BRITISH LEYLAND

SERVICE DIVISION

DEALER TRAINING

AID # S1006

SUBJECT: 1975 EMISSIONS

MODEL: TRIUMPH TR7

AUSTIN JAGUAR MG LAND ROVER TRIUMPH

TABLE OF CONTENTS

P R E F A C E

Your attention is drawn to the fact that the emission systems fitted to Triumph vehicles must not be changed or tampered with thereby rendering the system inoperative. If all instructions and specifications are followed as suggested, the vehicle performance will be satisfactory.

The information contained in this booklet is provided as an easy reference guide for technicians. More detailed information is available in the appropriate Workshop Manual.

PREPARED AND ISSUED BY SERVICE TRAINING DEPARTMENT

BRITISH LEYLAND MOTORS INC.

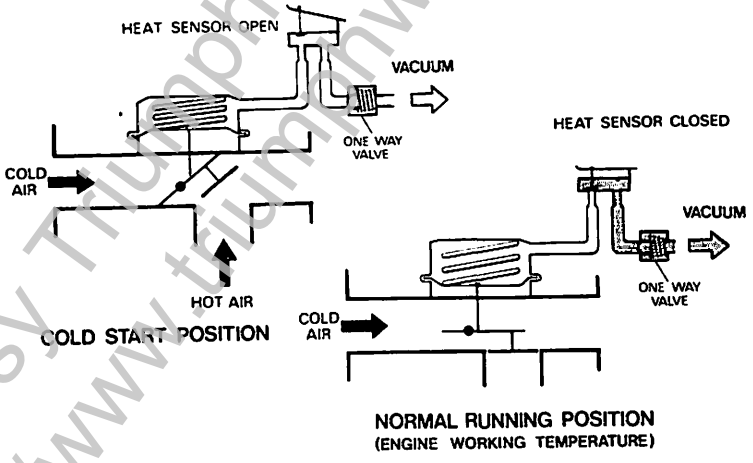
SPECIFICATIONS

Common specifications except where indicated.

	TR7
Carburetor Type	Zenith Stromberg 2 - 175CD2SEV (Federal) Zenith Stromberg 1 - 175CD4VT (Catalyst)
Needle	BIDH (Federal) 45C (Catalyst)
Bias	To Air Cleaner
Spring Color	Red
CO Reading (Air Injection Disconnected, Plug Line)	2.0% nominal (1-3%) Federal 1.25% nominal (0.5 - 3%) Catalyst
Idle Speed	800 ± 100 r.p.m.
Fast Idle Gap/Speed	Federal - 1600 r.p.m. hot Catalyst - .020"
Firing Order	1-3-4-2
Distributor Type	45DE
Air/Point Gap	014-016 @ 180° From Rotor Electrode
Dwell	Fixed
Plug Type	Champion N11Y
Plug Gap	.025"
Ignition Timing Idle	2° ATDC
Static	10° BTDC
Valve Clearance	.008" Inlet .018" Exhaust (Cold)
Nominal Compression Ratio	8.0 : 1 ± .5
Auto. Choke Needle	J3 Catalyst
Air Pump Pressure	8.2 - 10.5 lb/in^2

HEATED AIR INTAKE - FEDERAL

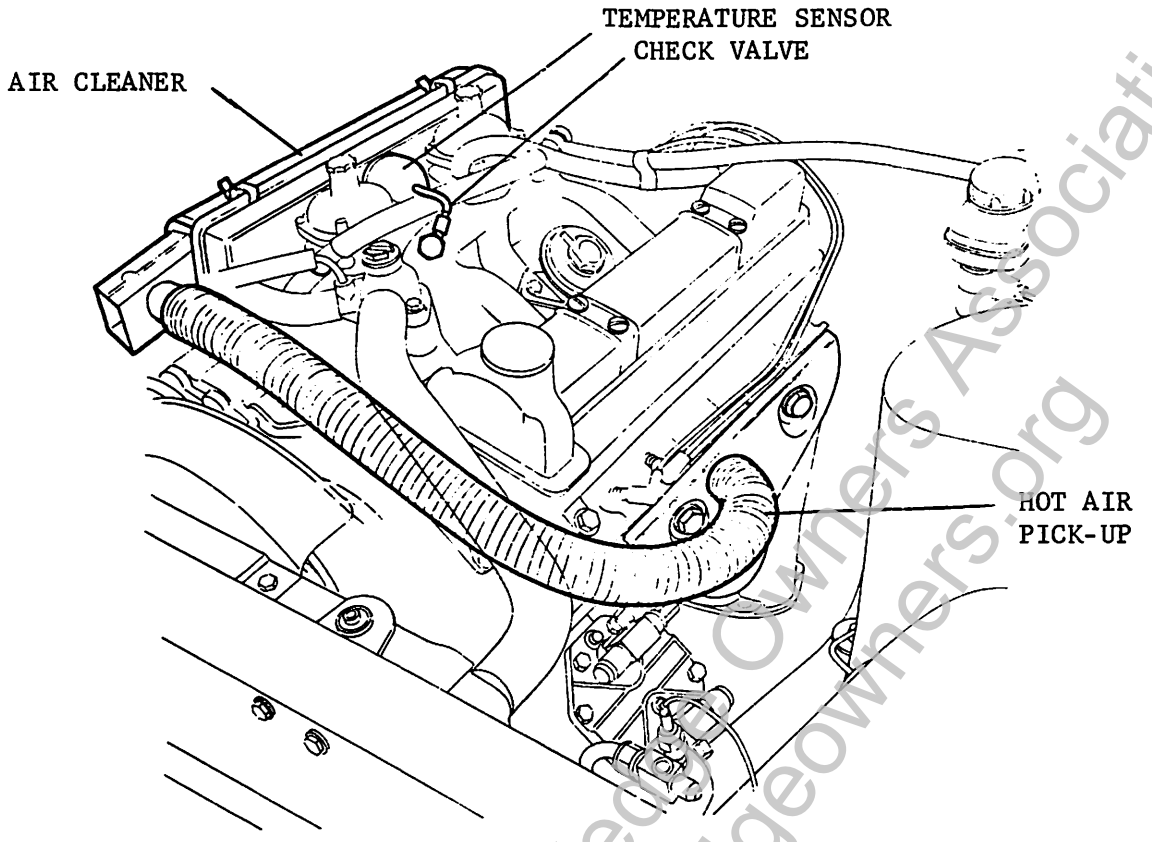
The air intake temperature control system is designed to maintain the air temperature entering the carburetor at a constant temperature by blending hot and cold air. A temperature sensitive bi-metal valve controls a flap valve which regulates the amount of air entering from the hot and cold air inlets maintaining the correct air temperature of 38°C (99°F) under all operating conditions. To avoid stalling the engine when cold during sudden increases in engine speed, a one-way check valve is fitted into the inlet manifold which maintains a vacuum preventing the flap valve moving to the fully open position.

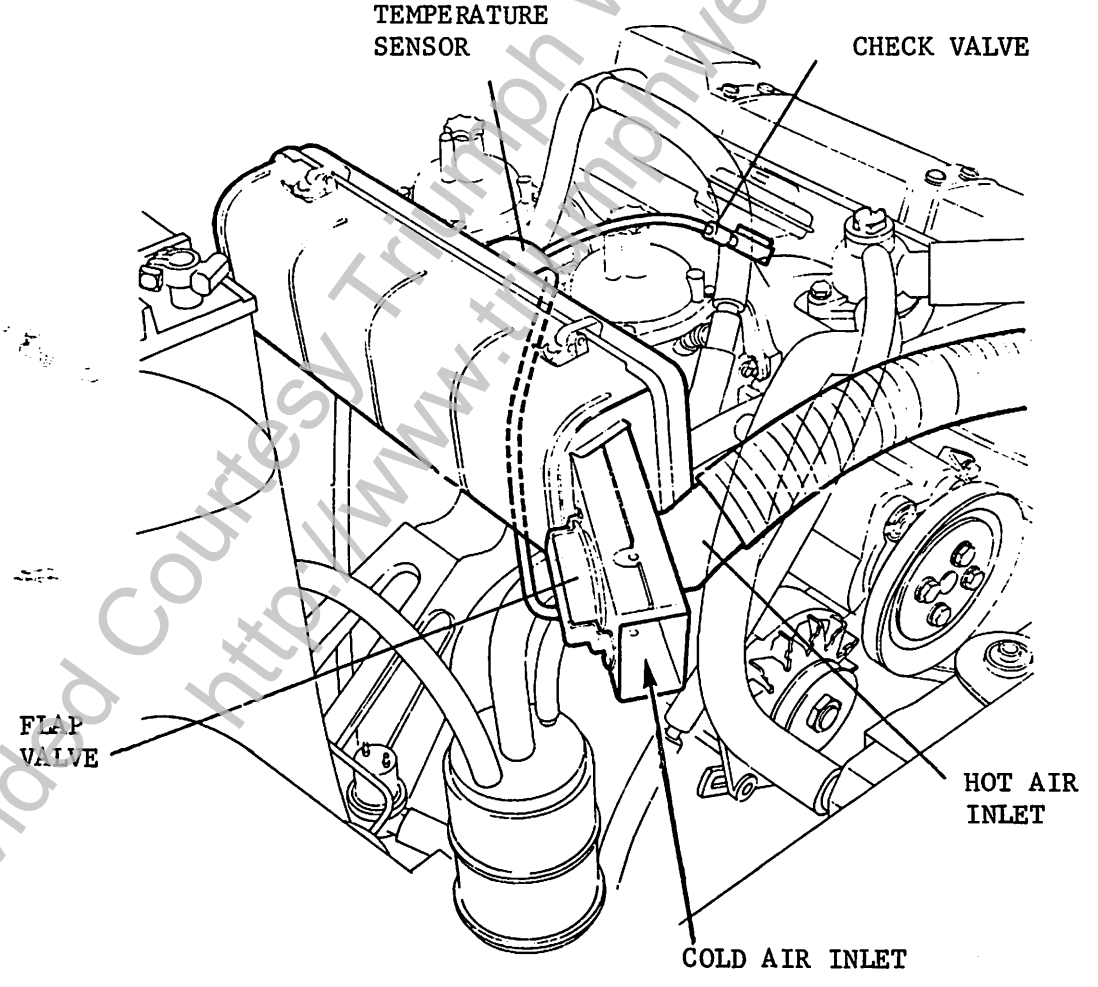


Testing

FLAP CONTROL VALVE

Disconnect vacuum line and apply a minimum vacuum of 9 in. Hg. Check that flap moves to fully closed (Hot) position. Remove vacuum supply - ensure flap returns to fully open (Cold) position.





