without damage to the gauge. Additional water is added to the tensiometer after each pumping. The pumping operation should be repeated four to five times to gradually remove all of the air.

Fig. 4

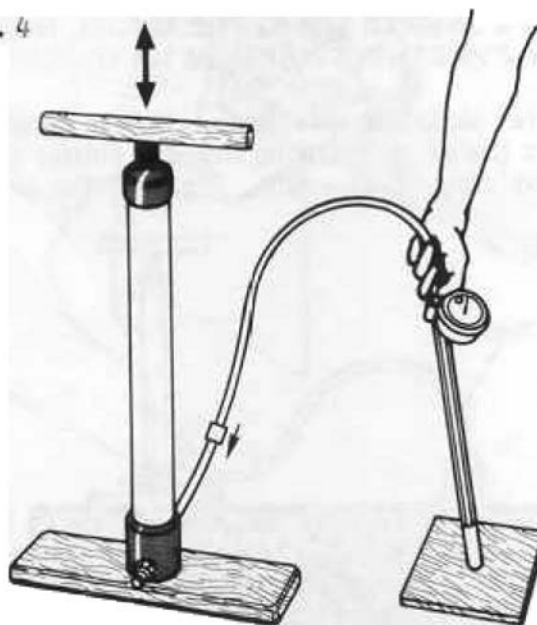
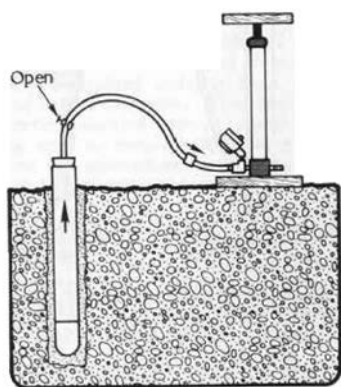


Fig. 4 shows how a vacuum is pulled in a dial type tensiometer to remove air bubbles from the unit before it is installed in the soil.

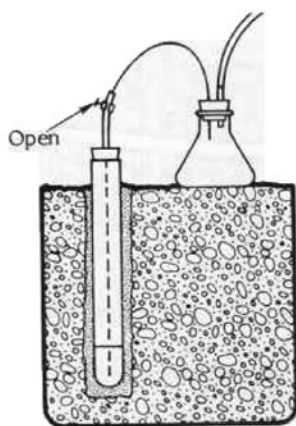
## PULLING A VACUUM IN THE SOIL WATER SAMPLER AND REMOVING A COLLECTED WATER SAMPLE USING THE 2006G2 PRESSURE-VACUUM HAND PUMP



For the 1900 Soil Water Sampler, insert the vacuum fitting into the rubber tube of the stopper assembly, Fig. 6. The pinch clamp on the stopper assembly is opened and the pump is then stroked until a vacuum of perhaps 60 centibars (18" of mercury) or more, is

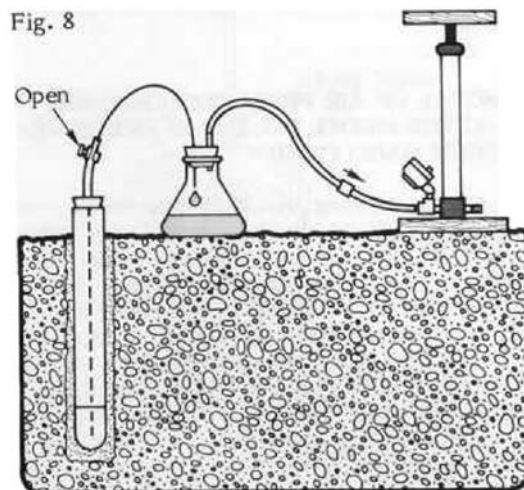
created within the sampler as read on the vacuum dial gauge. When a sufficient vacuum is reached, the pinch clamp is closed to retain the vacuum within the sampler. The pump can then be removed for other uses.

