Instructions for
Vacuum and Fuel
Pressure Tester Kit

Cranking vacuum tests

1. Start engine and allow it to warm
to normal operating temperature.
Stop engine. To prevent the
engine from starting, disable the
ignition system.
2. Remove the air filter. Back out the
idle speed screw (see Figure 1)
until the throttle valve is tighly
closed. If the carburetor is also
equipped with an idle air bleed
screw, turn the screw clockwise
until it bottoms lightly. In both
cases, count the number of turns
so the screws can be returned to
their original positions after the
tests.
3. If the vehicle is equipped with an
idle stop solenoid (See Figure 1 ),
disconnect the electrical wire at
the base of the solenoid under the
rubber boot or at the connector
as shown.
4. If the engine is equipped with a
PCV (Positive Crankcase
Ventilation) system, remove the
PCV valve at the engine rocker
arm cover (see Figure 2) and plug
the valve on the bottom with tape
or other suitable means.
5. Using the hose supplied, connect
the Vacuum Gauge to a source of
manifold vacuum. This may be a
fitting on the carburetor below the
throttle plate, or a fitting in the
intake manifold. See Figures 2
and 9.
6. Crank the engine and note
Vacuum Gauge reading.

(After testing, return adjustment

screws to their original positions.)

rubber cover cover solenoid

The general condition of an engine
is indicated by one of three possible
gauge readings:

1. (Figure 3) A reasonably steady
vacuum reading of 4 inches or
more on emission controlled
engines, and 10 inches or more

Fig. 3

on non-emission controlled engines
(pre-1968) indicates correct engine
vacuum. Readings may vary
considerably on different engines,
but should not fall below these
minimums. (See manufacturer's
specifications).

1. (Figure 4) An excessively low,
steady vacuum is caused by a
condition which affects all cylinders
equally.

Check for:

1. Leaking carburetor flange gasket.
2. Worn carburetor throttle shaft.
3. Leaking vacuum lines.
4. Improper valve timing.
5. Slow engine cranking due to:
* Battery
* Battery cable connections
* Defective starter motor
* Excessive mechanical drag in engine

caused by:

1. Tight fitting pistons in

rebuilt engine.

1. Thickened oil due to

excessive oxidation.

1. (Figure 5) A reading which pulses
unevenly indicates a leaky condition
which affects one or more, but not
all cylinders.

Fig. 5

NOTE: A certain amount of even
pulsing is normal, notably on 6 and 4
cylinder engines, and does not
necessarily indicate a leaky condition.
Check for:

1. Burned or stuck valve.
2. Intake manifold leak at one cylinder.
3. Worn intake valve guide.
4. Broken piston or piston rings.

Running vacuum test

While performing a running vacuum
test, it is possible to obtain a different
gauge indication than that obtained
under the cranking vacuum test.

1. Connect the vacuum gauge to a
source of manifold vacuum. See
Figures 2 and 9.

Fig. 6

1. Run the engine at normal operating
temperature and idle speed
2. (Figure 6) A steady reading between
15 and 22 inches indicates a
mechanically sound engine.
3. (Figure 7) A pointer which sweeps
or wanders erratically through
several inches indicates a
malfunction affecting all cylinders
unequally and inconsistently. To
help isolate the troubled area, run
the engine at about 2000 RPM. If
the pointer steadies, check for:
4. Ignition and/or timing.
5. Carburetor mixture adjustment at
idle. If the sweep gets larger, check
for weak or broken valve springs. If
the sweep becomes shorter and
more rapid, check for:
6. Carburetor or intake manifold leaks.
7. Sticky valves.

Exhaust restriction test

With vacuum gauge connected to a
source of manifold vacuum, increase
engine speed to 2000 RPM, maintain
this speed, and note the vacuum
gauge reading. A gradually decreasing
vacuum reading may indicate a
restricted exhaust system.(Partially
blocked muffler or tailpipe.)

Positive crankcase ventilation (pcv)
valve test

1. Unplug the PCV valve, plugged
previously with a piece of tape
(Step 4, Cranking Vacuum Tests)
and crank engine.
2. If the PCV valve is operating
properly, the vacuum will drop to
about one-half the value noted in
Step 6, Cranking Vacuum Tests.
3. A reading much lower than one-half
indicates excessive flow which could
upset the proper carburetor air/fuel
ratio causing rough idling and
burned valves.
4. No change in the vacuum indicates a
clogged PCV valve.
5. Return the idle screw (and idle air
bleed screw) to its original position.
(See Step 2, Cranking Vacuum
Tests).
6. Re-enable the ignition system.
7. Re-connect the wire to the idle
stop solenoid.
8. Re-connect all hoses and
vacuum lines.
9. Re-install the PCV valve in its
proper location