TEMPERATURE SENSOR

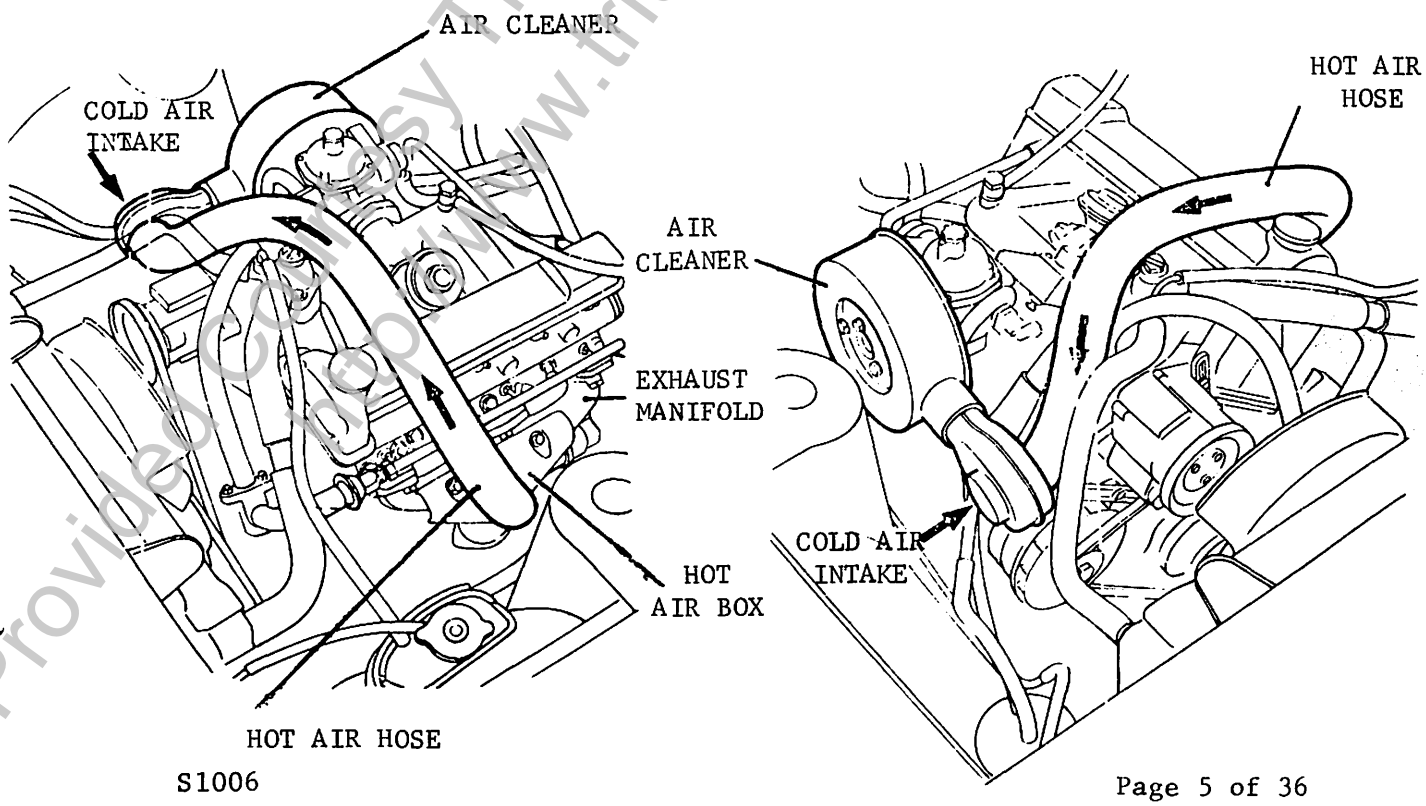
Disconnect sensor vacuum supply line. Apply a minimum of 9 in. Hg. Check that flap valve moves to closed (Hot) position and holds until vacuum released. Flap valve should return to open (Cold) position.

ONE-WAY CHECK VALVE

Apply a vacuum of 9 in. Hg to one-way valve. Check that flap valve moves to closed (Hot) position. Should hold flap valve for 20 seconds minimum.

HEATED AIR INTAKE - CATALYST

The air intake temperature control system is designed to maintain the air temperature entering the carburetor at a constant temperature by blending hot and cold air. A temperature sensitive bi-metal valve controls cold air intake from the underhood area and hot air intake from the exhaust manifold depending upon the temperature of the bi-metal strip. The flap valve should maintain the temperature at 38°C (99°F).

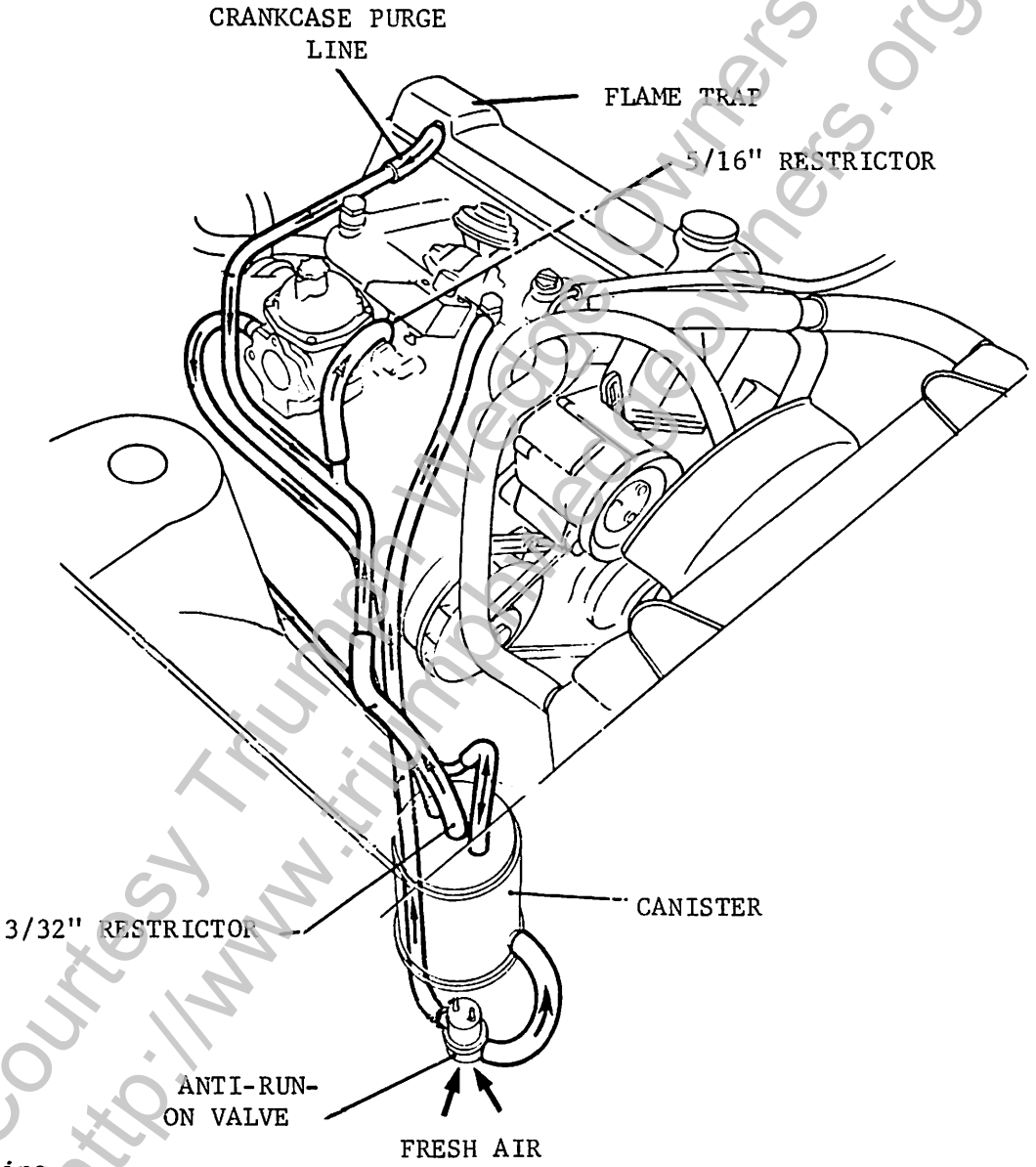


Testing

With engine cold, ensure flap valve blocks air entry from engine compartment. With engine at normal running temperature, ensure flap valve blocks air entry from exhaust manifold or pipe.

POSITIVE CRANKCASE VENTILATION SYSTEM

When the engine is running, vapors from the crankcase are drawn through a pipe into the low depression area of the carburetor and recycled through the engine induction system. With the engine at rest, the vapors are vented to and stored in the charcoal canister.



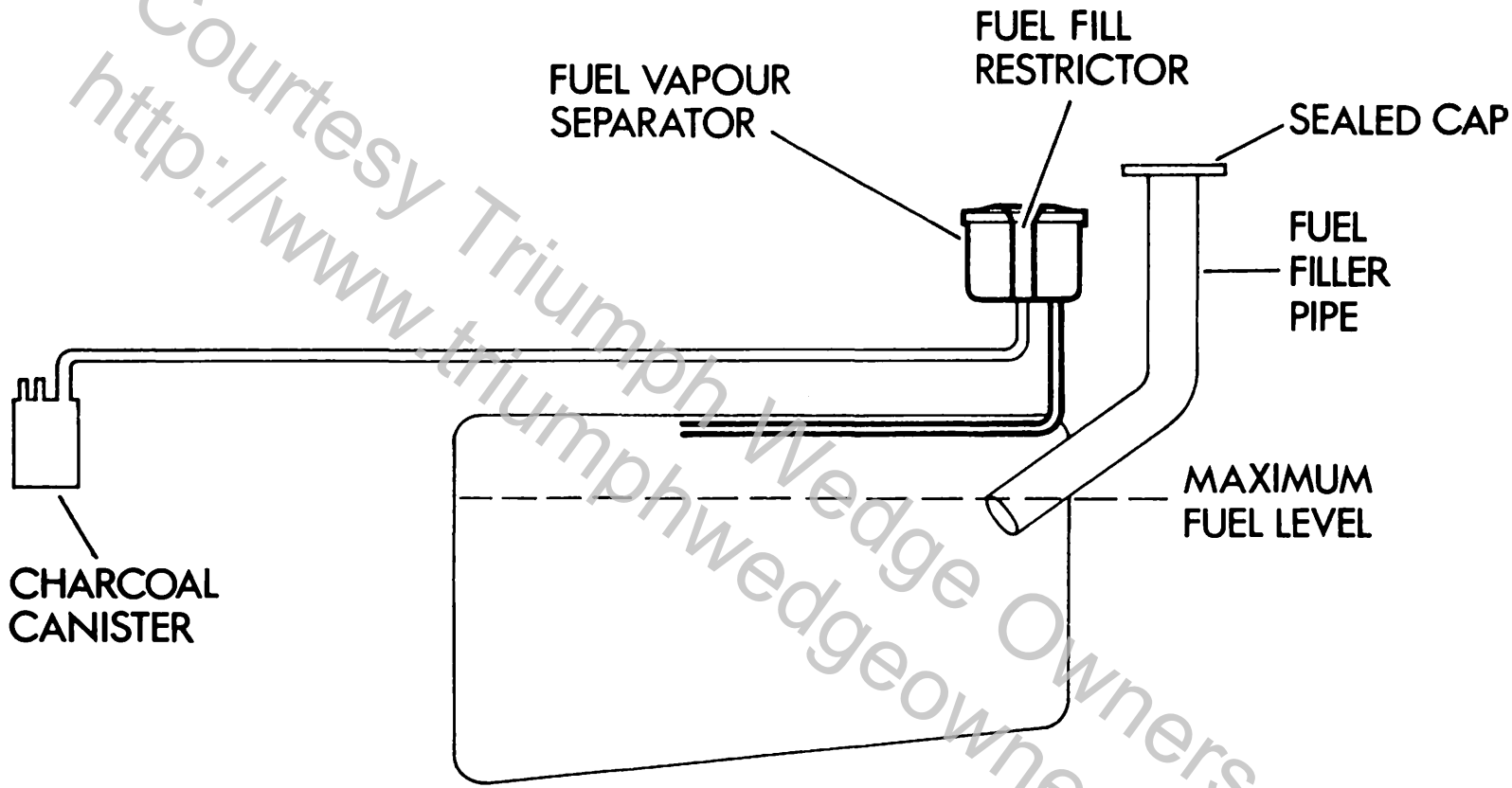
Testing

Ensure restrictors are clear. Check hoses for blockage, security and signs of deterioration.

