

# IGNITION TIMING

With Tachometer and Vacuum Gauge

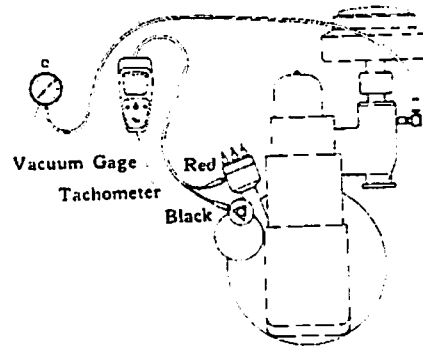
Reprinted from:  
"Service Tips for the  
 Automotive Mechanic"

Detonation and the results of detonation are costing automobile and truck owners thousands of dollars every year. Detonation is the major cause of top ring breakage, piston land and groove troubles.

One of the greatest causes of detonation is improper ignition timing. The practice of setting initial ignition timing with a timing light and then road-testing the vehicle and listening for detonation is often unsatisfactory. On some engines it is possible for the vibration damper to move on the damper assembly, which will cause the timing mark on the vibration damper to give an erroneous reading. A faulty vacuum advance diaphragm, inoperative or worn centrifugal governor mechanism can also cause erroneous ignition timing.

To eliminate the possibility of detonation, the following procedure can be used. Connect an electric tachometer and a vacuum gauge to the engine (See illustration). Set the engine speed to 1000 r.p.m. with the idle speed adjusting screw. Loosen the distributor mounting screws and slowly rotate the distributor back and forth until the highest vacuum reading is obtained on the gauge. If the engine speed changes, readjust to 1000 r.p.m. After the highest vacuum reading has been obtained,

rotate the distributor in a retard direction until the vacuum gauge has dropped exactly one-half inch and then tighten the distributor locking screws.



If the engine speed drops more than 20 r.p.m. after retarding the timing, one or more of the following conditions exists: Loose distributor shaft, improper cam angle, faulty advance mechanism, poor point condition.

If this ignition timing procedure is followed, the possibility of detonation will be eliminated and power settings of the timing curve will be up to standard.

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**80 MILES PER HOUR  
 IN A V-16**

Reprinted from:  
"The Cadillac-La Salle  
 Service Man"

Speeds of 70, 80 and 90 miles per hour have become so common that many owners do not realize what a tremendous task the car is performing with no apparent effort. As an example, here is what happens in an average V-16 travelling at a speed of 80 miles per hour:

- This speed requires approx. 100 h.p. at the rear wheels.
- The rear wheels are turning 840 revolutions per minute.
- The tires cover 117 feet of road surface per second.
- The engine turns 3900 revolutions per minute.
- Each spark plug fires 33 times per second and each valve opens and closes within a space of 1/104 of a second.

CRANKSHAFT

The crankshaft turns over 65 times per second. Twice during each complete revolution of the crankshaft each piston is accelerated from rest to a speed of 45.3 miles per hour and brought to rest again, all in 1/130 of a second.

Intake gas is drawn into the cylinders past the valves at an average speed of 148 miles per hour. Exhaust gases are forced out past the valves at a temperature of 1600° F.

There are 31,200 explosions per minute.

Each of the two distributor contact arms makes and breaks 260 times per second.

The water pump circulates a stream of 90 gallons per minute while the tip of the fan blades travel over 3-1/2 miles.

Energy required to stop over 3 tons of mass at 80 miles per hour would raise a 250-ton Pacific freight locomotive 33 inches in the air. The heat dissipated in stopping the car would evaporate 1-1/2 pints of water from room temperature.

And the remarkable part of this performance is the fact that the car stands ready for this task at any time. No special oils, pre-heating or unusual gearing that prevents ordinary speeds for city driving are required. Cadillac cars take it as a matter of course.