TUNE-UP



Technical Training Series

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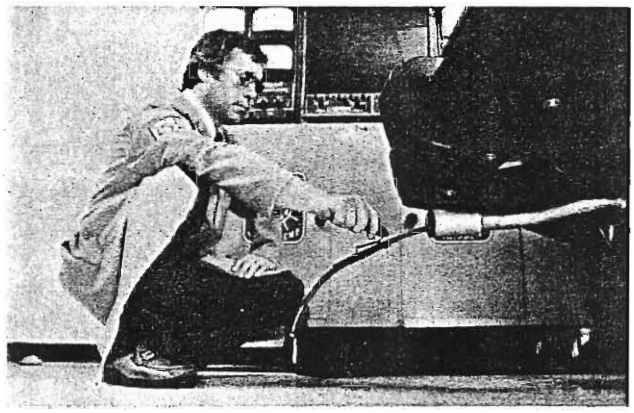
There was a time when tuning a British Leyland car involved only changing the spark plugs, points and condenser, and checking the ignition timing. With the modern emission control systems, it's not so simple to make the new British Leyland cars perform to specification by using older tools and techniques.

Several things are required to ensure that complex modern cars are properly tuned: a modern service department with up-to-date equipment; service information, in the form of workshop manuals and service bulletins; and most of all, qualified technicians.

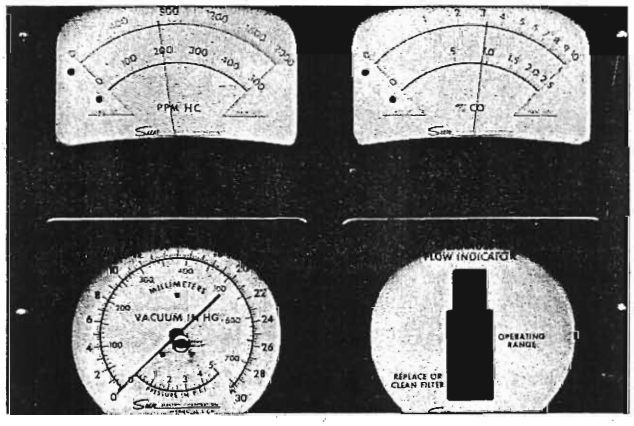
This workbook specifically addresses the Triumph TR7 tune up. However, this information should be used as a guide for tuning all British Leyland Motors cars.

Specifications for each car will be found in the Repair Operations Manual and on the emission decal located in the car's engine compartment.

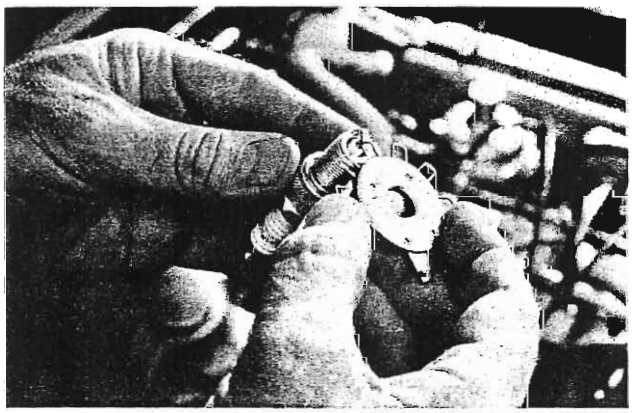
Please remember that a complete tune-up is part of BLM's regularly scheduled maintenance for all its cars.



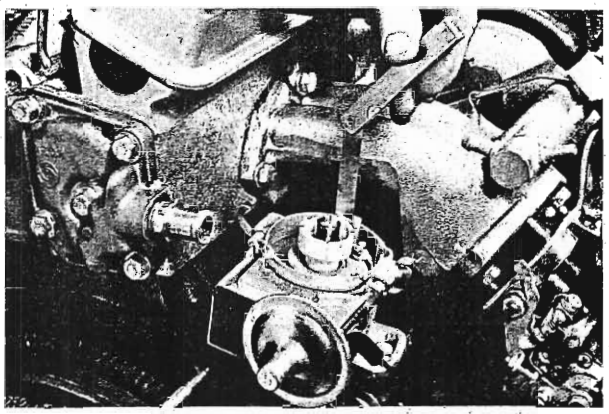
First we diagnose any problems in the engine and emission components with the infrared tester and an engine scope. This is done by sampling the exhaust gas.



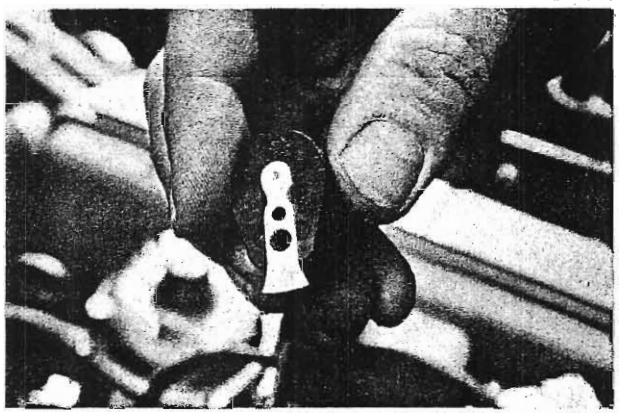
Let's assume that our testing indicates that the engine is in a very poor state of time and that high emissions are indicated. So, we'll do a complete tune-up on the TR7. During the tune-up, replace any defective components indicated by the engine scope analysis.



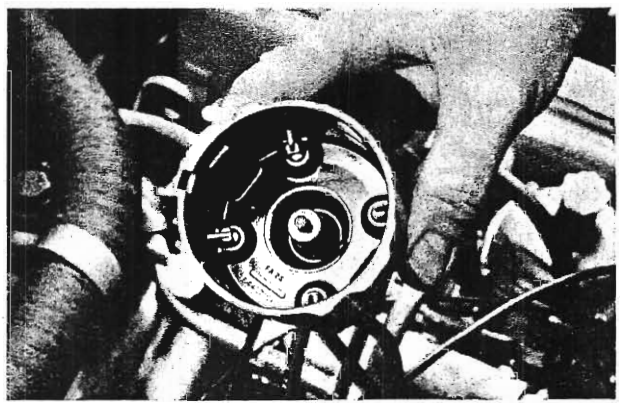
Remove, clean and gap the spark plugs. If the electrodes have deteriorated, replace the spark plugs, but be sure to set the gap before installing them.



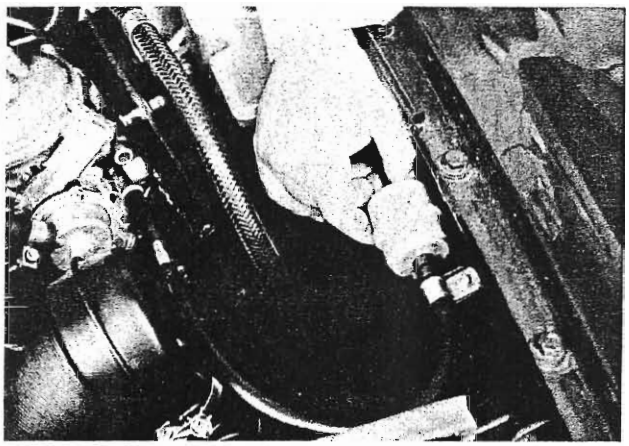
Check the electronic ignition air gap and lubricate the rotor shaft as shown. If a conventional ignition system is fitted, change the contact points and condenser.



