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Vacuum Test Kit

Instruction Manual
for Part No. 6978



Contents

- Vacuum Pump
- Fluid Container
- Transfer Cap
- 2 Lengths Vacuum Hose
- 12 Assorted Vacuum Hose Fittings
- Brake Bleeder Fitting
- Instruction Manual
- Blow Molded Case



WARNING: Wear eye protection and insulated gloves that meets ANSI Z87.1, CE EN166, AS/NZS 1337, and OSHA standards.

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Introduction

The use of a vacuum gauge is often overlooked when determining an engine's mechanical condition as well as performing a fault diagnosis. Monitoring actual manifold vacuum is invaluable when troubleshooting engine faults. This can only be done using a good quality vacuum gauge and a hand-operated vacuum pump. This allows for static testing of all types of vacuum operated systems.

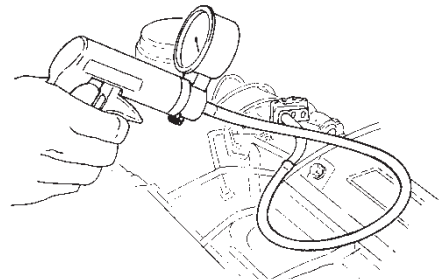
On the following pages are examples of applications in which a vacuum pump can be used. Please refer to an engine's manufacturer repair manual for correct testing procedures and specifications. Additional tests, such as, compression tests, cylinder leakage tests, ignition timing checks etc. should also be performed to confirm the indications of vacuum gauge readings.

Analysing Engine Mechanical Condition via Manifold Vacuum Readings

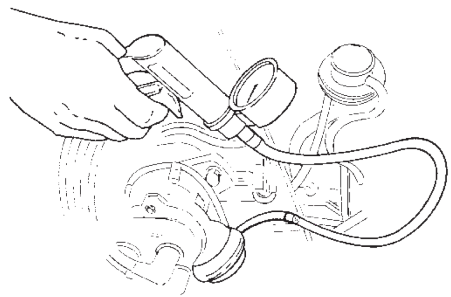
It is the action of the needle rather than the actual reading that is important. Varying engine types will run different manifold vacuum pressures, depending on camshaft profile, valve overlap, timing etc. An exact vacuum reading cannot be specified. Needle readings should be between 16 to 21 inHg and hold steady.

Manifold vacuum is affected by altitude. Readings will drop approximately 1 inHg for every thousand feet above sea level.

- Step 1. Run engine until normal operating temperature is reached.
- Step 2. Locate and connect the vacuum gauge to a port directly on the manifold or on the carburetor below the throttle butterfly.
- Step 3. Start and run the engine at idle, observing the gauge needle reading.
- Step 4. Refer to vehicle service manual for any abnormal readings on gauge.

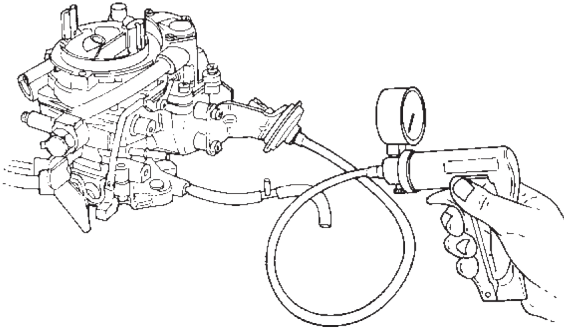
**Ignition System Vacuum Advance**

To test, start engine and let it idle. Remove the vacuum line from the distributor advance mechanism. Connect the vacuum pump and create a 5 – 10 inch vacuum, monitoring the timing at the same time. If a timing advance is noted this confirms that the vacuum diaphragm and mechanical links are in order and the fault is a vacuum supply. To confirm this connect the vacuum tester to the vacuum supply line and check the gauge reading. No vacuum should be noted at idle but when the engine RPM is increased a vacuum increase should also be noted. If this does not occur, trace the vacuum line back checking for restrictions and breaks.



Fuel Systems - Carburetors

There are many different types of vacuum control systems used on carburetors. This vacuum tester is quick and accurate when testing of these systems. Listed below are just two examples of tests that can be performed.

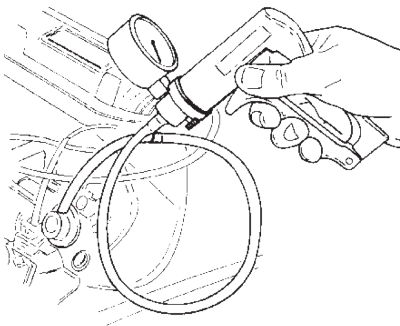
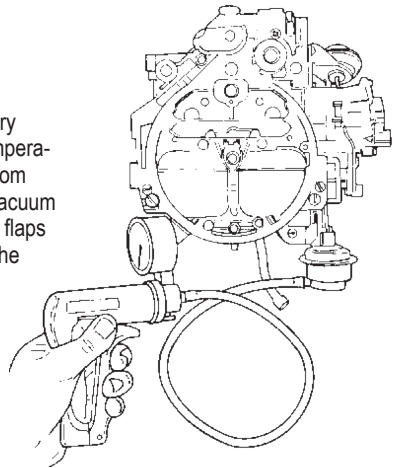


Example 1.

Testing a Choke Break Diaphragm. With the engine at normal operating temperature but not running, disconnect the vacuum line to the diaphragm module. Connect the vacuum tester and apply approximately 15inHg and allow to sit for 30 seconds. No drop in gauge reading should be noted. With the vacuum still applied ensure that the choke butterfly is pulled slightly open.

Example 2.