PCV system test

1. Operate the engine at normal
temperature and idle speed.
2. Remove the hose connected
between the air cleaner and valve
cover or oil filler/breather cap as
shown in Figure 8. Plug the oil
dipstick tube to prevent an air leak-
3. Hold the vacuum gauge with rubber
universal adaptor firmly over the
valve cover hole or filler/breather
cap opening.
4. A properly working PCV system will
draw a vacuum of about 3 to 5
inches within 10 seconds.
5. If there is very little or no change in
the gauge reading in the first 10 to
15 seconds of the test the PCV
valve is clogged or frozen, or there
is excessive air leakage in the
vacuum hose between the intake
manifold and PCV valve (or other
leakage into the crankcase).
6. Repair or replace the defective parts
as needed and reconnect hoses.

Distributor vacuum advance
mechanisms

The amount of spark ignition advance
needed is determined by the intake
manifold vacuum and engine speed.
The vacuum advance mechanism in
the distributor is connected to the
intake manifold or carburetor by a
rubber hose. To measure the amount
of vacuum at any RPM, disconnect the
hose from the distributor and insert a
"Tee" connector (Item 4, Figure 12) in
line with this hose and another back
to the distributor as shown in Figure 9.
Also, connect the gauge to the "Tee"
as shown.

On many systems, little or no vacuum is
applied to the distributor at idle-, as the
throttle is opened wider (engine RPM
increases),the vacuum gradually
increases. The manifold vacuum drops
when the engine is accelerated in
proportion to the amount of throttle
advance. The gauge should read

between 18 and 21 for normal engines.
Check vehicle manual for your car for
proper value.

If the vacuum gauge does not change
or changes very little with a change in
RPM as described above, the vacuum
hose may be open or cracked, or the
diaphram in the advance mechanism
may be punctured.

NOTE: The vacuum reading can appear
to be normal during the above tests
while the advance mechanism is
defective; that is, frozen due to rust,
dirt or corrosion.

Fuel pump testing
CAUTION: Use extreme care in
disconnecting fuel lines. Catch all
gasoline in a container and discard.
Leaking gasoline is a serious fire
hazard.

Before testing, check tightness of all
fittings and connections.

Check the rubber fuel lines at the fuel
pump for deterioration, such as
splitting, cracking and spongyness.

If leaks are evident in lines or fittings,
repair or replace as necessary. If
leakage is detected in the pump at the
diaphragm flange, in the sheet metal
cover, or in casting breather holes,
replace the fuel pump. Check fuel level
and remove any kinks in the fuel line. It
is not necessary to remove the fuel
pump for any of these inspections.

1. Disconnect the fuel line between the
fuel pump and the carburetor and
attach the vacuum gauge hose to
the fuel line, using adaptors as
necessary. (See Figure 10).

NOTE: The fuel in the carburetor fuel
bowl will be sufficient to run the
engine for these tests.

2. Operate the engine at idle. Hold
gauge at carburetor height and note
the reading. Stop engine and
re-connect fuel line.

Compare the observed reading with
the manufacturer's specifications. If
specifications are not immediately
available, fuel pump pressure can be
considered satisfactory if it is between
4 and 6 PSI, with lower readings for
smaller displacement engines. If
pressure reading falls outside this
range, consult the manufacturer's
specifications before replacing the
fuel pump.

Volume test

1. Operate engine with fuel line
connected to fill carburetor fuel
bowl. Stop engine.
2. Disconnect the fuel line at the
carburetor and connect a flexible
hose to the fuel line using the
adapter as shown in Figure 11.
Insert the other end of the hose
in a proper gasoline container.

Fig. 11 Carburetor

1. Have an assistant start the
engine. While holding the
gasoline can, carefully collect the
discharge from the fuel pump for
exactly 30 seconds. The assistant
must count off the time precisely
and turn off the engine after the
30 seconds to get an accurate
measurement. Reconnect the
fuel line to the carburetor.
2. Remove the gasoline from the
engine area. Pour the contents
of the gasoline can into another
container marked off in fluid
ounces such as a kitchen
measuring cup. Record the
fuel quantity.
3. After taking all measurements,
return the fuel to the vehicle’s
gas tank.

Consult the manufacturer's
specifications for required fuel
delivery rate. If specifications are
not readily available, use the
following table as a guide.

Engine Ozs.Collected

Displacement (CID) (30 seconds)

Up to 225 8

225 to 350 11

Over 350 16

If the above conditions are not met,

replace or repair the defective
components.