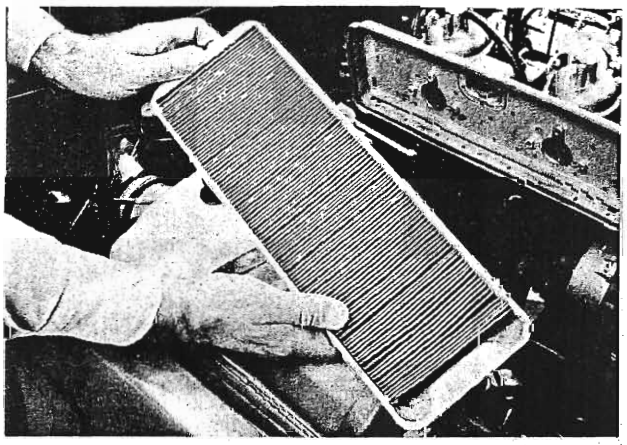
Check the rotor.



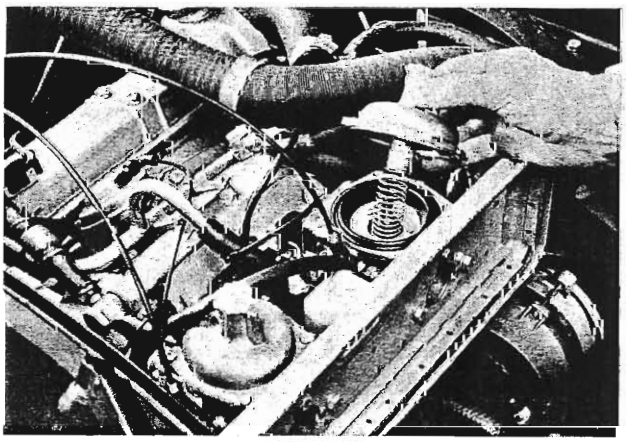
Check the distributor cap and high tension wire condition. Replace the rotor if it is burned. Replace the cap if tracing or cracks are present.



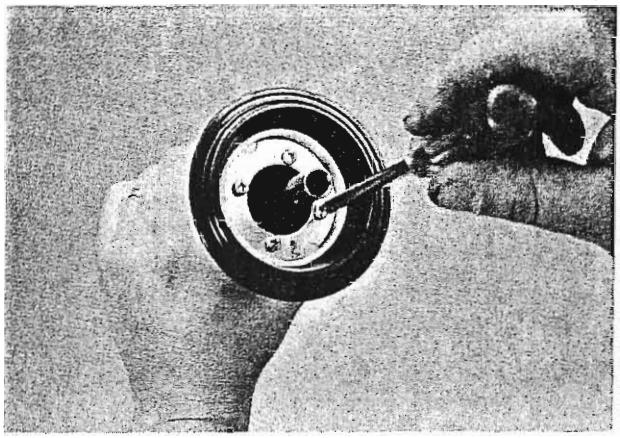
Replace the fuel filter cartridge.



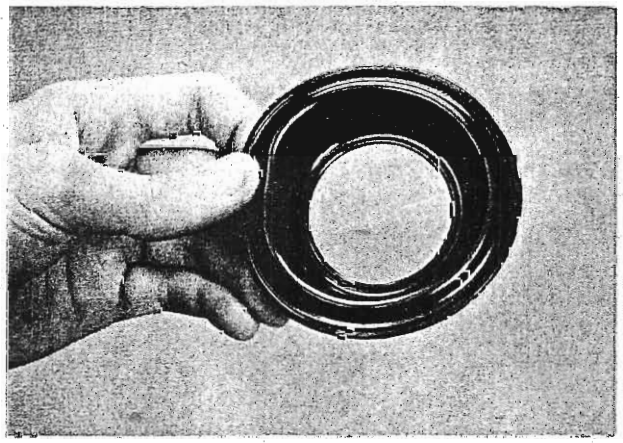
Replace the air filter element. Next . . . check the carburetor diaphragm for cracks or holes.



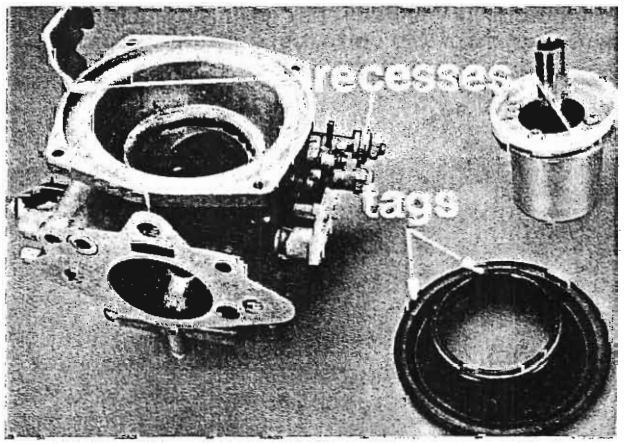
Do this by removing the four screws holding the top cover to the carburetor body. Then lift off the top cover and remove the diaphragm spring.



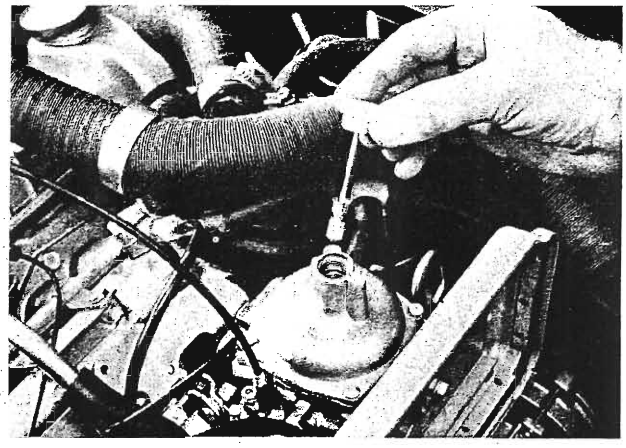
Remove the piston and diaphragm assembly, and loosen the screws on the diaphragm retaining plate. Then lift out the diaphragm.



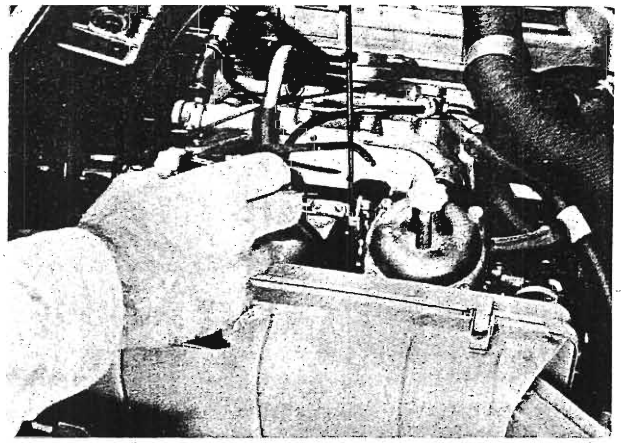
Now . . . inspect the diaphragm. If you are unable to determine the condition, replace the diaphragm as a precautionary measure.



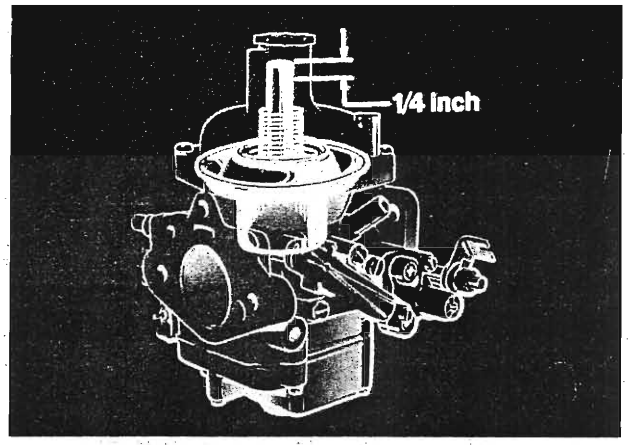
When re-installing the diaphragm, be sure the inner and outer tags are located in the recesses. Now, top-up the carburetor piston dampers.



