

DEALER TRAINING



PARTS & SERVICE DIVISION

AID NO.: S1044

SUBJECT: 1978 EMISSIONS

MODEL: TRIUMPH SPITFIRE - MG MIDGET

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P R E F A C E

Your attention is drawn to the fact that the emission systems fitted to MG and 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.



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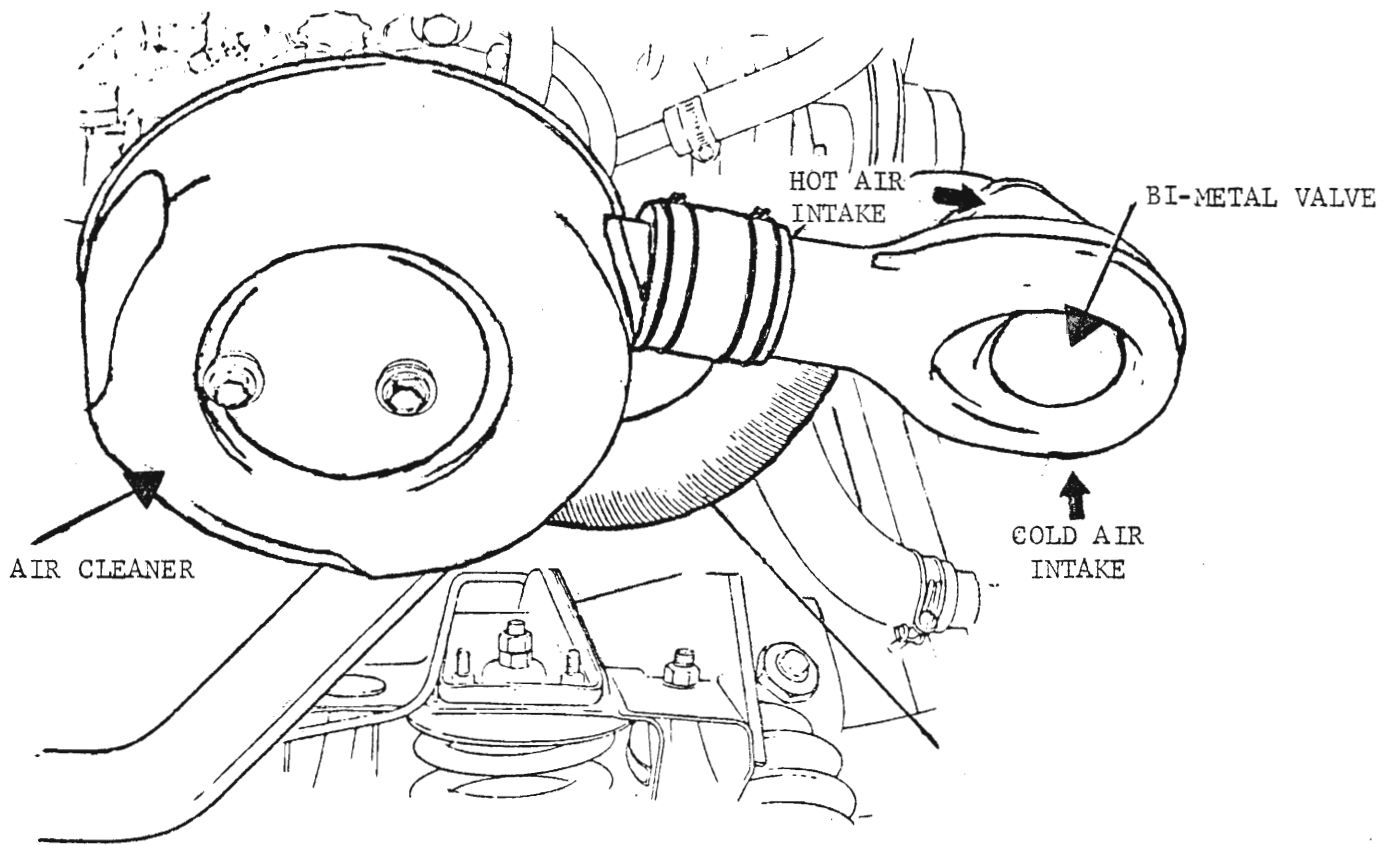
SPECIFICATIONS

Common specifications except where indicated.