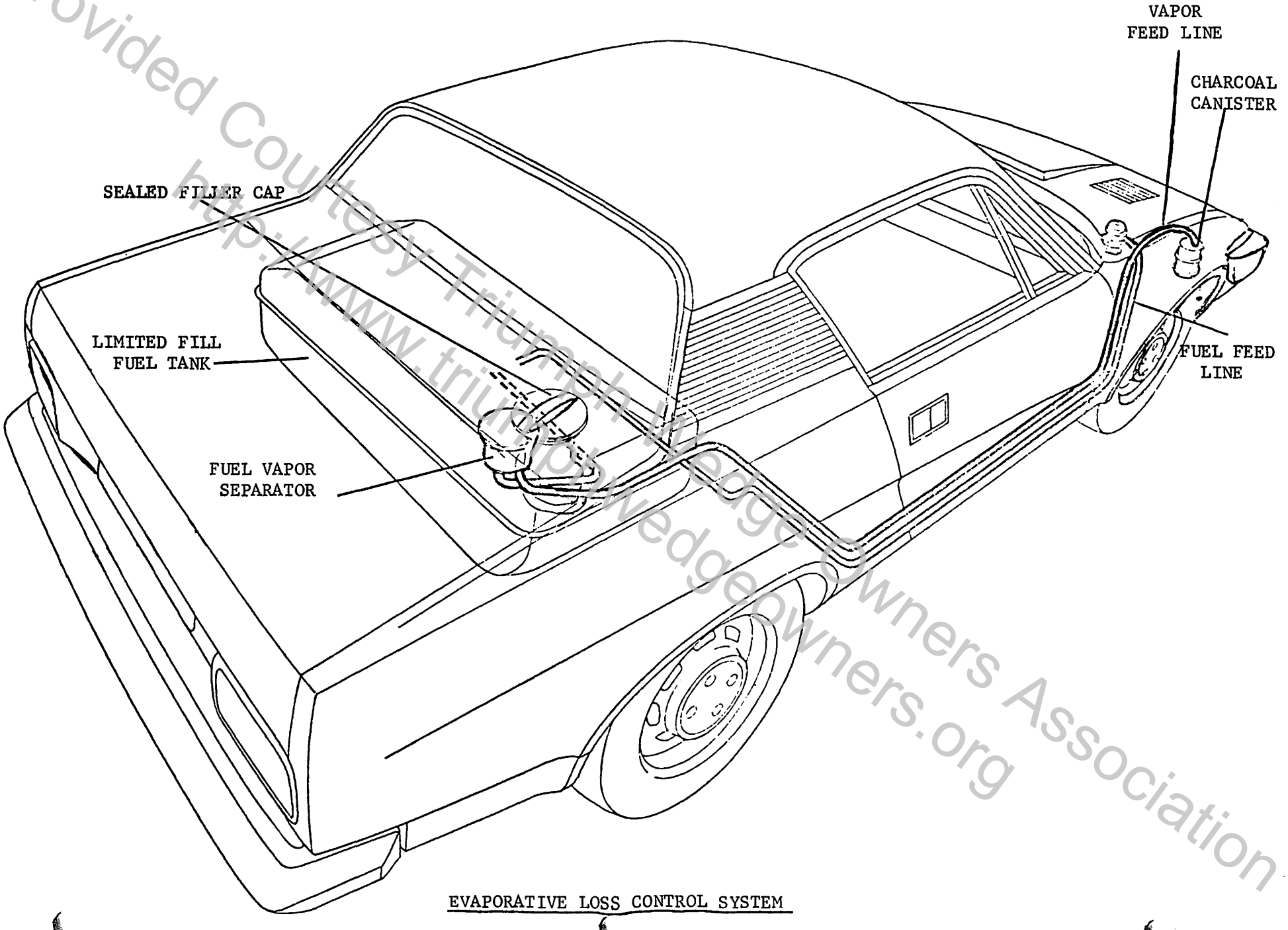
EVAPORATIVE LOSS CONTROL SYSTEM

The evaporative loss control system is designed to prevent fuel vapor venting to the atmosphere. Fuel vapors from the fuel tank and carburetor float bowl(s) are vented to and stored in the charcoal canister while the engine is stationary. With the engine running, the fuel vapors are drawn into the low depression area of the carburetor via the crankcase purge line and recycled through the induction system.

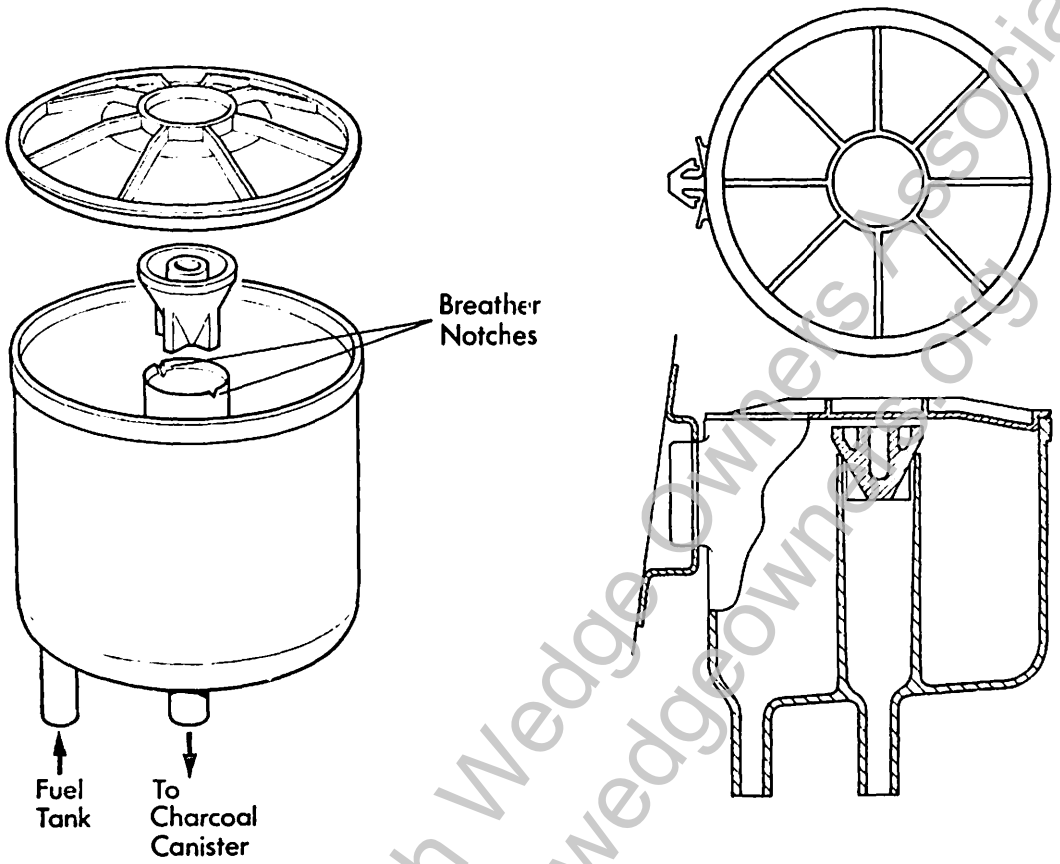
The fuel tank has a restricted fill allowing approximately 5% of the fuel tank volume for expansion. To achieve this, the fuel fill is restricted by two notches in a seat on which a tapered plug rests in the fuel/vapor separator which permits only a small flow, i.e., those likely to occur with fuel vapor, or replacement air, as fuel is used, but not large enough to vent the tank during filling conditions. A small vapor separator is also in circuit. Vapors from the tank and float bowl are piped to the canister and then recycled through the induction system.