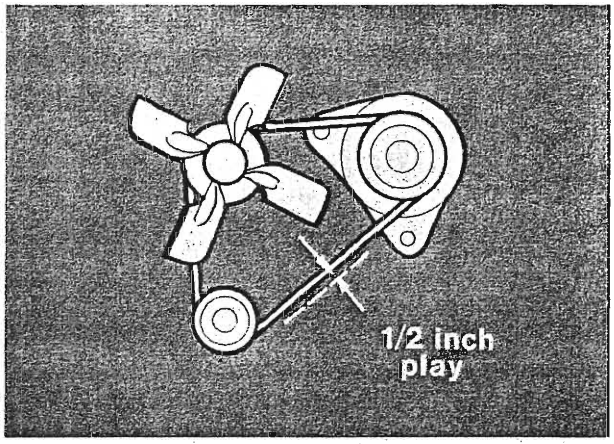
Remove the damper assembly from the top of the carburetor.



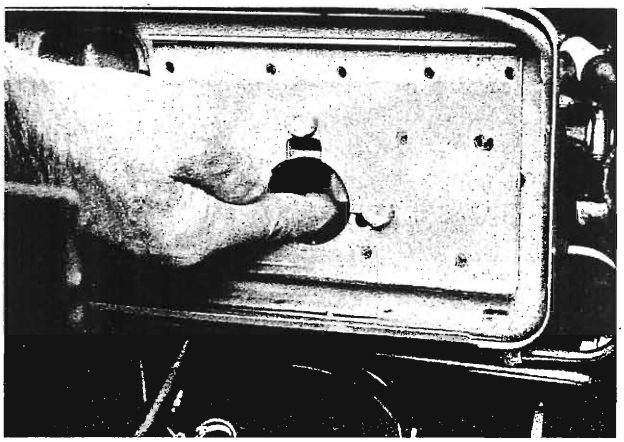
Next . . . lubricate the throttle linkage and ensure that it moves freely.



Raise the piston with your finger through the carburetor opening. With the piston raised all the way, top-up the damper tube with engine oil until the level is ¼ inch from the top of the tube.

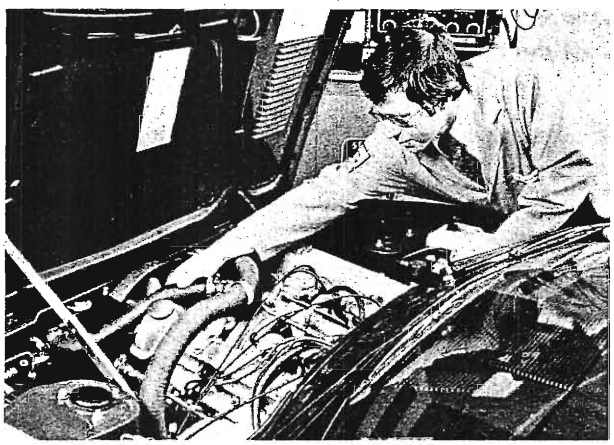


Check and adjust all drive belt tensions. The maximum deflection should be ¾ to 1 inch on the longest run.

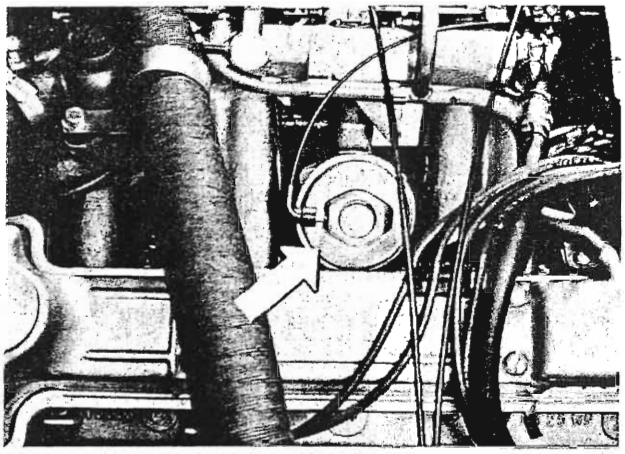


Then, reinstall the damper assembly. Again, raise the piston all the way. This will enable you to position the oil retaining clip.

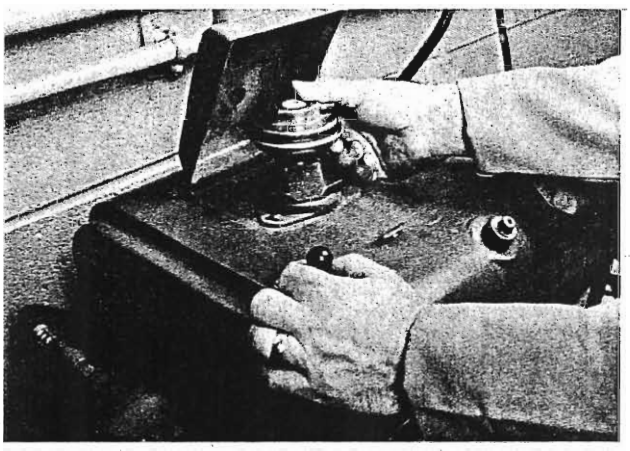
NOTE: Some resistance will be felt as the retaining clip is positioned in the piston.



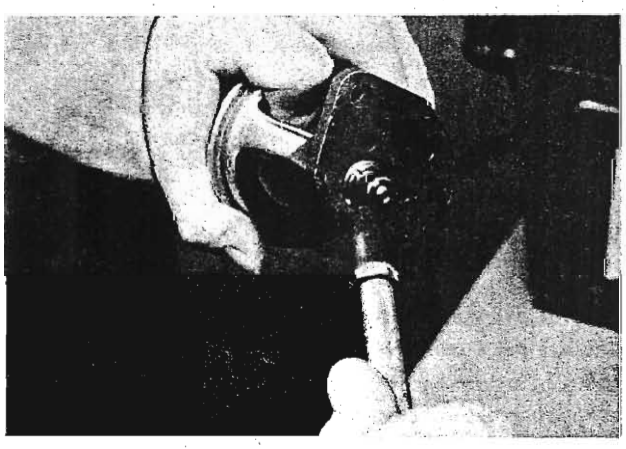
Check the condition and tightness of all hoses . . . vacuum, air and water. At specified mileage the exhaust gas recirculation valve should be serviced.



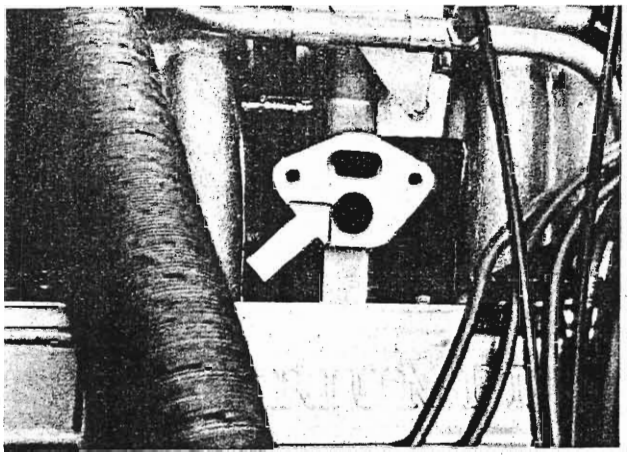
Here's how it's done . . . first . . . remove the valve, and clean the base with a wire brush.