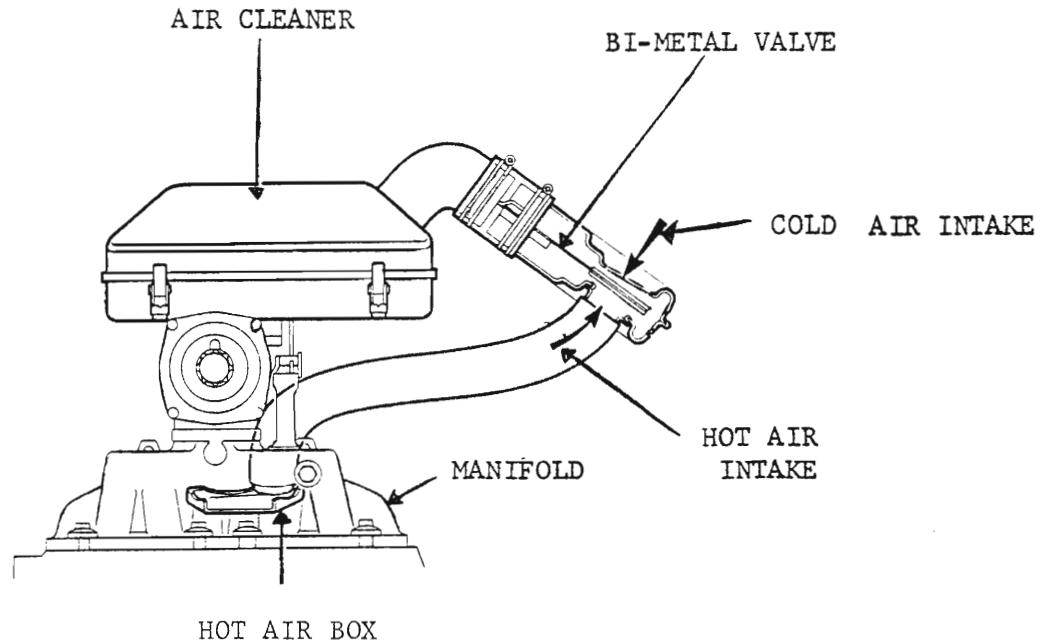
	TRIUMPH SPITFIRE	MG MIDGET
Carburetor Type	Zenith Stromberg	150 CD4T
Needle	45L (Calif.)- 45P (Fed.)	45R (Calif.)- 45Q (Fed.)
Bias	Towards Air Cleaner	
Spring Color	Blue	Blue
CO Reading (Air Injection disconnected, plug line)	3% Nominal (Calif.) (0.5 - 6.5%) 5% Nominal (Fed.) (<u>±</u> 2%)	3% Nominal (Fed.&Calif.) (0.5 - 6%)
Idle Speed	800 <u>±</u> 100 r.p.m.	
Fast Idle Gap/Speed	.035"	
Firing Order	1-3-4-2	
Distributor Type	Lucas Electronic 45DE4	
Air/Point Gap	014 - 016	
Dwell	Fixed	
Plug Type	Champion N12Y	
Plug Gap	.025"	
Ignition Timing Idle	2° ATDC (Calif.) - 10° BTDC (Fed.)	
Valve Clearance	.010" Cold	
Nominal Compression Ratio	7.5 : 1 <u>±</u> .5	
Auto. Choke Needle	D9	
Auto. Choke Cam	CT8	
Air Pump Pressure	5.5 - 8 lb/in ²	

HEATED AIR INTAKE

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 pipe (Spitfire), exhaust manifold (Midget), depending upon the temperature of the bi-metal strip. The flap valve should be in the mid position when the temperature is 25°C (76°F) ambient.