Testing Vacuum Operated Carburetor Secondary Barrel. With the engine at normal operating temperature but not running, remove the vacuum line from the secondary diaphragm module. Attach the vacuum tester, hold the throttle and secondary air valve flaps open. Operate the hand pump while watching the secondary throttle butterfly open freely.



Testing Fuel Injection Pressure Regulator

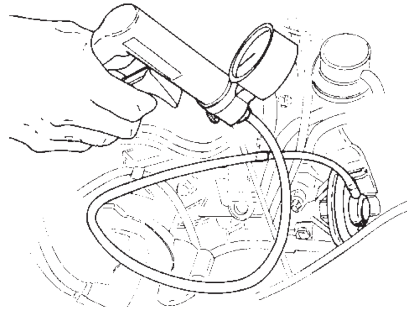
To test the fuel rail pressure, a gauge is attached to the rail, start and idle engine.

Remove and block off the vacuum supply line to the pressure regulator, connect and operate the vacuum pump to approximately 15inHg and note the variation in the fuel pressure reading.

Testing Emission Control Exhaust Gas Recirculation Valves (EGR)

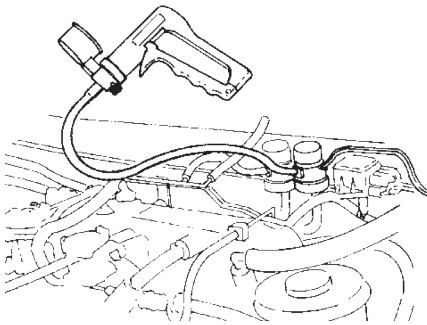
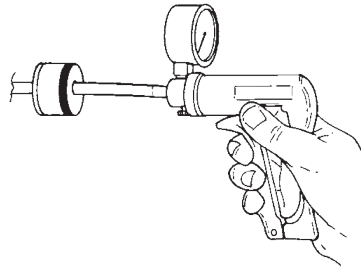
Start engine and run at idle until normal operating temperature is reached. Remove the vacuum line from the EGR valve and attach the vacuum tester pump.

Operate the hand pump to apply approximately 15inHg. If the EGR Valve is working correctly the engine idle will become rough.



Testing One Way Valves

Remove valve, attach the vacuum test pump and operate to apply vacuum. In one direction the valve must hold vacuum and in the opposite direction it must not.

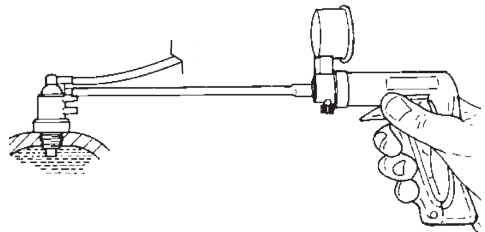


Testing Electrically Operated Vacuum Solenoids

Locate the solenoid to be tested and remove the line that goes to the component being tested. Connect the vacuum tester to the solenoid port and start the engine. With the system turned off there should be a zero gauge reading. Now turn the system to the "on" position and a gauge reading equal to the manifold vacuum should be noted.

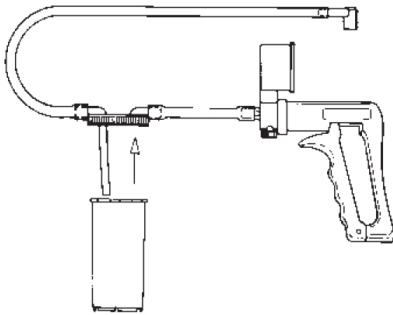
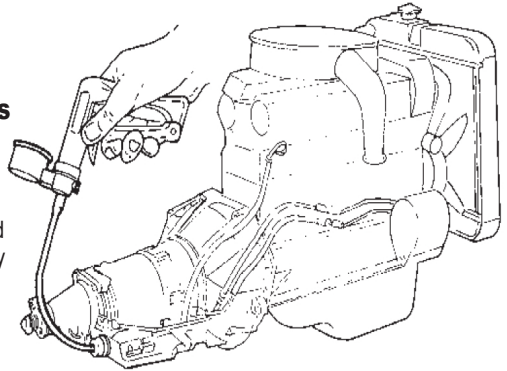
Testing Thermal Vacuum Switches

Remove the vacuum supply line coming from the manifold to the switch and test for manifold vacuum. If this vacuum is correct reconnect the supply line to the thermal switch and remove the opposing line from the switch. Attach the vacuum tester to the port and start the engine. With a cold engine no reading should be noted. When the engine reaches normal operating temperature a manifold vacuum reading should be noted.



Testing Automatic Transmission Vacuum Operated Modulator Valves

To test the modulator valve diaphragm remove the vacuum supply line from the valve and attach the vacuum tester. Operate the tester until approximately 15inHg is achieved and monitor the gauge reading for approximately 30 seconds. No vacuum drop should be noted.



Brake Bleeding – Assembly of Brake Bleeder Kit

Ensure that vacuum pump is connected to the brake bleeder reservoir in accordance with the assembly diagram (Pictured left). Failure to do so will result in brake fluid being drawn into the vacuum pump.

Brake Bleeding

1. Draw contaminated fluid from master cylinder. Replenish with new fluid.
2. Remove and clear bleeder screw. Apply silicone grease to threads to prevent air being drawn past thread.
3. Attach suitable bleeder fitting to bleed screw.
4. Operate vacuum pump until approximately 21inHg vacuum is created in container.
5. Open bleed screw. Allow fluid to be drawn until new fluid is visible in clear hose.
6. Close bleed screw.
7. Fill master cylinder reservoir after each wheel.

- Note: Refer to specific procedures and instructions from the vehicle manufacturers service manual.
- Empty bleeder container as required. Do not allow container to overflow as brake fluid will be drawn into vacuum pump.
- After bleeding, test brake performance.
- Clean bleeder components “with water only” after use.