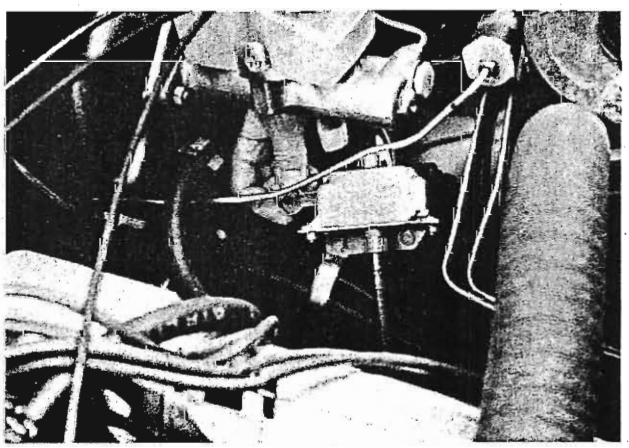
Then, clean the valve seat and metering valve. Keep the valve off the seat by holding the diaphragm up with your fingers. Use short 30 second blasts until the valve and seat are clean.



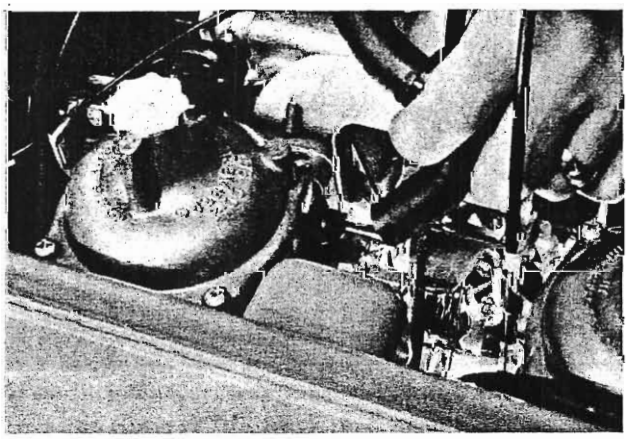
Blow-off the valve and seat with shop air to remove all carbon and cleaning compound.



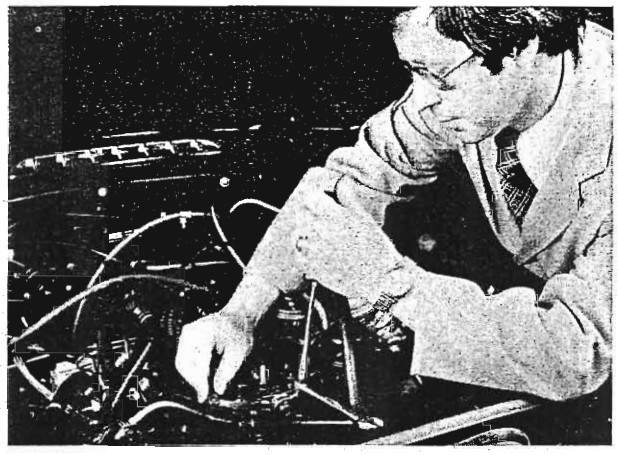
Inspect the ports in the manifold for accumulation of deposits. Light deposits are acceptable; however, if heavy deposits are present, the manifold must be removed for cleaning.



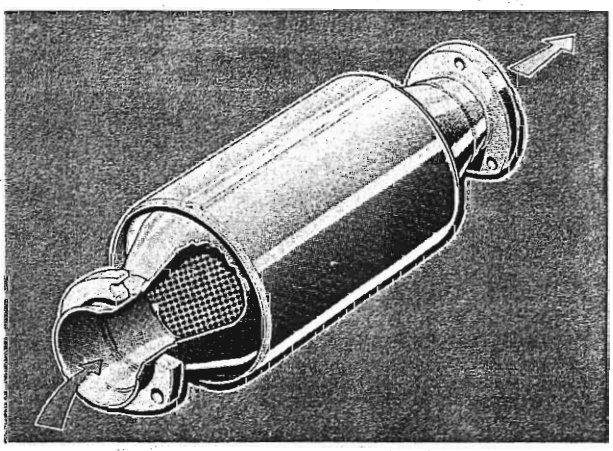
After servicing, reinstall the manifold and EGR valve. Then reset the EGR service interval indicator with the special key.



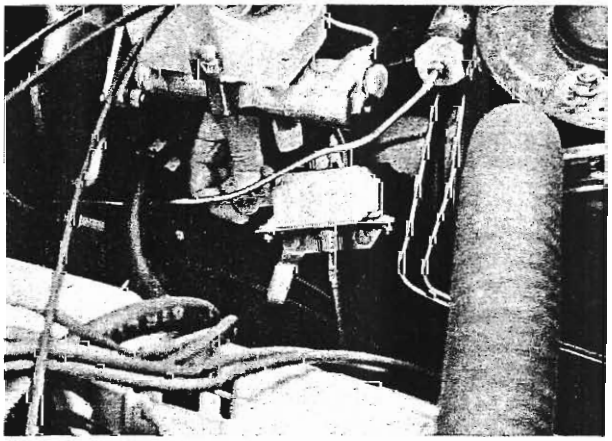
At 12,500 miles, check for obstructions in the crankcase purge line restrictor at the valve cover.



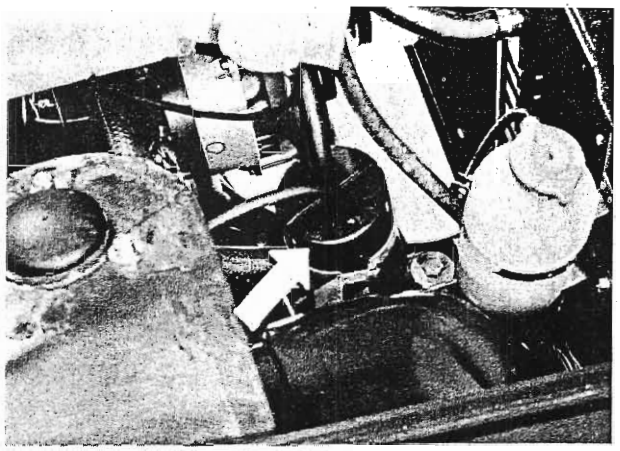
If applicable, adjust the valve rocker clearances.



Change the catalyst at specified mileage on cars so equipped.

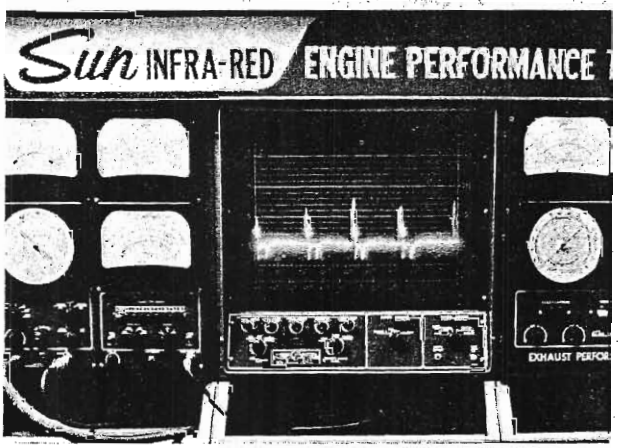


And don't forget to reset the service interval indicator.