SPITFIRE



Testing

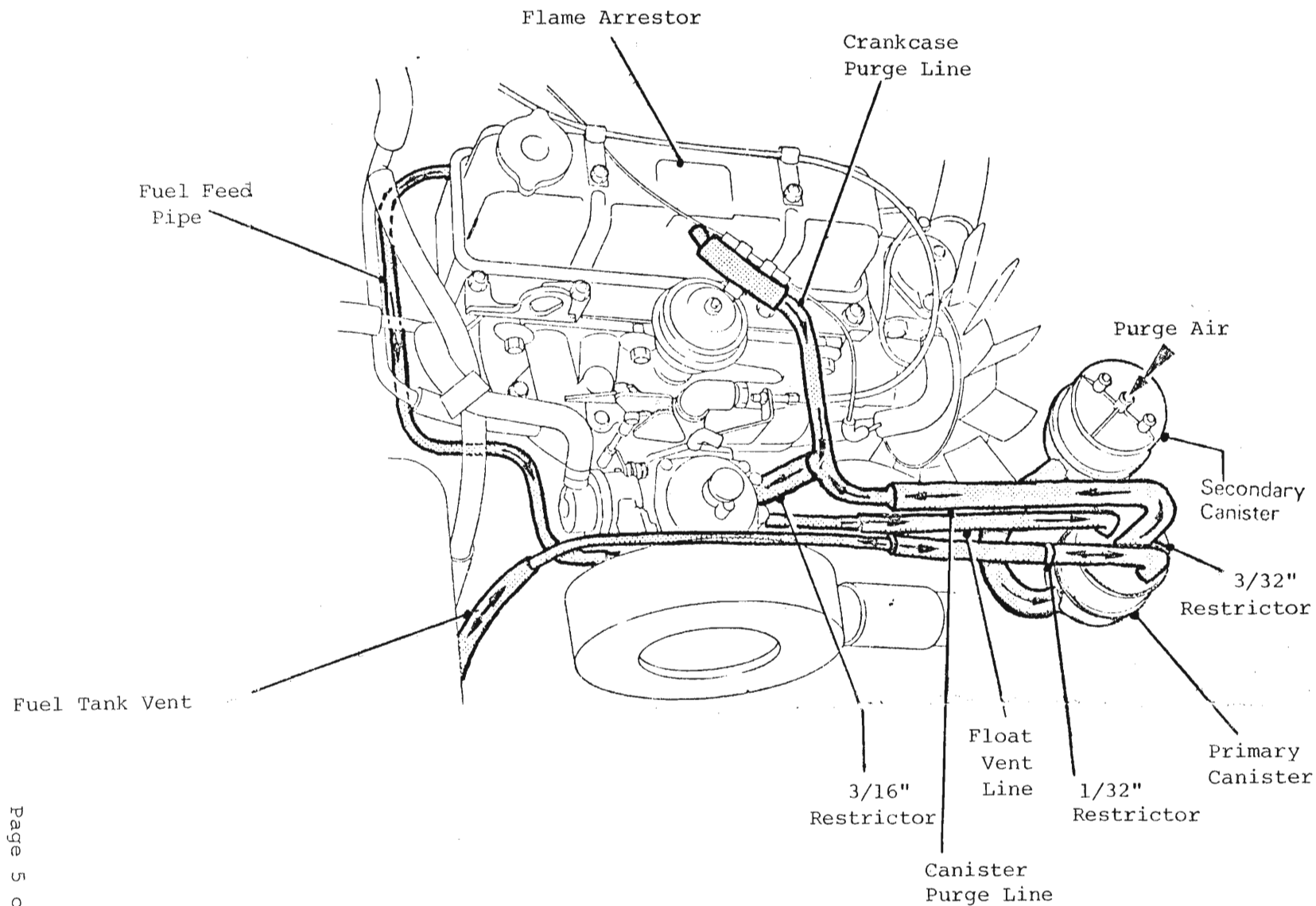
With engine cold, ensure flap valve blocks air entry from engine compartment. With engine at normal running temperature, ensure flap valve blocks air entry from exhaust manifold or pipe.