To remove the collected soil water sample from the 1900 Soil Water Sampler, a simple assembly is used made of a small xxx diameter plastic tube (3/32" O.D. or less), a two-hole rubber stopper, and a flask or bottle, as shown in Fig. 7. The pinch clamp on the

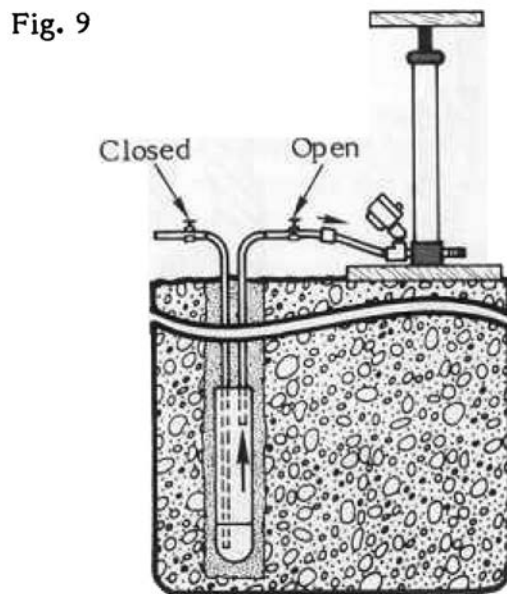


sampler is opened, and the small diameter plastic tube is inserted into the end of rubber tube on the stopper assembly and pushed down until it reaches

the bottom of the sampler. The other end of the plastic tube is pushed into one of the holes in the two-hole rubber stopper.

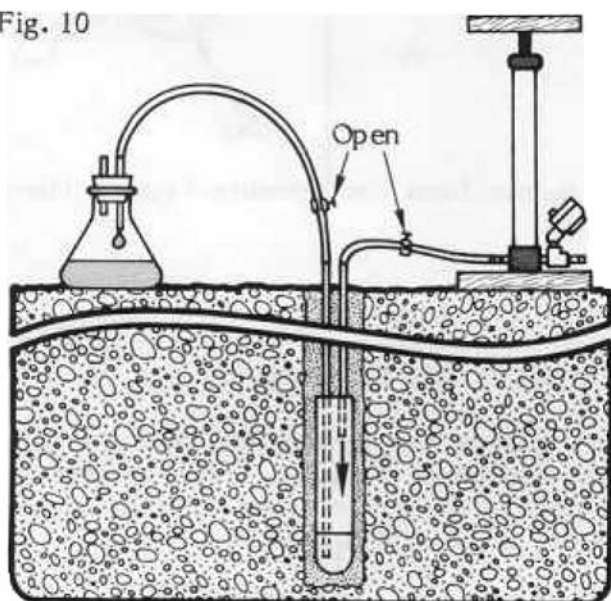


The vacuum fitting of the pump is connected to the other hole in the stopper, Fig. 8, and then pumped to create a vacuum within the flask or bottle. The vacuum will pull the sample up from sampler, through the plastic tube and into the flask or bottle.



On the Model No. 1920 Pressure-Vacuum Soil Water Sampler, the pinch clamp on the discharge access tube is closed and the vacuum fitting of the Pressure-Vacuum Hand Pump is connected to the pressure-vacuum access tube, Fig. 9. The pump is then stroked until a vacuum of about 60 centibars (18" of mercury) is created within the sampler, as read on the vacuum dial gauge connected to the pump. The pinch clamp on the pressure vacuum access tube is then closed securely to seal the sampler under vacuum. The hand pump can now be disconnected for other uses. To remove the collected soil water sample from the Model No. 1920 Pressure Vacuum Soil Water Sampler, attach the pressure-vacuum access tube to the pressure fitting of the Pressure-Vacuum Hand Pump, Fig. 10. Place the discharge access tube in a small collection bottle