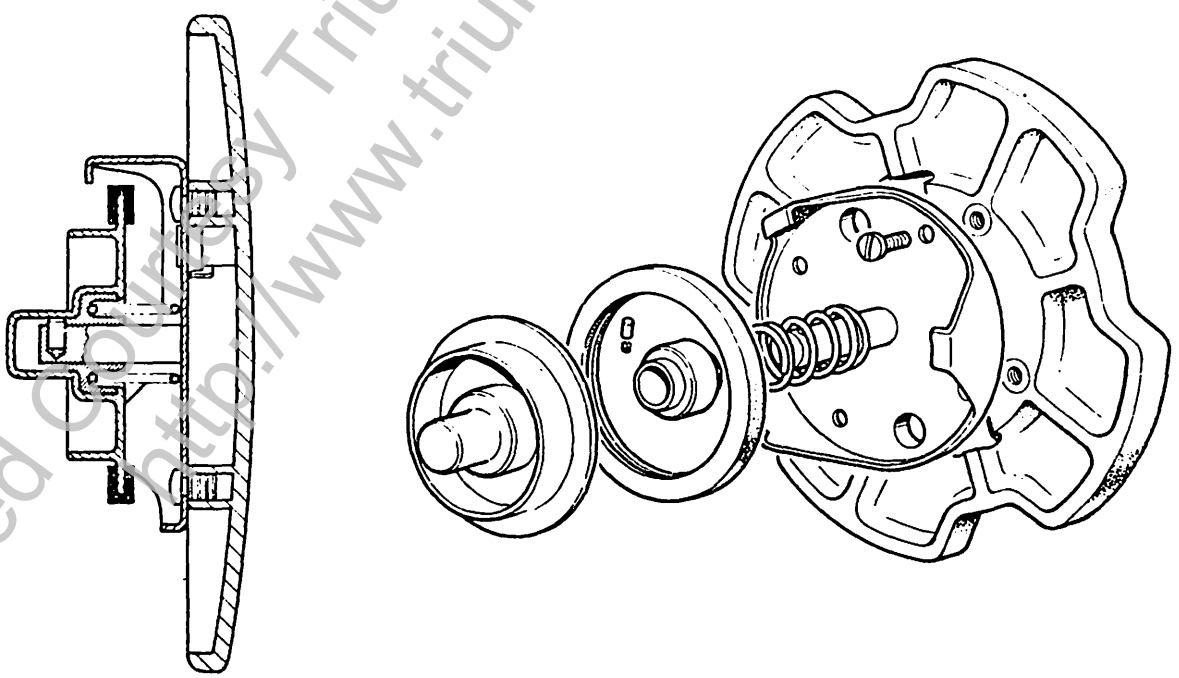
LIMITED FILL FUEL TANK



EVAPORATIVE LOSS CONTROL SYSTEM



VAPOR SEPARATOR

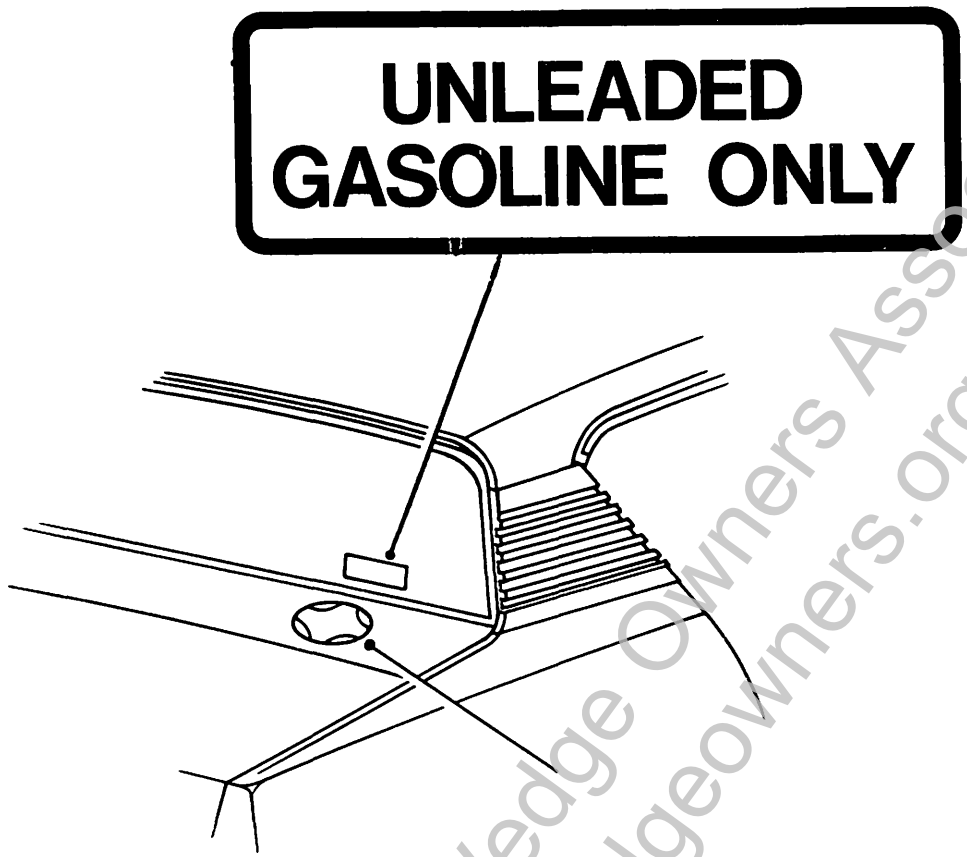


FUEL CAP

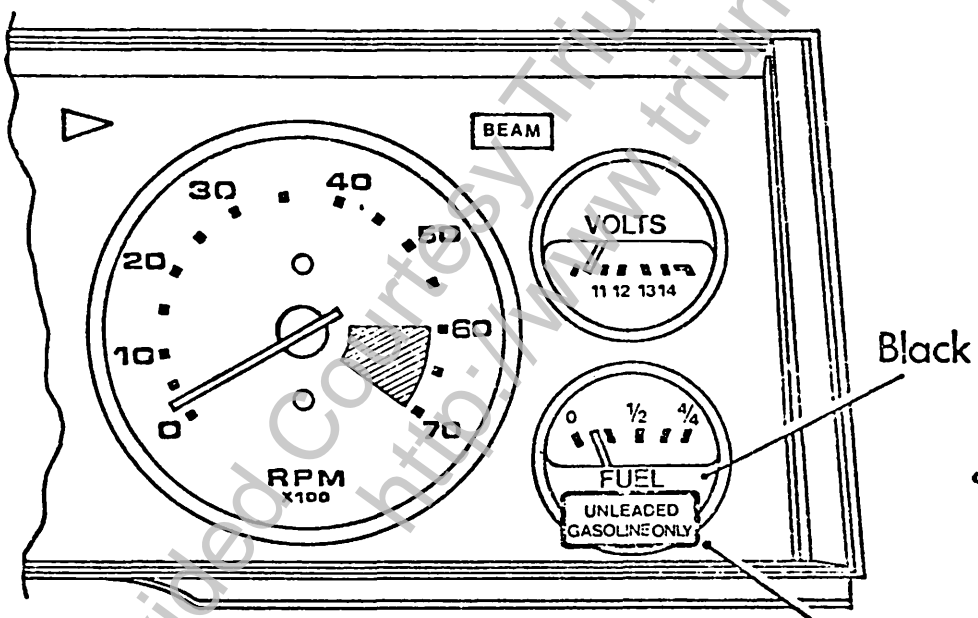
Testing

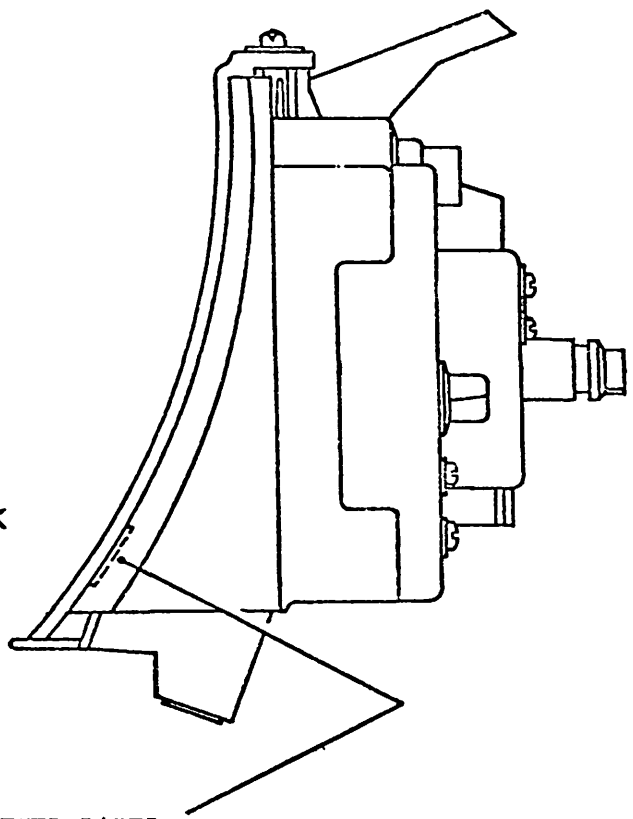
Same as listed under positive crankcase ventilation system. Also check fuel filler cap for good sealing qualities.

LEAD FREE LABELS 91 octane fuel rating (cars equipped with catalyst only).



LEAD FREE FUEL LABEL

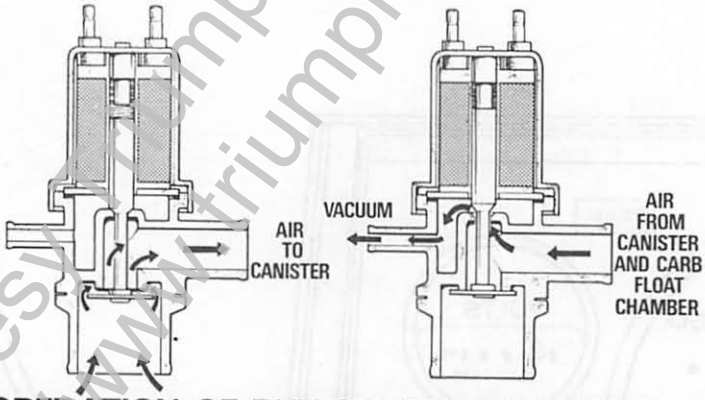




FUEL LABEL
FIXED TO REAR FACE OF LENS

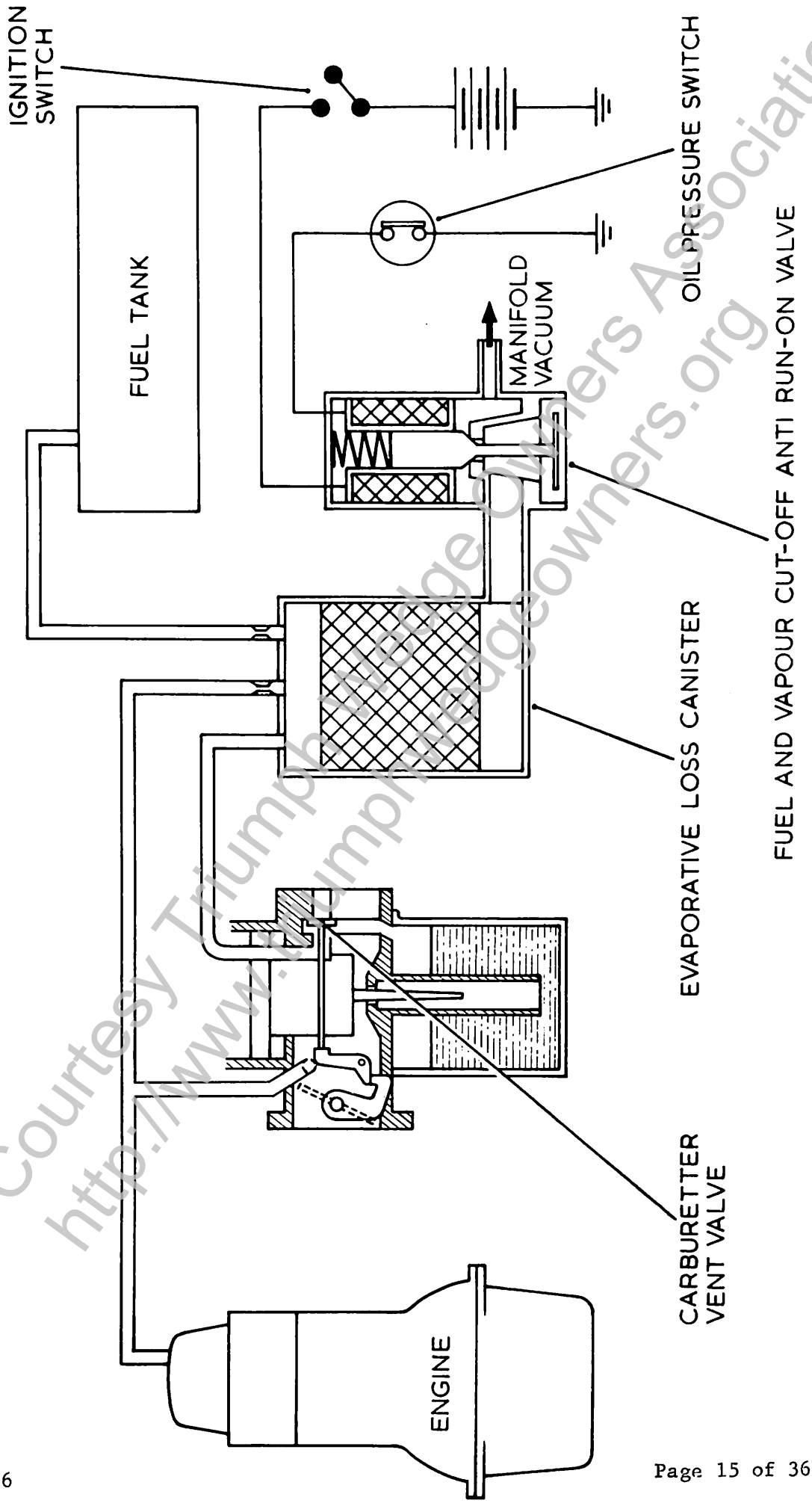
ANTI-RUN-ON VALVE

To prevent a tendency for the engine to 'run-on' after the ignition is switched off, an anti-run-on valve is fitted into the charcoal canister vent line. When the ignition is switched OFF, a voltage is applied to the anti-run-on valve solenoid. The solenoid closes the canister vent and simultaneously allows a slight depression to the top of the float bowl which equals the depression already present in the low depression area of the carburetor thus preventing fuel flow across the mixture needle. As the oil pressure drops to zero, an oil pressure switch breaks the circuit and de-energizes the solenoid - ready for restarting.