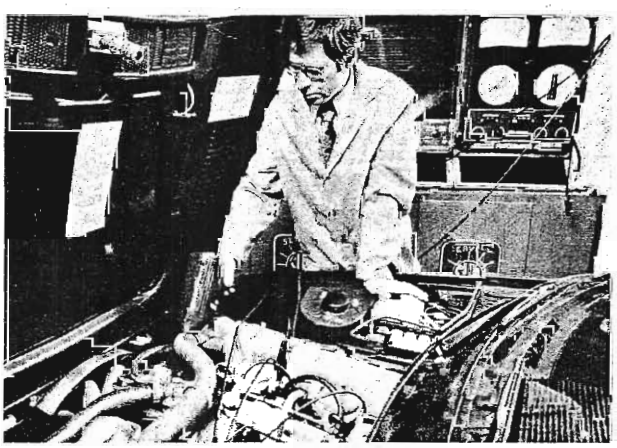


Finally . . . change the evaporative loss canister at specified mileage.

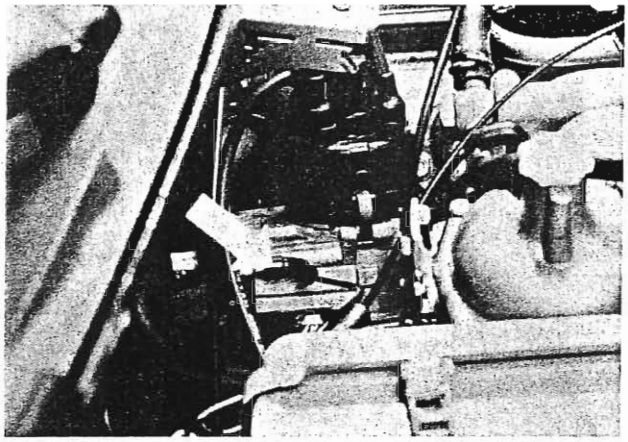
Now, we make our running adjustments and checks.



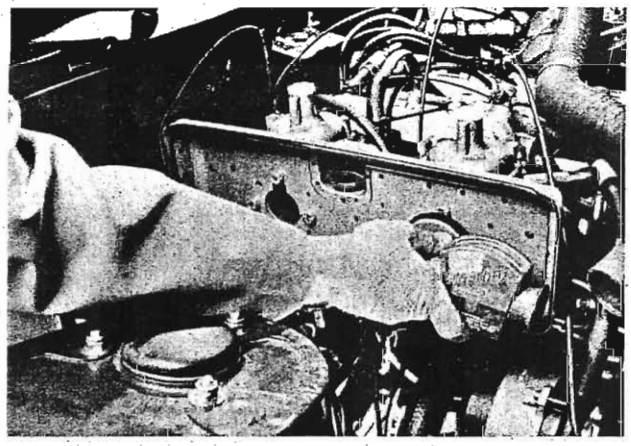
Connect the engine scope, timing light and insert the exhaust probe for the HC and CO meters in the tail pipe.



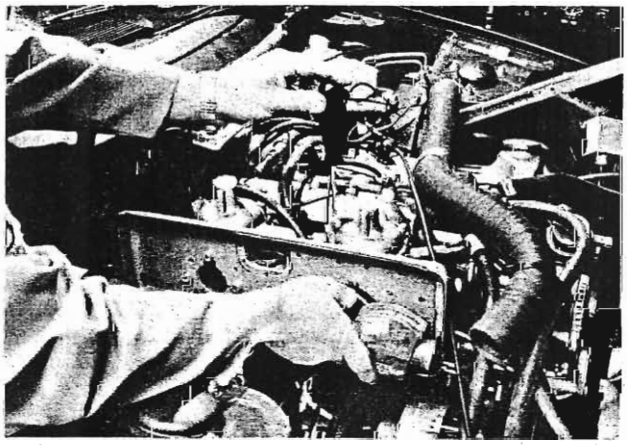
First adjust the ignition timing. Get the specification from the emission decal in the engine compartment.



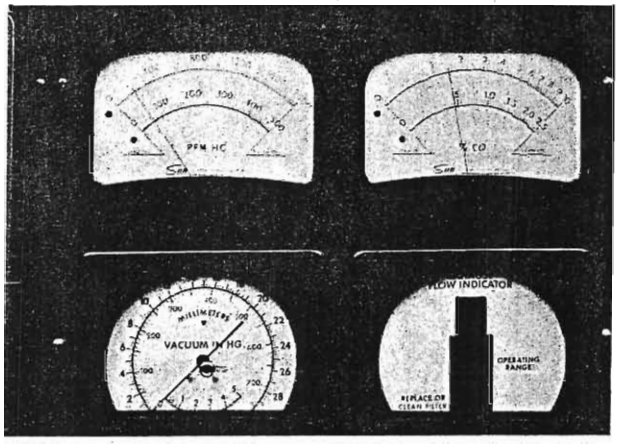
Test the retard unit. With the engine at normal operating temperature, momentarily disconnect the retard hose at the distributor. The engine speed should increase approximately 500 RPM.



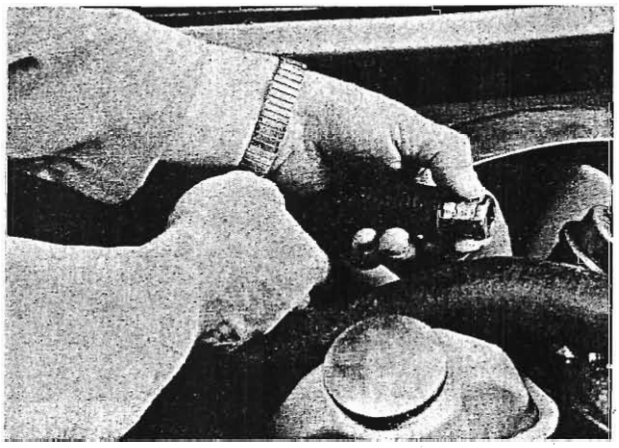
Then set the carburetor balance using the air flow meter.



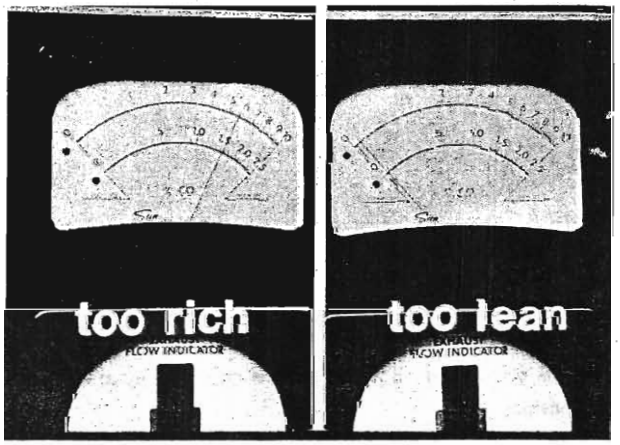
Set the carburetor idle speed. Both of these adjustments are covered in your workshop manuals and training aids.



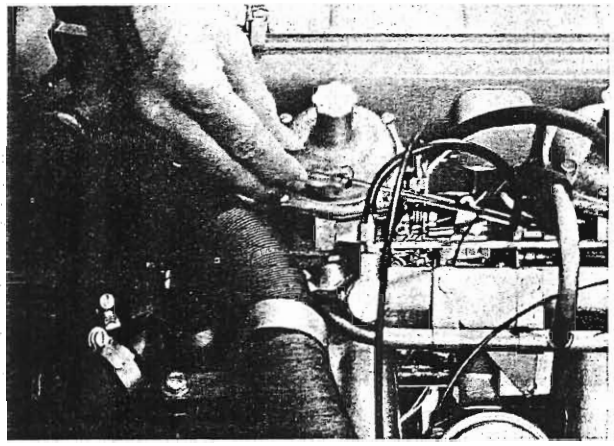
Get the CO at idle specification from the emission decal, and check the CO level.



