



MS17AM LEAK CHECKER

The MS17AM is a manual valve version of the MS17AB. Since it is a manual unit, some care must be exercised in the sequencing of the valves. The most important things to remember are that during normal leak testing:

1. The THROTTLE VALVE is NEVER opened unless the ROUGH VALVE has been operated first. In cases of large leaks, the ROUGH VALVE may still be open while opening the THROTTLE VALVE.
2. The THROTTLE VALVE is ALWAYS closed BEFORE opening the VENT VALVE. The only exception is during servicing.
3. The VENT VALVE is NEVER opened if either the THROTTLE VALVE or the ROUGH VALVE is open. Again, the exception is during servicing.

MS17AM OPERATING INSTRUCTIONS

WARNING

These instructions are not to be used for the MS17AB or MS17ABC. Instructions for these units will be found in the manual.

I. Starting from a total shut down.

a. Position of Valves and Control Switches

Rough Pump.....Off	Rough Valve..... Open
Forepump.....Off	Throttle Valve..... Closed
Diffusion Pump....Off	Test port.....Capped or connected to test object
Electronics.....Off	

b. Procedure

- 1) Plug the power cable into a 115 volt, 60 Hz source.
- 2) Plug the cord of the REMOTE LEAK METER into the socket on the rear, upper left part of the unit housing.
- 3) Cap the TEST PORT, or, connect to the test object.
- 4) Turn on the FOREPUMP switch. A gurgling sound will be heard, caused by the high pressure air being exhausted from the pump.
- 5) With THROTTLE VALVE **open** and ROUGH VALVE **closed**, the forepump can be monitored on the MANIFOLD PRESSURE meter (the thermocouple for the manifold meter is between these two valves, see diagram). Pressure should not exceed 500 millitorr. Once the pressure holds at 500 millitorr or less, **close** the THROTTLE VALVE and turn on DIFFUSION PUMP. The FOREPUMP and DIFFUSION PUMP switches are interlocked so that the diffusion pump cannot operate unless the forepump is on. You will not be able to monitor the pressure obtained by the diffusion pump until the electronics are turned on later.
- 6) Turn on the ROUGH PUMP and **open** the ROUGH VALVE. The pressure obtained by the rough pump will be displayed on the MANIFOLD PRESSURE meter.
- 7) After about 20 minutes (time needed for diffusion pump to heat up), turn on the ELECTRONICS switch. Turning on the electronics too soon can contaminate certain components. Monitor the pressure on the HI-VAC PRESSURE meter. If the pressure reading is off-scale, shut off the ELECTRONICS switch and wait a few more minutes. It can take a longer time to pump down if there is condensation in the cavity surrounding the cold trap.

WARNING

Never obstruct the filler opening of the cold trap fill pipe as pressure builds up due to nitrogen evaporation. Always wear protective gloves and eye protection when working with liquid nitrogen.

- 8) When the HI-VAC PRESSURE reads 10^{-4} Torr or lower, add liquid nitrogen (LN_2) to the cold trap. Start by adding a small amount to the trap and wait. After about 3 minutes fill the trap the rest of the way. The HI-VAC PRESSURE should drop to 5×10^{-5} Torr or lower in a few minutes.
- 9) Push the FILAMENT switch to on. This should light the EMISSION lamp on the front panel and the TEST lamp on the remote meter. These lamps should remain lit. If the HI-VAC PRESSURE gets higher than about 3×10^{-4} the filament will automatically turn off. If this happens you should:
 - a. check the cap on the test port, or, if you are connected to the test object, check connections.
 - b. evaluate if your leak is large enough to detect by other means.

II. Leak Testing - Typical

a. Procedure

- 1) If not already done, connect the object to be tested to the TEST PORT. Tighten the quick coupling securely. The electronics must be on and the cold trap filled.
- 2) **Open** the ROUGH VALVE fully and pump down to 20 millitorr. If 20 millitorr cannot be reached, see Section III.
- 3) **Close** the ROUGH VALVE and slowly **open** the THROTTLE VALVE fully. The HI-VAC PRESSURE meter should read less than 2×10^{-4} . Turn the FILAMENT on. The EMISSION lamp should stay lit.
- 4) Set the Volume and Scale on the REMOTE LEAK METER so that a low, steady tone is heard.
- 5) Spray the test object with helium, watch for the needle to deflect and listen for the tone to get higher in pitch. There can be a delay of as much as 10 seconds between helium spray and detection by the Mass Spectrometer, be patient.
- 6) When the leak test is done, **close** both the THROTTLE and ROUGH VALVES. **Open** the VENT VALVE until the test object is fully vented to atmosphere. Disconnect the test object and **close** the VENT VALVE.

III. Leak Testing – Large Leaks, Large Gassy Volumes

Occasionally, the manifold pressure will not go down to 20 millitorr. This is either due to a large leak, several small leaks, or a very large volume that is slow to pump down. In these cases a slightly different technique is used in operating the valves.

a. Procedure

- 1) If not already done, connect the object to be tested to the TEST PORT. Tighten the quick coupling securely. The electronics must be on and the cold trap filled.
- 2) **Open** the ROUGH VALVE fully and pump as low as possible. If pressure is above 20 millitorr it must be “throttled” into the high vacuum section.
- 3) Slowly **open** the THROTTLE VALVE until a reading of between 5×10^{-5} and 1×10^{-4} is read on the HI-VAC PRESSURE meter. Note that the ROUGH VALVE is still open.
- 4) Spray the test object with helium and monitor the REMOTE LEAK METER. Use a minimum of helium at first because there may be a large leak. Increase the helium dose if nothing is detected.
- 5) When the leak test is done, **close** both the THROTTLE and ROUGH VALVES. **Open** the VENT VALVE until the test object is fully vented to atmosphere. Disconnect the test object and **close** the VENT VALVE.

IV. Partial Shut Down (Overnight or Weekend)

a. Procedure

- 1) Cap the TEST PORT. Tighten the quick coupling securely.
- 2) **Open** the ROUGH VALVE until 20 millitorr or less is reached.
- 3) **Close** the ROUGH VALVE. The THROTTLE and VENT VALVES should already be closed.
- 4) Turn off the ELECTRONICS.

V. Complete Shut Down

a. Preparation

- 1) The cold trap must be at room temperature before a complete shutdown can be performed. Leave the unit in the “Partial Shut Down” configuration until the LN_2 evaporates and the cold trap warms to room temperature. Leave a note on the unit

saying that it is warming up for a complete shut down. This is to prevent condensation from forming in the vacuum chamber around the cold trap.

b. Procedure

- 1) Turn off the ELECTRONICS.
- 2) Turn off the DIFFUSION PUMP. Note the time.
- 3) Wait 30 minutes after turning off the diffusion pump.
- 4) Verify that the COLD TRAP is at room temperature. If not, wait until it is.
- 5) **Open** the ROUGH and THROTTLE VALVES and pump down to 500 millitorr. **Close** the THROTTLE VALVE. Turn off the ROUGH PUMP. **Open** the VENT VALVE until pressure equalizes. **Close** the ROUGH VALVE.
- 6) If it has been at least 30 minutes since step (3), **open** the THROTTLE VALVE. Turn off FOREPUMP. **Close** the VENT VALVE.