OPERATION OF RUN ON CONTROL VALVE

DIAGRAMMATIC ARRANGEMENT OF FUEL AND VAPOUR CUT-OFF ANTI RUN-ON SYSTEM



Testing

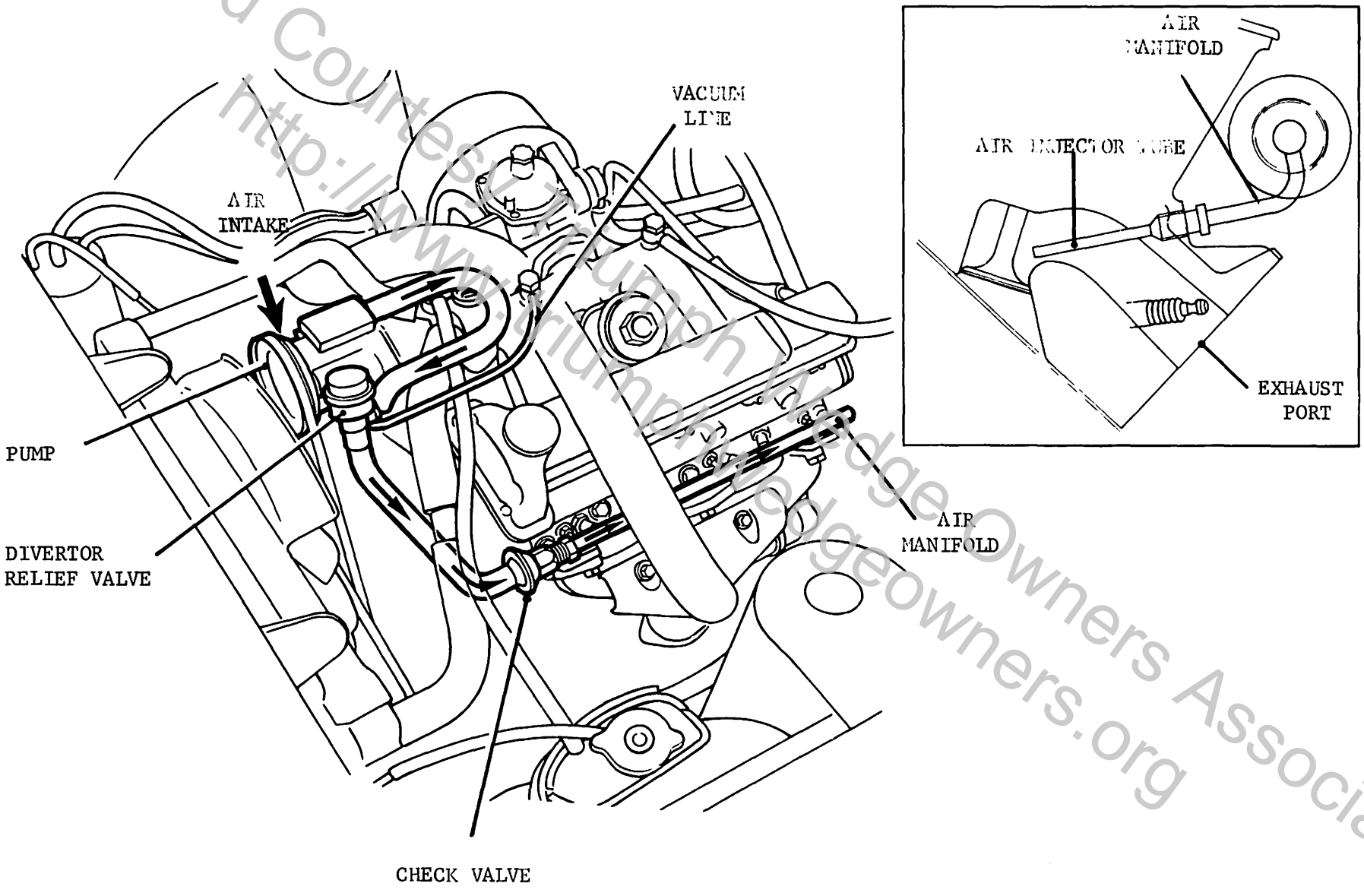
With engine running, apply 12 volts to solenoid terminal. If engine does not stop, valve, wiring, ignition switch and oil pressure switch are suspect.

NOTE: If vent valve is not correctly adjusted, air will bleed into float chamber preventing vacuum - hence engine shutdown even if valve is operating correctly.

AIR INJECTION SYSTEM

A belt driven air pump supplies air under pressure through a non-return check valve through an air manifold to the exhaust ports just above the exhaust valve heads. The air combines with exhaust gases to continue the oxidation process in the exhaust system. The non-return check valve prevents reverse flow in the air injection manifold when exhaust gas pressure exceeds air supply pressure.

A combination divertor/relief valve is fitted to divert air to the atmosphere on deceleration to prevent backfire and relieve air at high pump speeds to prevent pump damage.



Testing

DRIVE BELTS

Check condition and adjustment of drive belt. Adjustment should be 3/4 - 1" deflection at the mid point of its longest run.

PUMP AND RELIEF VALVE

Check that relief pressure operates at 8.2-10.5 lb/in^2 by using a pressure gauge between the divertor/relief valve and pump. If air is not relieved at the specified figures, renew valve. If pump pressure does not reach minimum figure, replace pump.

DIVERTOR VALVE

Check that air is dumped on deceleration by disconnecting the air outlet pipe at the divertor. Operation can be felt by opening and closing the throttle quickly.

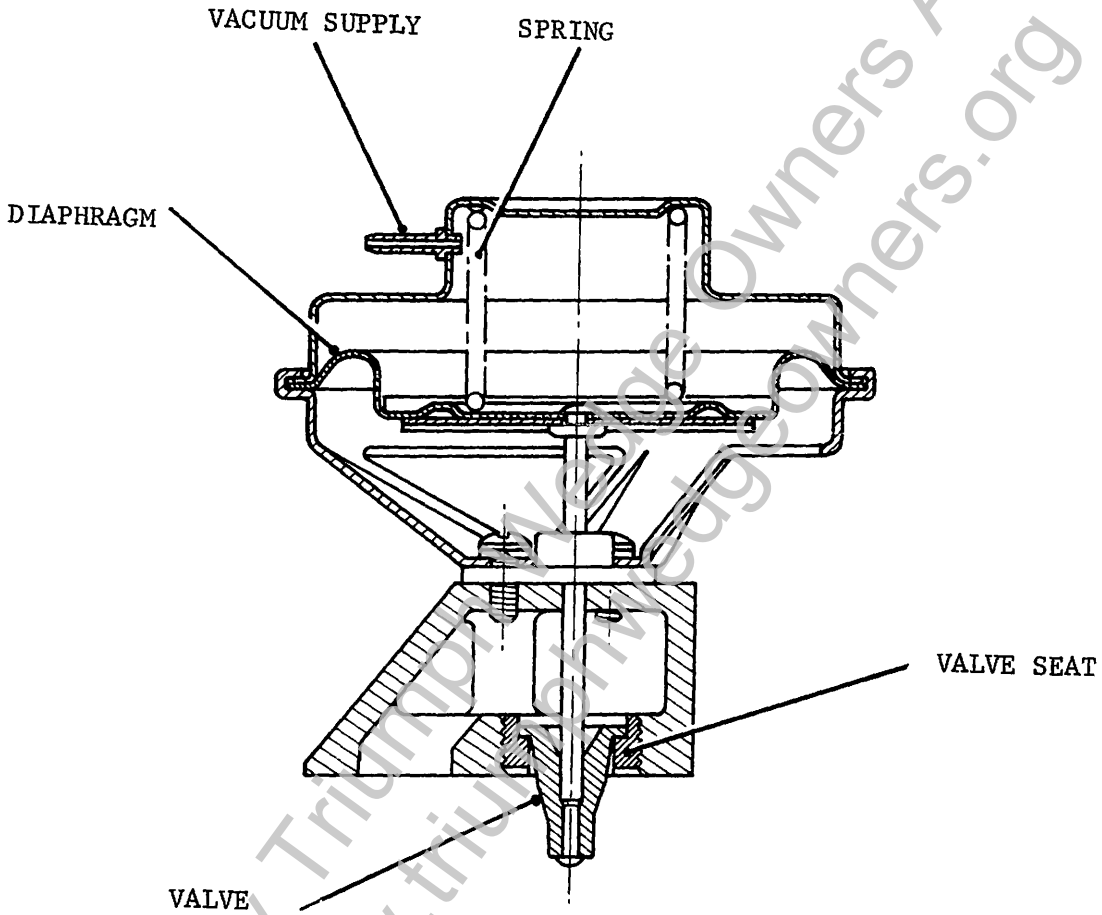
CHECK VALVE

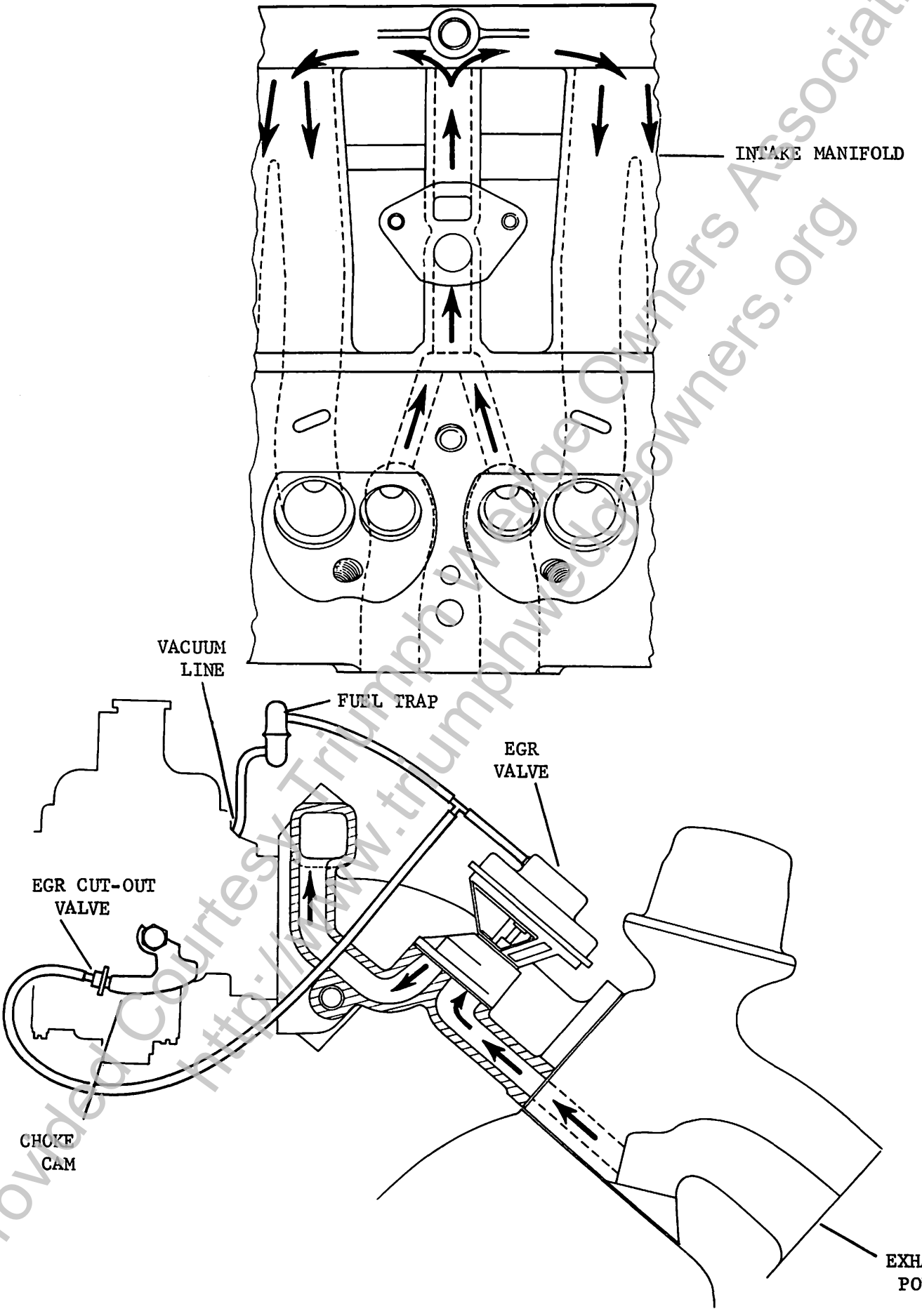
Remove check valve - blow through the valve orally - should allow flow pump to manifold end - no flow manifold to pump end. Ensure hose is free from restrictions.