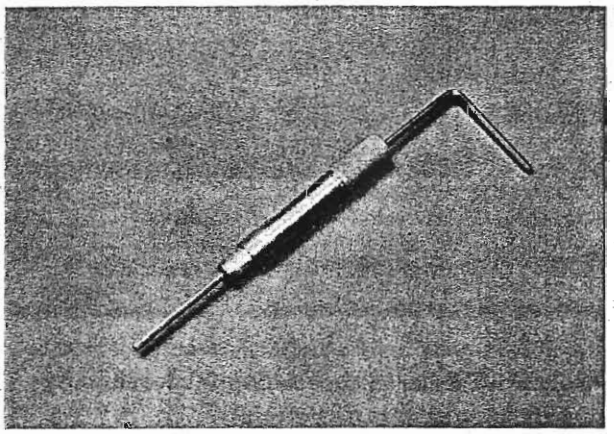
Be sure to follow the instructions on the emission decal when disconnecting the outlet hose from the air pump. Plug the manifold side of the hose before checking the CO level.



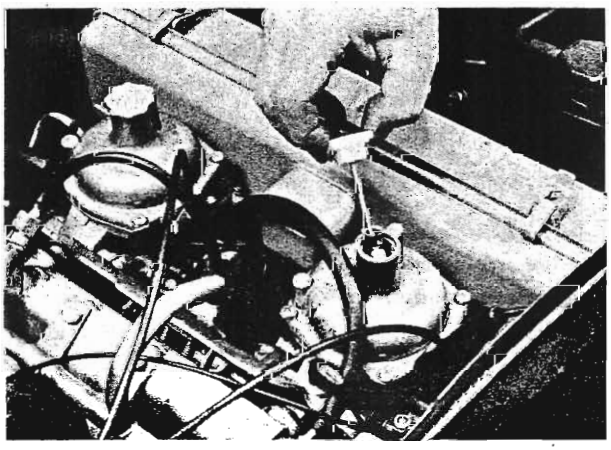
If the CO reading is high, the fuel/air mixture is too rich. If the CO reading is low, the fuel/air mixture is too lean.



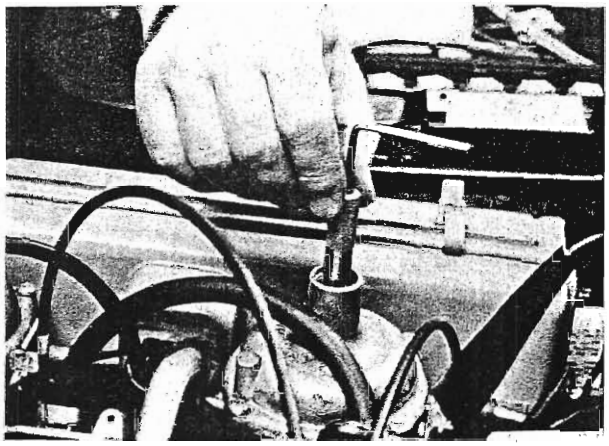
On applicable models, adjust the fine idle CO screw on both carburetors evenly until the CO reading is correct.



For models not equipped with the fine idle adjustment screw or for significant deviation from the CO limits, the carburetor needle should be adjusted. This requires a special tool.

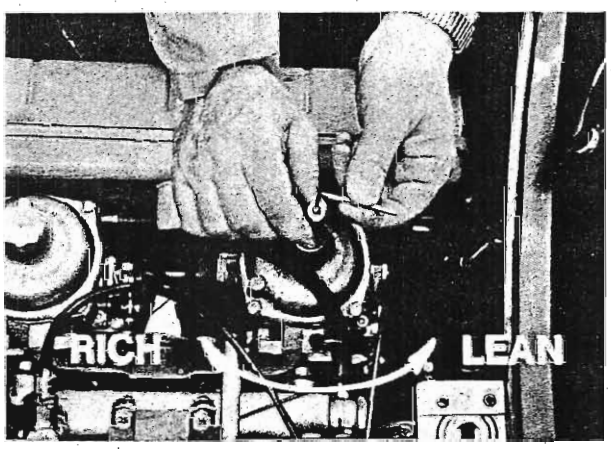


With the engine operating at normal idle, remove the carburetor piston damper.

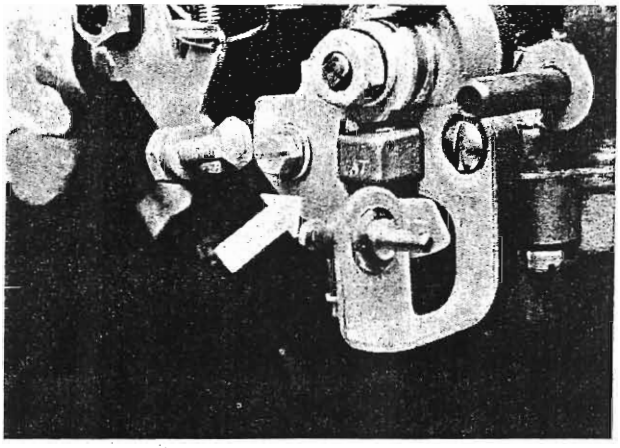


Slowly insert the special tool into the dashpot until the outer tool engages the air valve and the inner tool engages the hexagon in the needle adjustor plug.

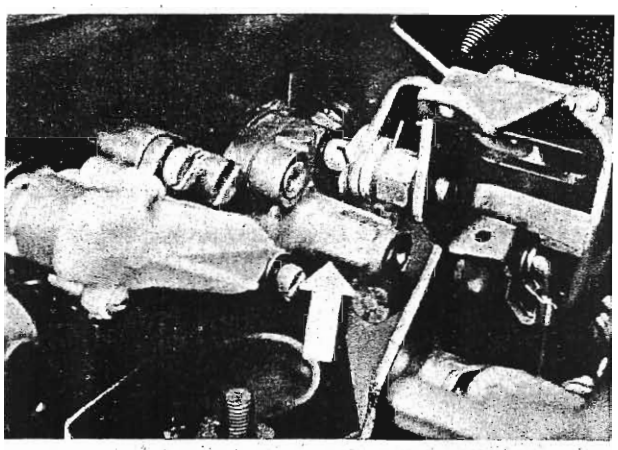
CAUTION: The outer tool must be correctly engaged and held to prevent damage to the diaphragm.



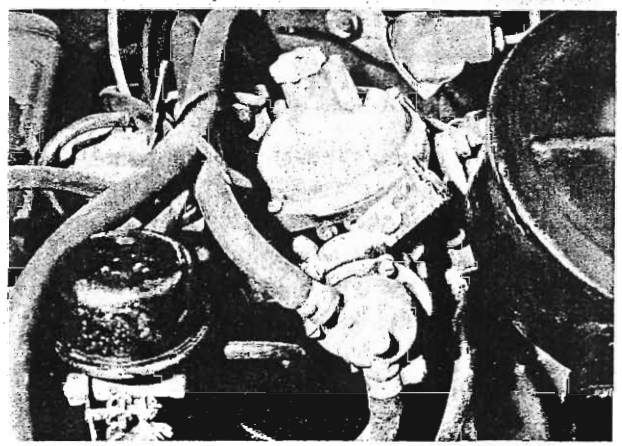
Hold the outer tool firmly and turn the inner tool in small increments. Clockwise for a richer mixture, counterclockwise for a leaner mixture. When the adjustment is complete, reinstall the piston damper. After the engine is shut off, position the oil retaining clip and re-check the damper oil level as shown previously. Also, re-check the idle speed.