POSITIVE CRANKCASE VENTILATION SYSTEM

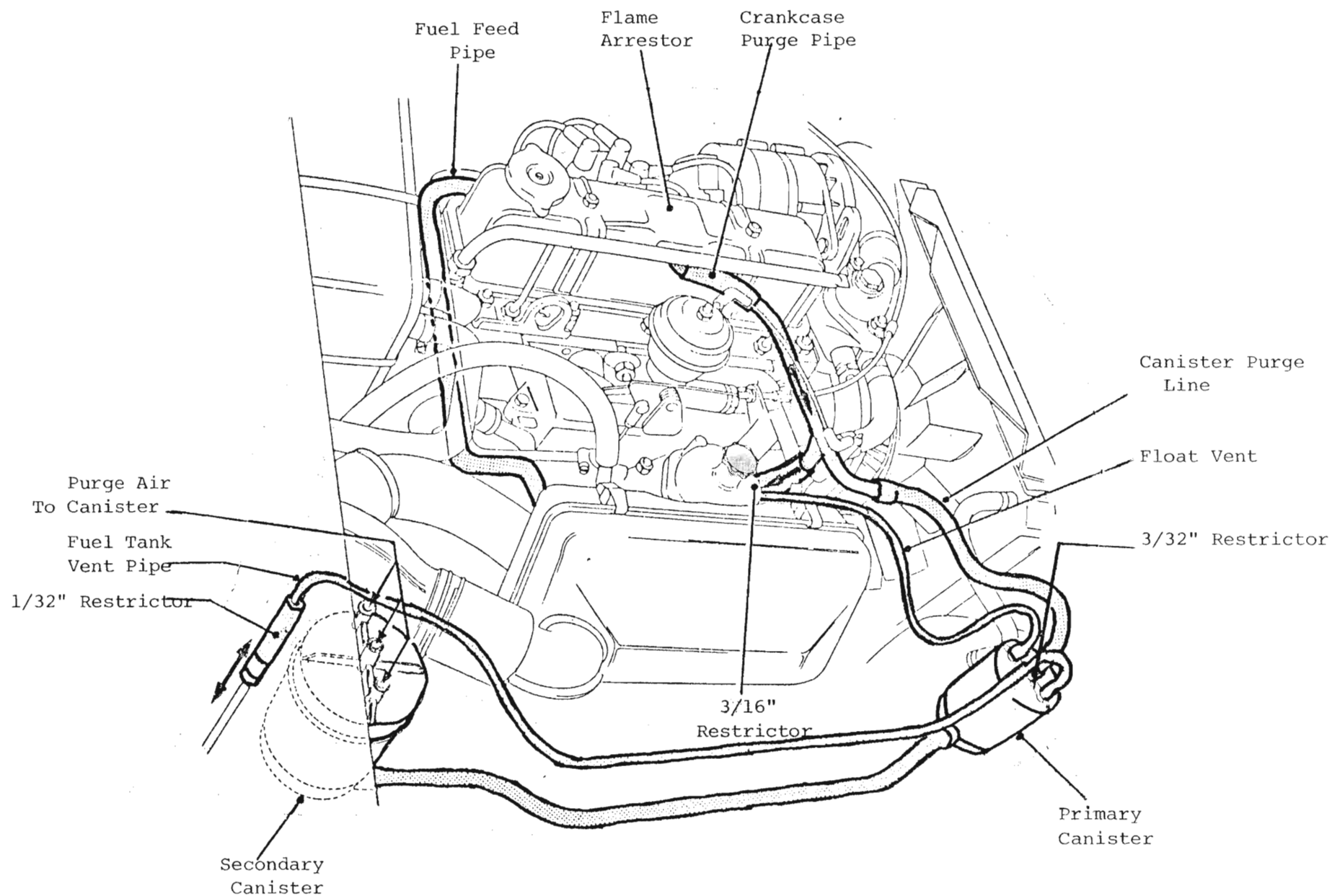
When the engine is running, vapors from the crankcase are drawn through a pipe into the low depression area of the carburetor and recycled through the engine induction system. With the engine at rest, the vapors are vented to and stored in the charcoal canisters.

SPITFIRE CRANKCASE AND CANISTER PURGE SYSTEM

S1044



MIDGET CRANKCASE AND CANISTER PURGE SYSTEM



TESTING: ENSURE ALL RESTRICTORS ARE CLEAR. CHECK ALL HOSES AND PIPES FOR BLOCKAGE AND SECURITY.

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 are vented to and stored in the charcoal canisters 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.

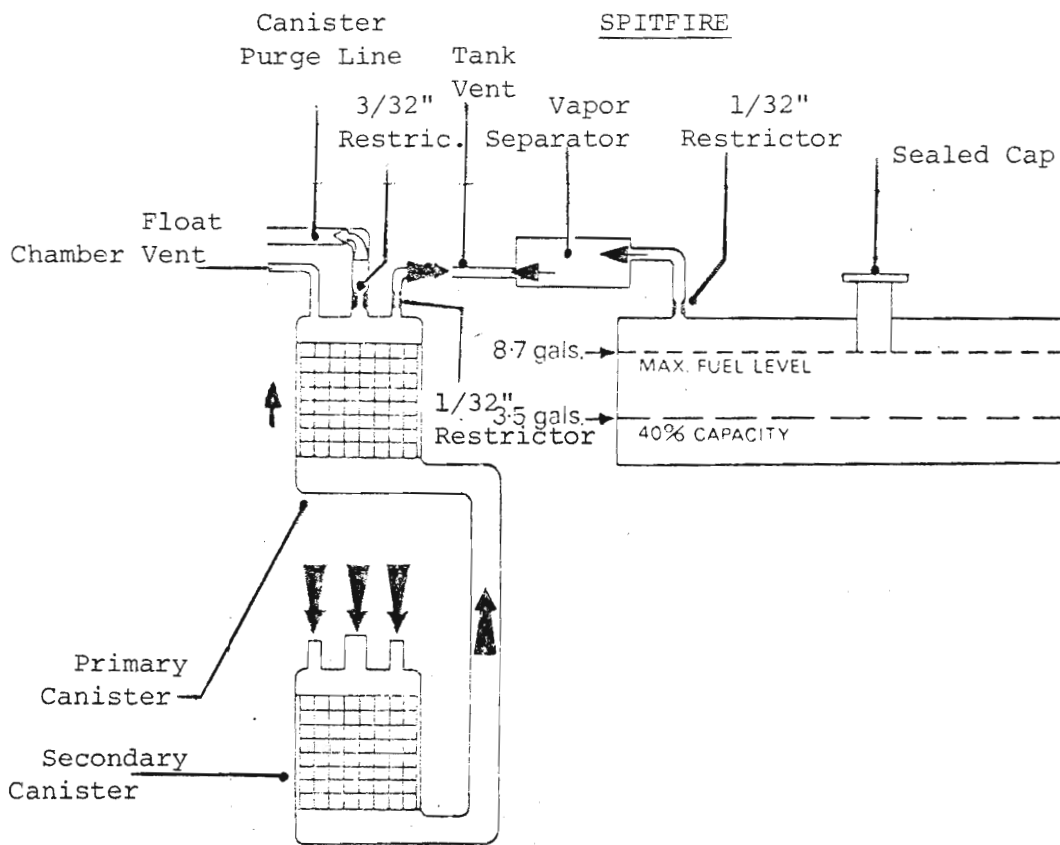
The fuel tank has a restricted fill allowing approximately 1 gallon of the tank volume for expansion.