Fig. 10

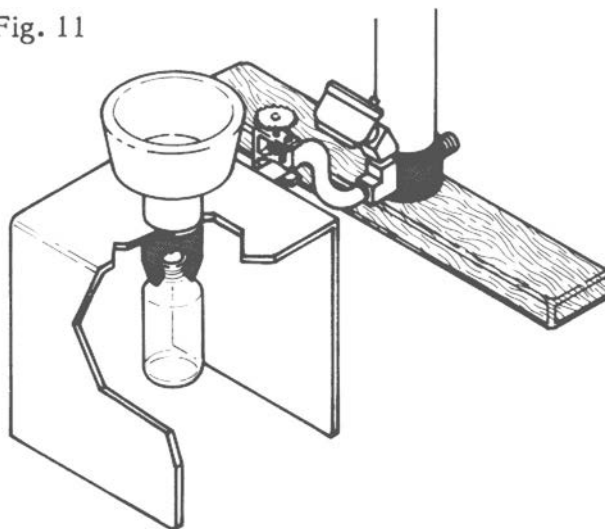


and open both pinch clamps. Apply a few strokes on the hand pump to develop enough pressure within the sampler to force the collected sample out of the sampler and into the collection bottle.

### USING THE 2006G2 PRESSUREVACUUM HAND PUMP AS A VACUUM SOURCE FOR PORTABLE EXTRACTORS

Connect a length of 3/16" I.D. rubber hose to the connection fitting of the portable extractor and the vacuum fitting of the pump, Fig. 11. A pinch clamp is placed on the rubber tube and left open. A vacuum of 80 to 90 centibars is then pulled, using the pump,

Fig. 11



within the extractor as read on the vacuum dial gauge. After the vacuum is pulled, the pinch clamp is closed, and the pump can be removed for other uses. The vacuum created within the extractor will cause the soil water sample to move from the funnel into the collection bottle.

### USING THE PRESSURE/VACUUM HAND PUMP TO CHECK THE CALIBRATION OF TENSIOMETER DIAL GAUGES

The adapter fitting on the end of the rubber hose is inserted into the filler end of the tensiometer body and held tightly against the "0" ring seal to make a vacuum-tight seal, as explained previously. As a vacuum is pulled within the tensiometer, the reading of the vacuum dial gauge on the tensiometer can be compared with the reading of the vacuum dial gauge on the pump, which is used as the reference gauge. In checking the calibration of the vacuum dial gauge, it is always desirable to lightly tap the gauge case to relieve the internal friction of the gauge mechanism to obtain the most accurate reading.

### GENERAL CARE AND MAINTENANCE

When the 2006G2 Pressure-Vacuum Hand Pumps are used for air removal or pulling a vacuum, very little maintenance of the unit is required. If, however, the pump will not hold a vacuum or has a pressure leak, the check valves of the pump could be leaking due to accumulation of debris. The check valves can be removed to be flushed and cleaned of particles which may interfere with their proper sealing action. To remove the check valves, unscrew the tube from the