Now, check and adjust the carburetor fast idle speed,

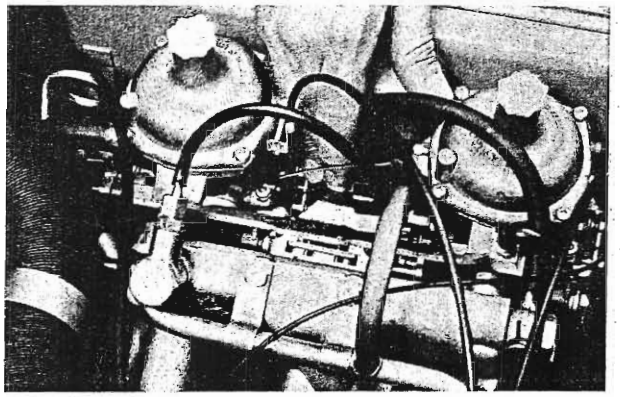


the deceleration by-pass valve,

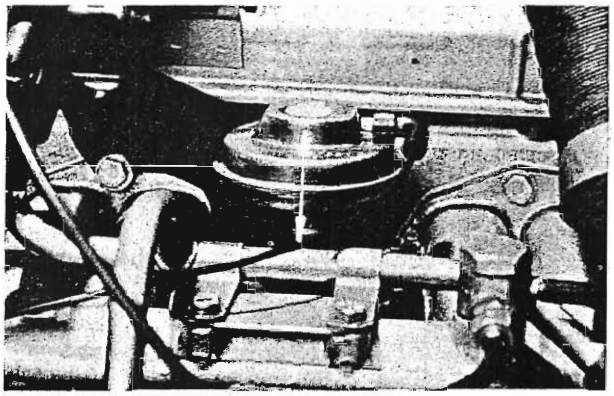


and, where applicable, the automatic choke. The procedures for the three checks are covered in your workshop manual and training aids.

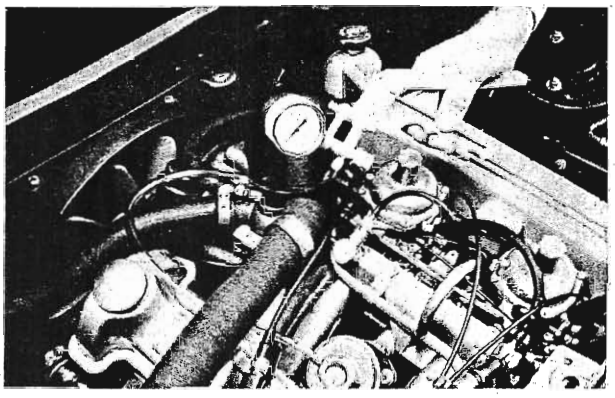
Check the EGR valve operation as follows:



With the engine at operating temperature and the choke off, open and close the throttle several times.

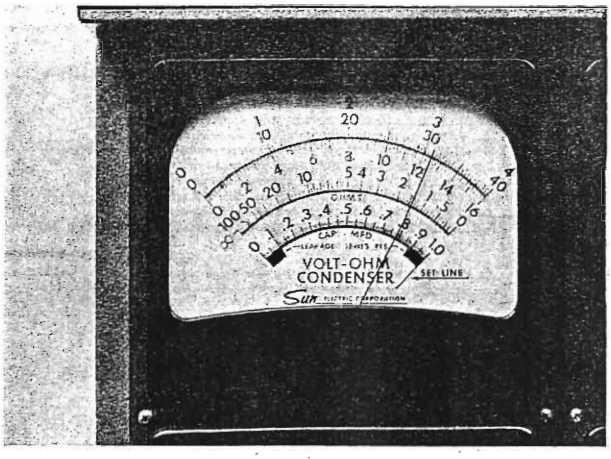


The EGR valve should open and close with the change of RPM. When the throttle is closed, the valve should close immediately.

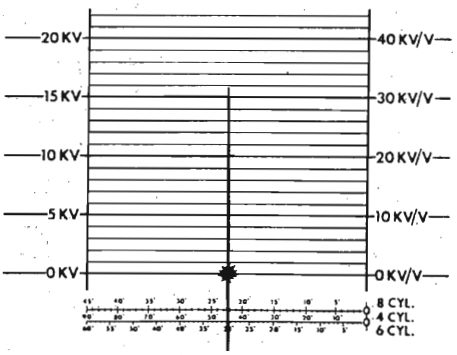


If the operation of the valve doesn't appear satisfactory, apply a vacuum to the diaphragm with an auxiliary pump. The diaphragm should hold open until released.

That completes all the running checks and adjustments. Now, using an engine performance tester, we'll verify that everything is performing up to specs – the engine, the emission system, and the charging system. Remember, procedures for conducting each test are found in the operator's manual supplied with the tester.

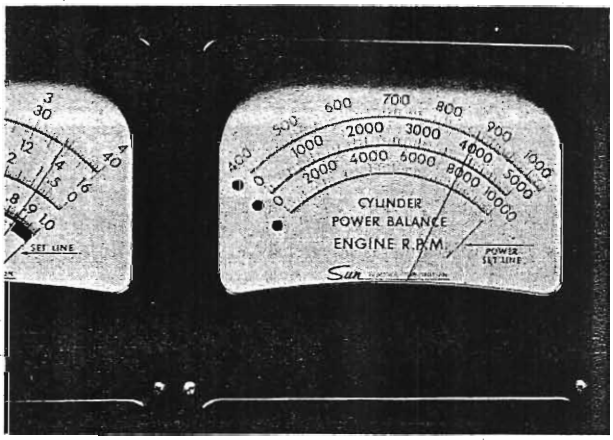


While starting the vehicle, check the cranking voltage on the voltmeter . . .

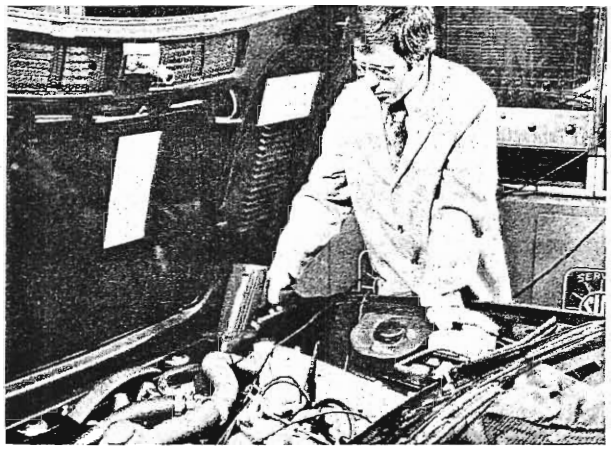


normal

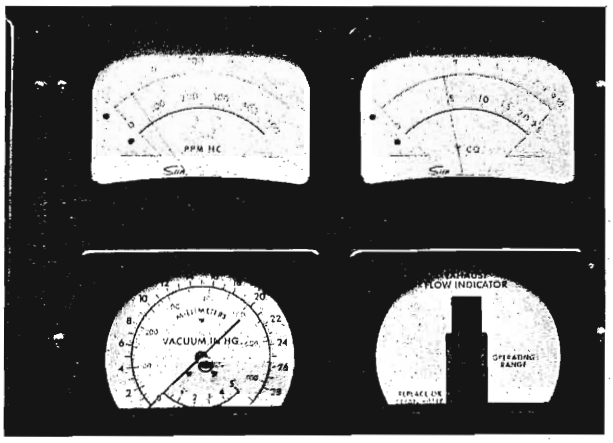
and the cranking coil output on the engine scope.