EXHAUST GAS RECIRCULATION SYSTEM

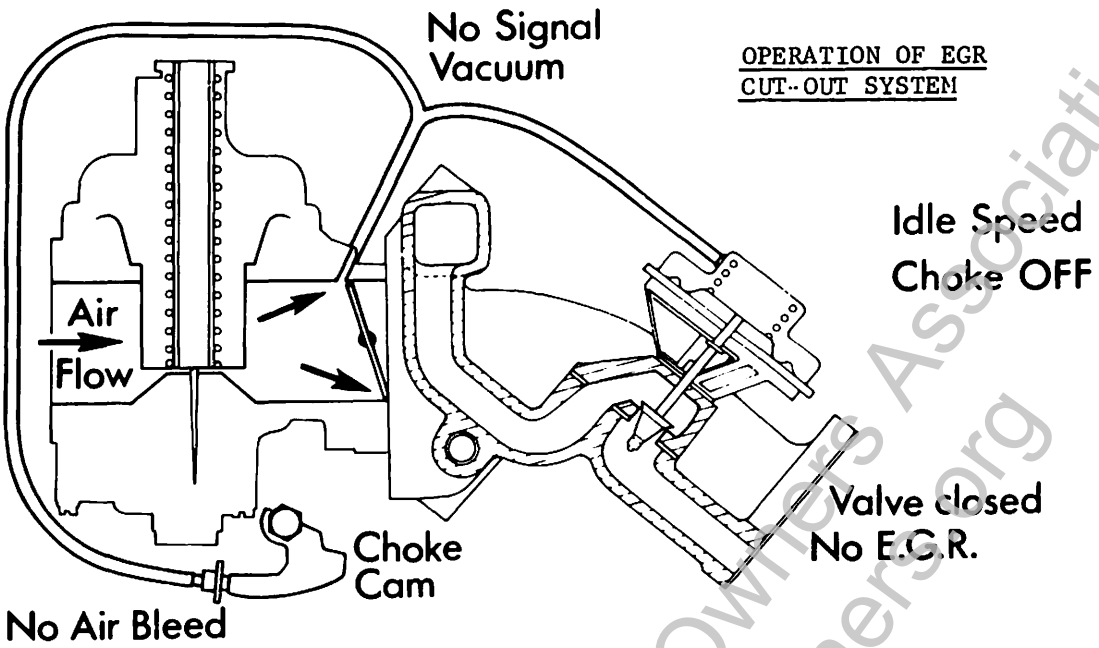
This system is fitted to reduce emissions of oxides of nitrogen. The EGR valve is mounted into the exhaust manifold and controls flow of exhaust gases into the intake manifold. The control signal is taken from a throttle edge tapping which gives no recirculation at idle speed or full load, but gives a varying amount of recirculation between these two extremes depending on the vacuum signal and metering profile of

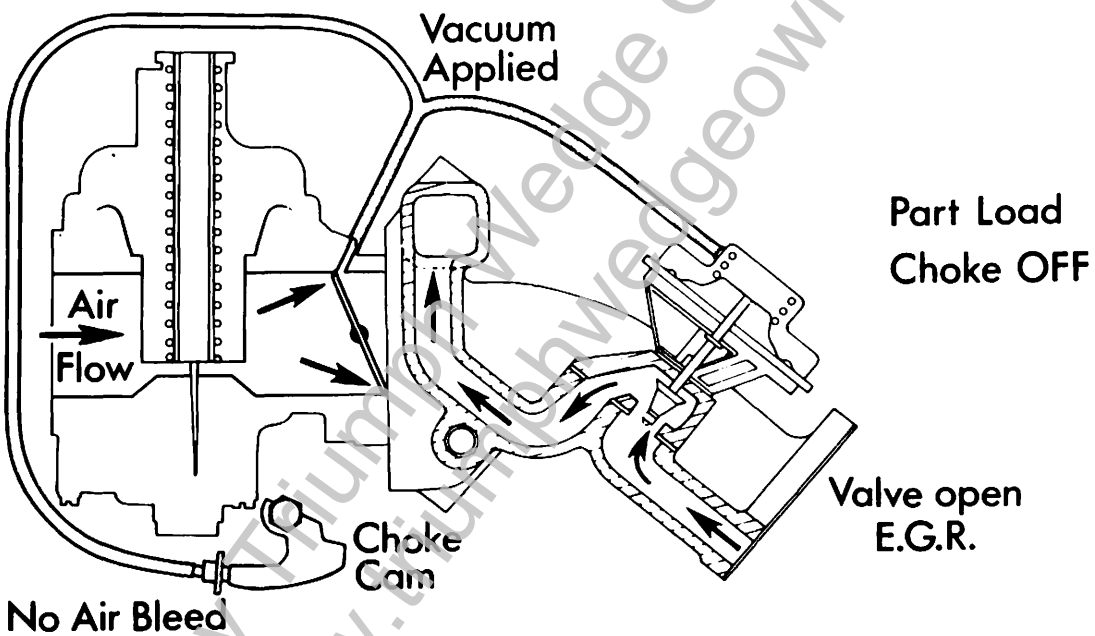
the valve. A cut out valve destroys the vacuum signal to the EGR valve when the choke is operated.

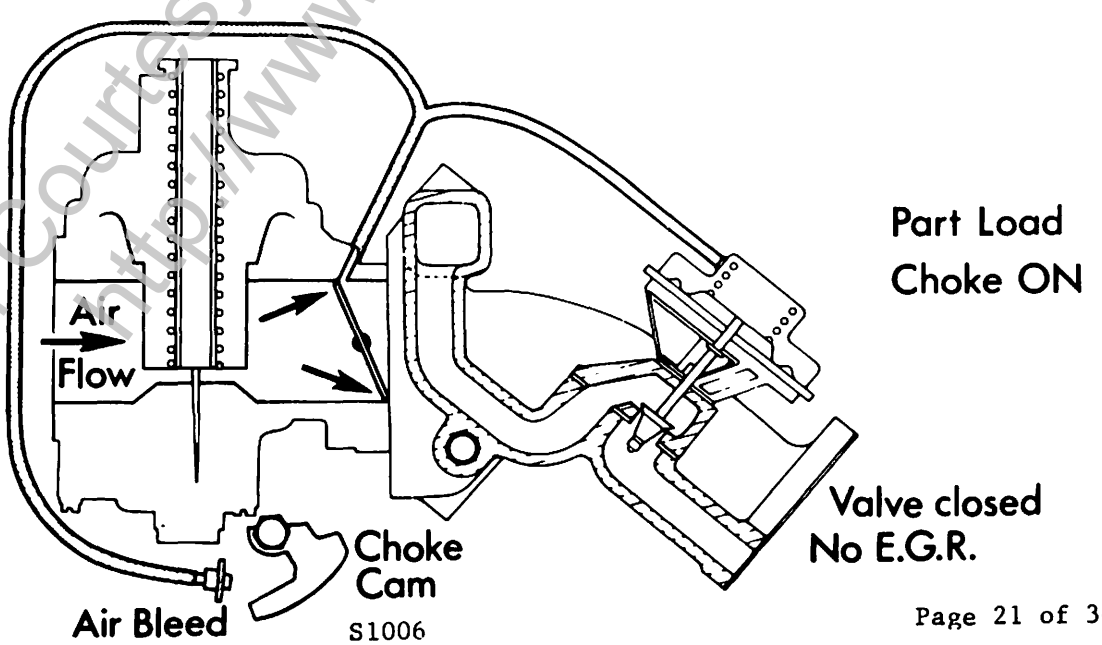




OPERATION OF EGR
CUT-OUT SYSTEM







Testing

1. Check all lines and connections for security.
2. Bring engine to normal running temperature. Ensure choke is 'OFF'. Open and close the throttle several times. The valve should open and close with change of r.p.m. and should close immediately - the throttle is closed.
3. Using a vacuum tester (Mighty Vac.) ensure the valve diaphragm retains a vacuum when open.

SERVICING EGR

1. Remove EGR valve.
2. Clean base of valve with wire brush.
3. Using a spark plug cleaner, clean the valve seat and metering valve by holding the diaphragm upward with the fingers. Blast the valve at 30 second intervals until clean.
4. Remove all traces of carbon and cleaning compound with an air line.
5. Examine ports in manifold - light deposits are acceptable. If heavy deposits have accumulated, the manifold must be removed when cleaning.
6. Refit EGR valve.
7. Check condition and refit all lines and pipes.
8. Check function of the valve as follows:
9. Bring engine to normal running temperature - ensure choke is fully off.
10. Open and close throttle and observe valve which will open and close with changes in engine speeds.
11. If operation of valve doesn't appear satisfactory, apply a vacuum with an auxiliary pump or (Mighty Vac.) - diaphragm should hold vacuum

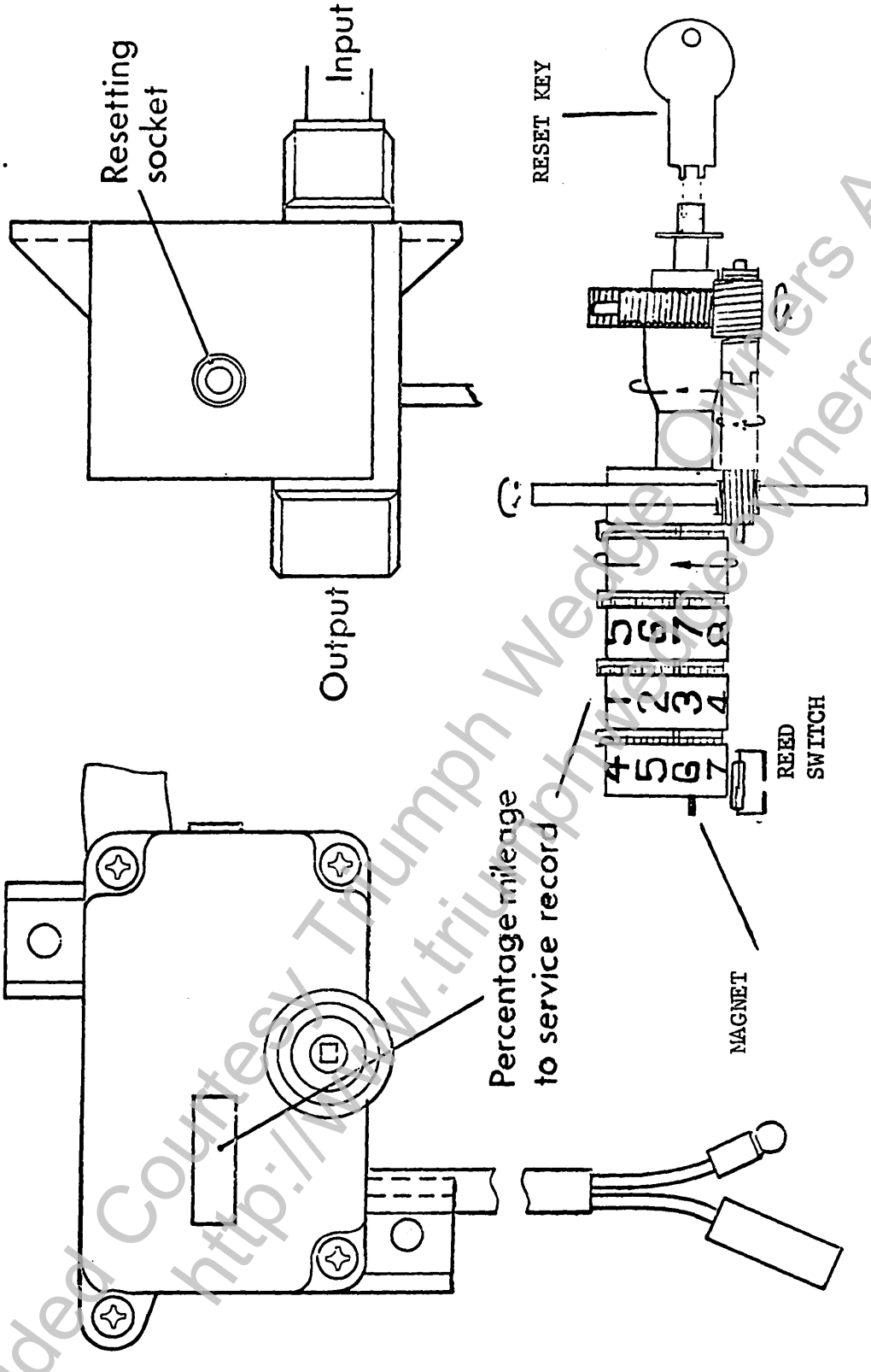
until released.