Fig. 12

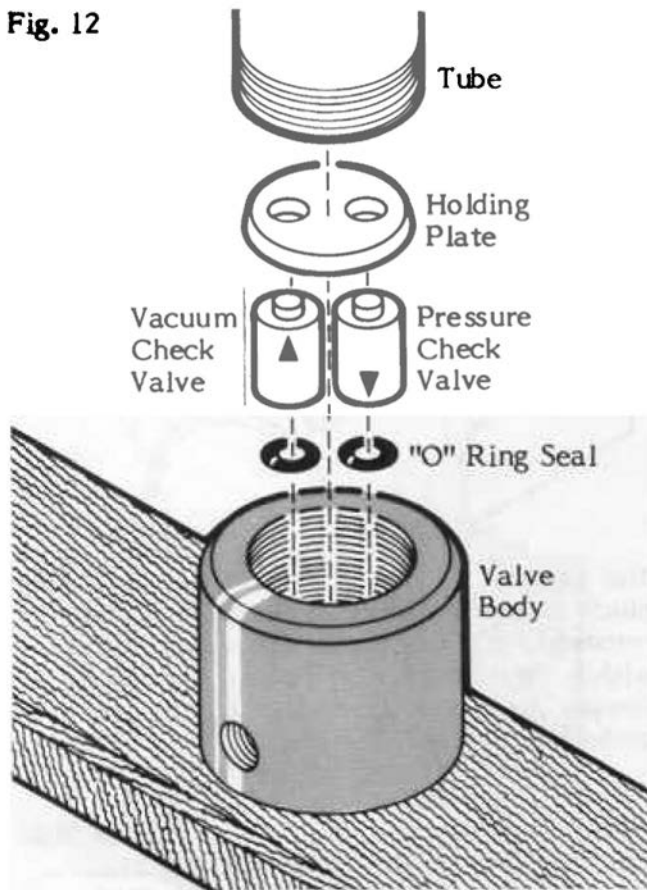
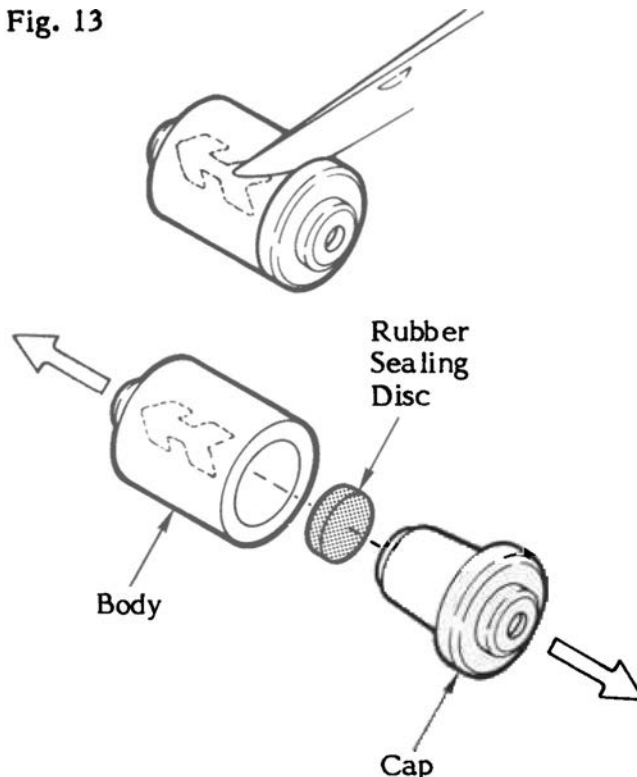