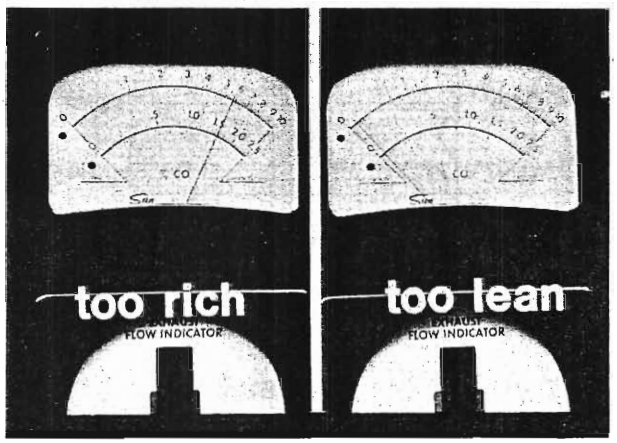
With the engine warmed up and running at idle, check the idle speed, . . .



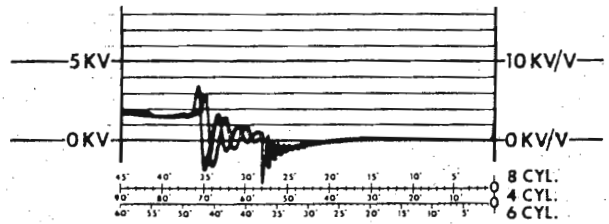
and the ignition timing.



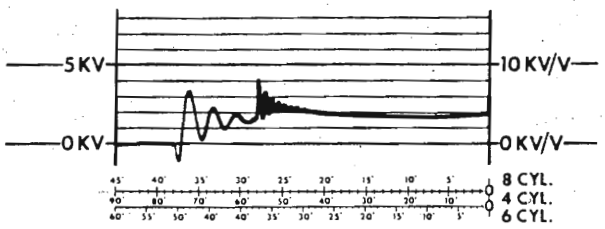
Read the HC and CO levels.



If the readings obtained are outside the limits, correct the mixture before proceeding. Next, set the engine speed to cruise, and check the following:

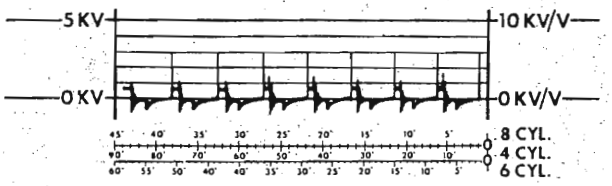


correct polarity



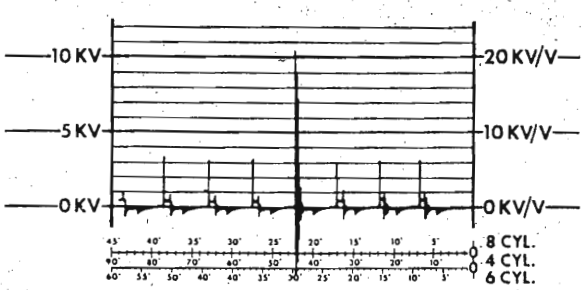
incorrect polarity

coil polarity . . .



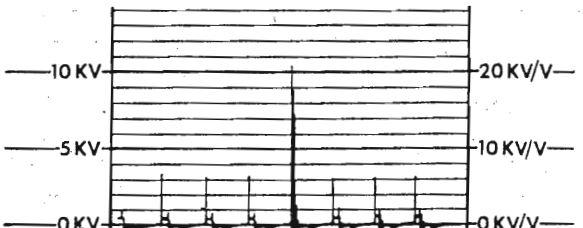
normal

spark plug firing voltage . . .



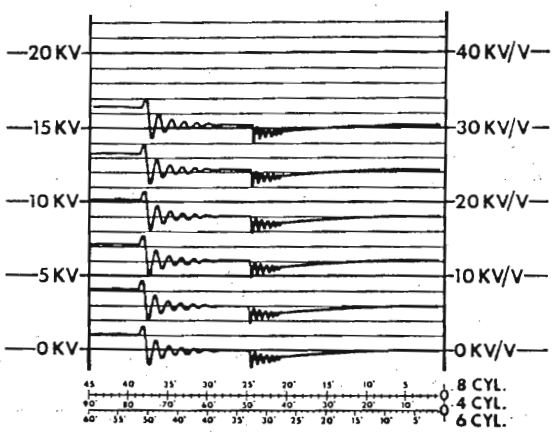
normal

maximum coil output . . .



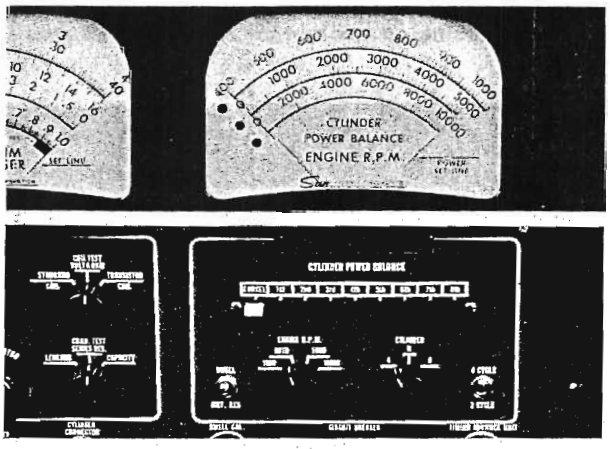
normal

secondary circuit insulation . . .

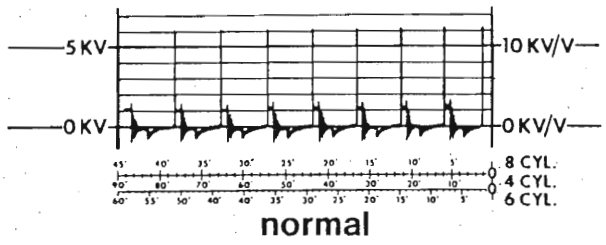


normal

secondary circuit condition . . .



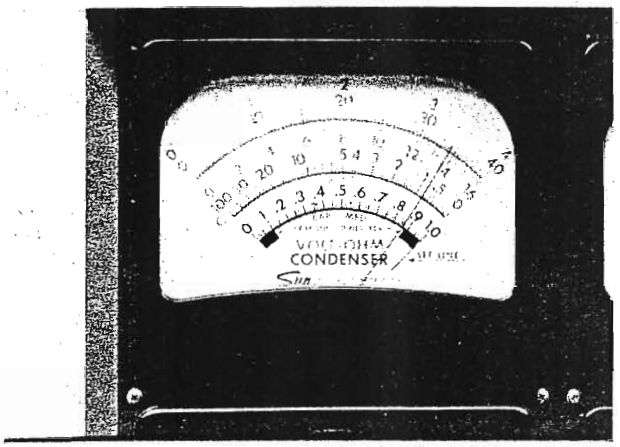
and the cylinder power balance. Now, run the engine at high speed, and check the following:



spark plugs under load . . .



the timing advance . . .



And . . . the charging voltage.

NOTES



Performance
Publishing