12. Reset EGR service interval indicator with special key.

EGR MAINTENANCE INDICATOR

This unit completes an electrical circuit at a predetermined mileage which illuminates a warning lamp marked 'EGR Service' on the dash panel. In addition, the unit records a percentage of time to or from the required service, i.e., 100% indicates servicing is required. Once servicing is completed, the unit may be reset to zero by a special key.

The unit is mounted in the engine compartment and is driven by the speedometer cable. The unit is a gear driven mechanical reduction device with the addition of a magnetically actuated reed switch to complete the electrical circuit.

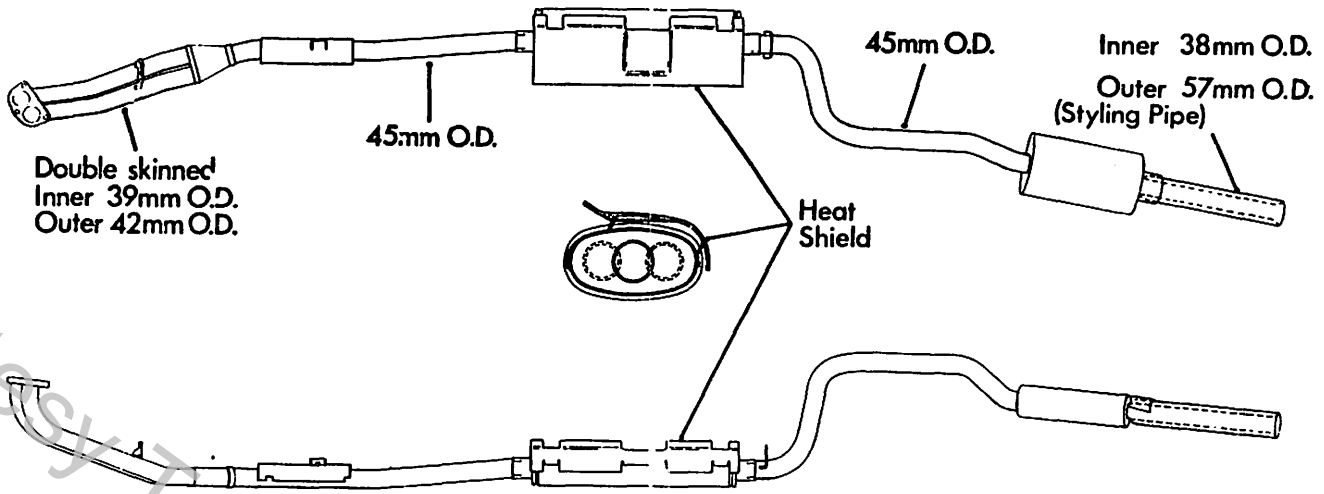


E.G.R. SERVICE INTERVAL INDICATOR

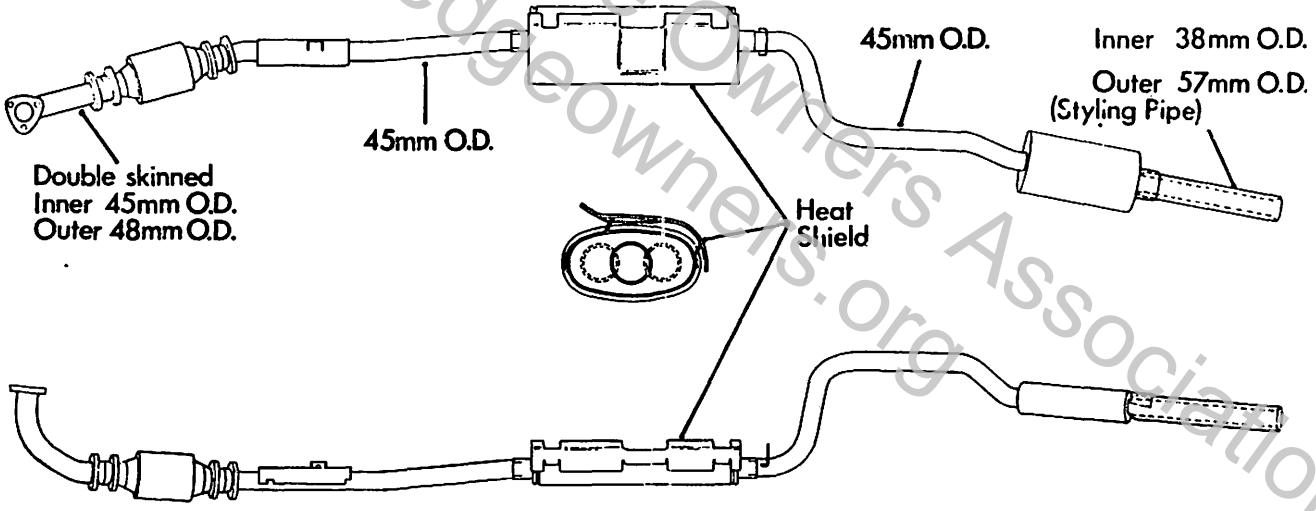
Testing

1. Check electrical connections.
2. Check operation of drive cable and gears.
3. Reset unit with special key at 12,500 intervals EGR.
4. Reset unit with special key at 25,000 intervals catalyst.

EXHAUST SYSTEM



FEDERAL



CATALYST

OPERATION OF THE CATALYST UNIT

A chemical reaction which converts carbon monoxide and hydrocarbon to less harmful carbon dioxide and water (steam), takes place when air is injected into hot exhaust gas. This is effectively a continuation of the burning process. Hot exhaust gas passes through the catalyst unit which speeds up this conversion process. This process generates more heat which in itself assists in conversion. The hotter the exhaust gases the more readily convertible they are to carbon dioxide and water or conversely when the exhaust gases become cool they do not convert.

The catalyst unit consists of a ceramic matrix block coated with a Platinum based compound which remains unchanged during the conversion process. The exact mechanism by which this happens is a complex chemical process.

Over extended mileage, the pores on the surface of the block become coated and the effectiveness of the unit is reduced and should, therefore, be replaced. Similarly lead compounds clog the pores which render the catalyst ineffective.

ADVANTAGES OF THE CATALYST

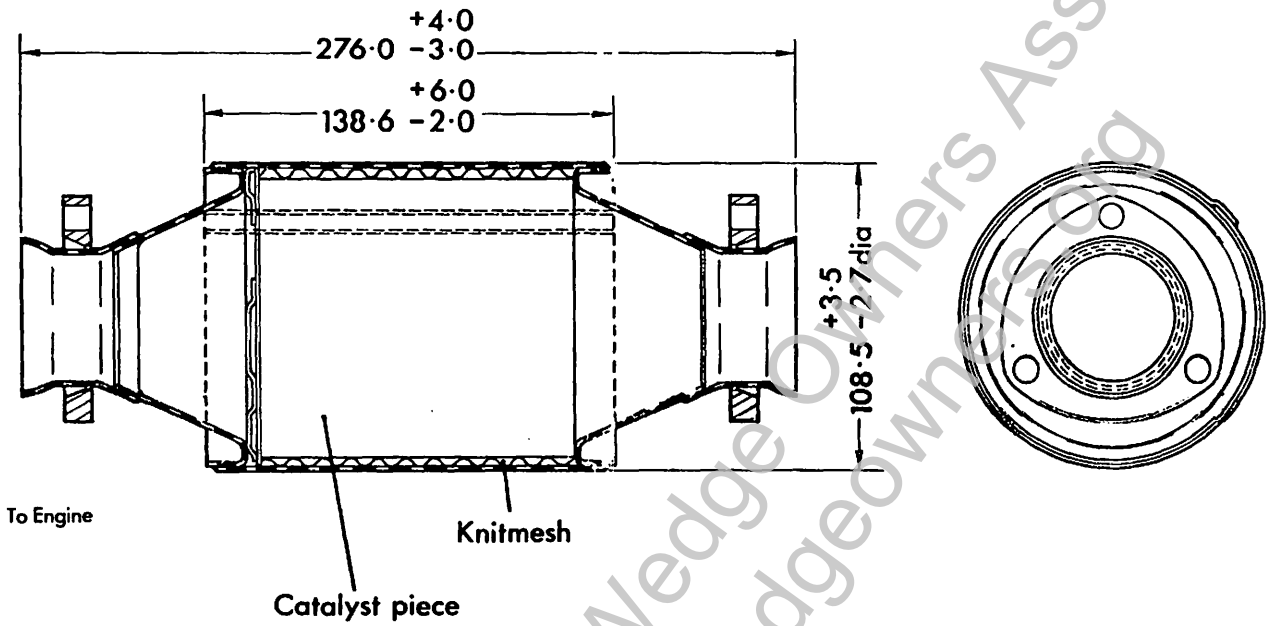
With use of the catalyst some other emission control devices can be eliminated or modified, i.e., thermostatic vacuum switch eliminated. Ignition timing need not be as retarded - carburetion can be set at a richer setting giving better driveability and about 10% better fuel economy.

DISADVANTAGES OF THE CATALYST

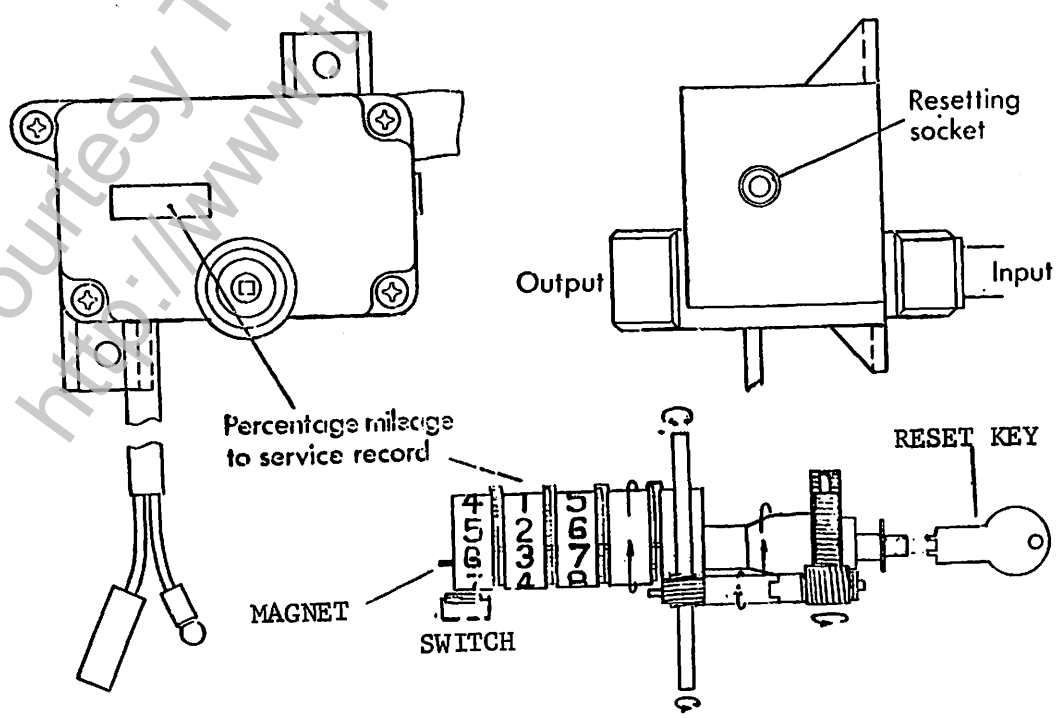
Catalyst equipped cars must be run on unleaded fuel otherwise the catalyst will be rendered ineffective. In an emergency, the catalyst would accept leaded fuel, however, Federal Law provides stiff penalties for pumping leaded fuel into vehicles so equipped. Fines as high as $10,000.00 per day for each and very day of violation could be imposed on the refiner, distributor, retailer, employees or agents. The fuel filler size also inhibits acceptance of leaded fuel nozzles.