Fig. 13



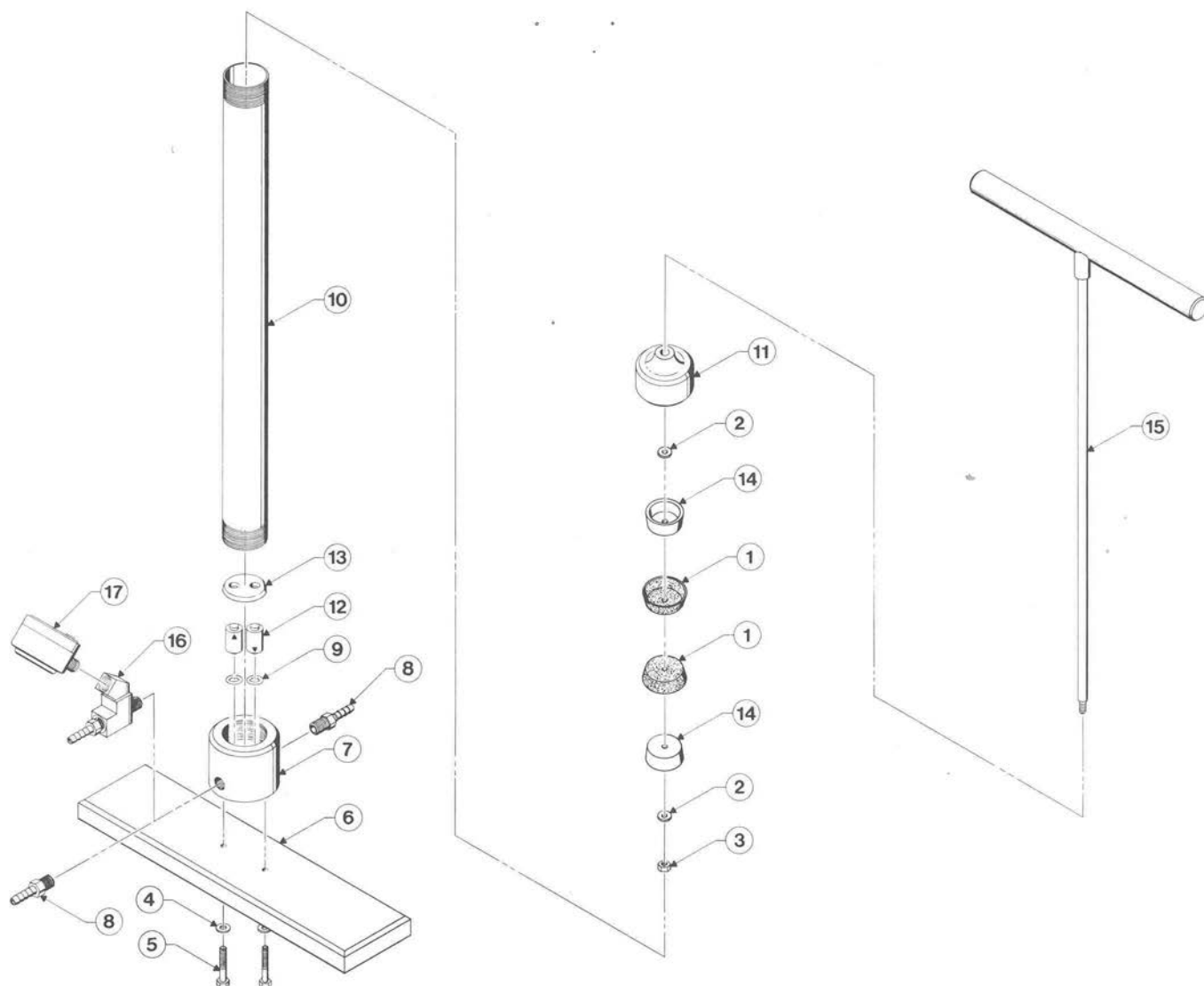
## MINOR ADJUSTMENTS

### To Adjust the Pointer

First remove the vent screw from the dial gauge and insert a small 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 was reading low, turn the screwdriver counterclockwise an estimated amount to correct the error. Repeat the process if necessary until the pointer is on the zero position.

valve body and remove the holding plate at the bottom of the tube cavity, Fig. 12~ The check valves can then be removed from the valve body, taking care to observe the correct orientation of each check valve, as they are the same in construction. The vacuum check valve should have the arrow on the side pointing towards the handle while the pressure check valve should have the arrow pointing towards the base. Once the check valves are removed, the valves can be disassembled by inserting a knife blade into the joint, Fig. 13, created by the body and cap, and prying the two pieces apart revealing the rubber sealing disc. Flush any accumulated debris from inside the body, and clean the sealing disc of debris. Reassemble the check valve, pressing the body and cap together, and insert the valve into the valve body as shown in Fig. 12. If the Inline Air Filter gets clogged due to the accumulation of debris, attach the air filter to the pressure inlet of the pump, in the opposite direction of flow used, and blow the debris out of the air filter with one or two pumps from the Pressure-Vacuum Hand Pump.

## 2006G2 PARTS LIST



### INDIVIDUAL REPLACEMENT PARTS

ITEM	PART #	DESCRIPTION	ITEM	PART #	DESCRIPTION
1	MML029	Leather Plunger	12	2006G1-007	Check Valve
2	RW030SCR	Washer	13	2006G1-008	Holding Plate
3	R2420CAH	Hex Nut	14	2006G1-009	Plunger Support
4	RW040BNR	Washer	15	2006G1-100	Handle Assembly
5	Q2420CAH20	Cap Screw, 1/4-20 X 1-1/4	16	1920K1-100	Gauge Adapter Assembly
6	2006G1-001	Base	17	2060FG3	Vacuum Dial Gauge, 2-inch Dial, 1/4" NPT Gauge Stem, Recalibrator-style
7	2006G1-002	Valve Body	18	2006G1-003	Adapter Fitting
8	2006G1-004	Outlet Fitting	19	MML043	Air Filter
9	M801X112	Neoprene "O" Ring	20	1900-203	Neoprene Tube
10	2006G1-005	Tube			
11	2006G1-006	Top Cap			

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