It is hazardous to park over any combustible materials, i.e., leaves, accumulated oil droppings, because of the danger of fire caused by the catalyst temperature (1100-1300°C).

CATALYST



CATALYST MAINTENANCE INDICATOR



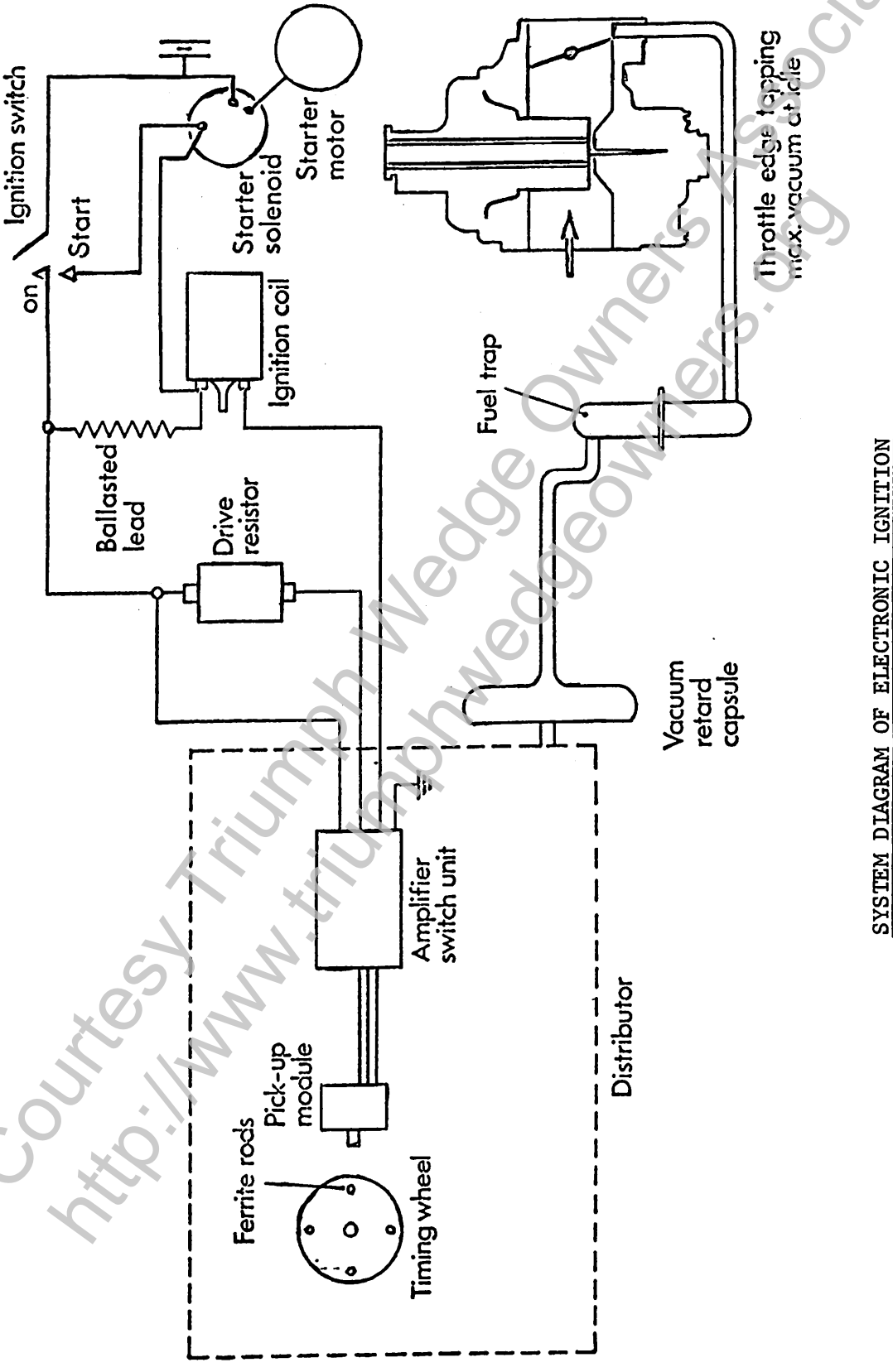
Testing

Replace at 25,000 miles - Reset service interval indicator with special key.

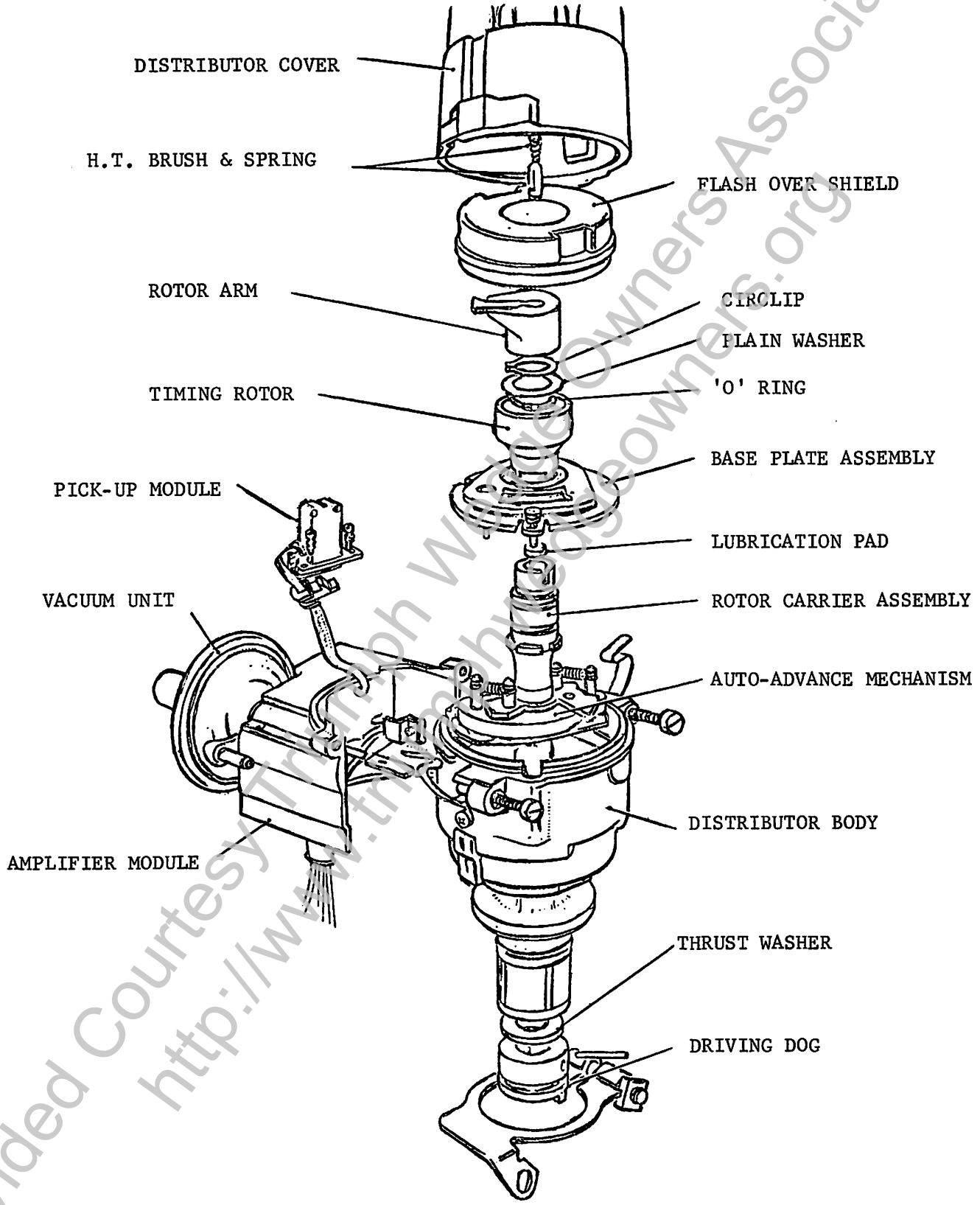
IGNITION SYSTEM

The system is electronic with no contact breaker points. The coil is energized via a power transistor. As a timing rotor containing ferrite rods passes across the coil of the pick-up module, the oscillator breaks into high frequency. The signal switches off the power transistor. The primary circuit of the ignition coil is broken everytime the ferrite rod passes across the pick-up coil producing a high voltage in the secondary winding and a spark at the plug in the normal manner.

A six volt coil is used in series with a ballast resistor wire for normal running. The resistor is short circuited when the solenoid is in operation. Centrifugal advance is by weights which modify the position of the base plate. Vacuum retard is controlled by a throttle edge tapping which gives maximum retard at idle and deceleration, reverting to normal centrifugal advance at small throttle openings.



SYSTEM DIAGRAM OF ELECTRONIC IGNITION



ELECTRONIC IGNITION

PRECAUTIONS

1. DO NOT connect the white leads with either a blue or black sleeve direct to the positive supply.
2. Always ensure the ignition is 'off' when setting the air gap between the pick-up and timing rotor.

TESTING TO LOCATE CAUSE OF MISFIRE

When checking for possible causes of misfire, it is advisable to check the ignition system in the order listed below.

1. Check all connections. Ensure HT leads are a tight fit inside towers and ascertain all LT connections are clean and tight.
2. Test spark plugs and check gaps.
3. Check HT leads. Inspect for signs of tracking, broken or damaged cables, etc.
4. Check distributor cover for signs of tracking inside and out. Clean and examine HT brush, electrodes, etc.
5. Check rotor arm for tracking.
6. Check pick-up/timing rotor air gap (ensure ignition is switched off).
7. Check coil tower for signs of tracking, etc.
8. Substitute ignition coil.
9. Substitute amplifier unit.

TEST CHART FOR COMPLETE FAILURE

Remove coil/dist. H T lead from dist. and hold end ¼" (5mm) from good earth. Switch on ign. Disconnect white/blue lead at drive resistor & check for H T spark each time connection is broken. Reconnect lead after test.

No Spark

Check supply voltage at Black/red connection

Less Than 11V

Check battery wiring, ignition switch, etc.

More Than 11V

Check voltage at coil + terminal Should be 11V or more. (Ballasted system 4-8V)
If zero check ballast res. & cables.

Check voltage at coil & terminal

Less than 2 volts

Disconnect White/Blue lead at drive resistor. Check voltage at coil '-' terminal

More than 9 volts

Check H T leads

Substitute coil

Replace amplifier unit

Less than 9 volts

Disconnect coil '-' lead, check voltage at coil '-' terminal

Less than 9 volts

Replace coil

More than 9 volts

Replace amp. unit

More than 2 volts

Check drive resistor Resistance value 9 - 11

Ensure amp. unit & dist. are well earthed to engine

Replace amp. unit

Sparking

Check pick-up/timing rotor air gap (ignition off). Limits 0.014"-0.016" (0.35mm-0.40mm)

Remove dist. cover, Crank engine and ascertain whether dist. shaft rotates.

No

Check dist. & drive

Yes

Replace amp. unit.

Testing

RETARD UNIT

Check condition of all pipes. Bring engine to normal operating temperature. Disconnect retard pipe at distributor. Engine speed should increase approximately 500 r.p.m.

SETTING IGNITION TIMING

Run engine at idle - if timing is not 2° ATDC, slacken distributor clamp bolt and rotate distributor until 2° ATDC is obtained.