SPITFIRE

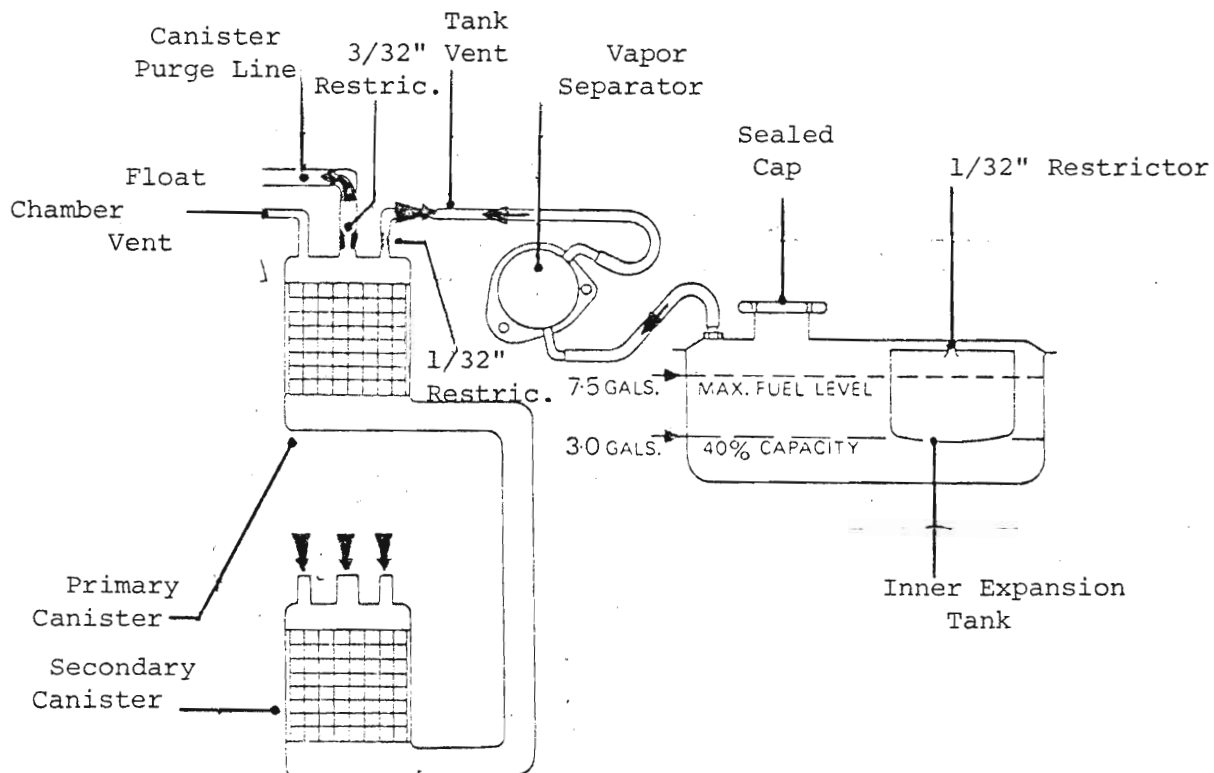
To achieve this, a restrictor is put in the line between tank and canister which permits only a small flow, i.e., those likely to occur with fuel vapor, or replacement air, as fuel is used, but not large enough to vent the tank during filling conditions. A small vapor separator is also in circuit. Vapors from the tank and float bowl are piped to the **primary** canister and then recycled through the induction system.

MIDGET

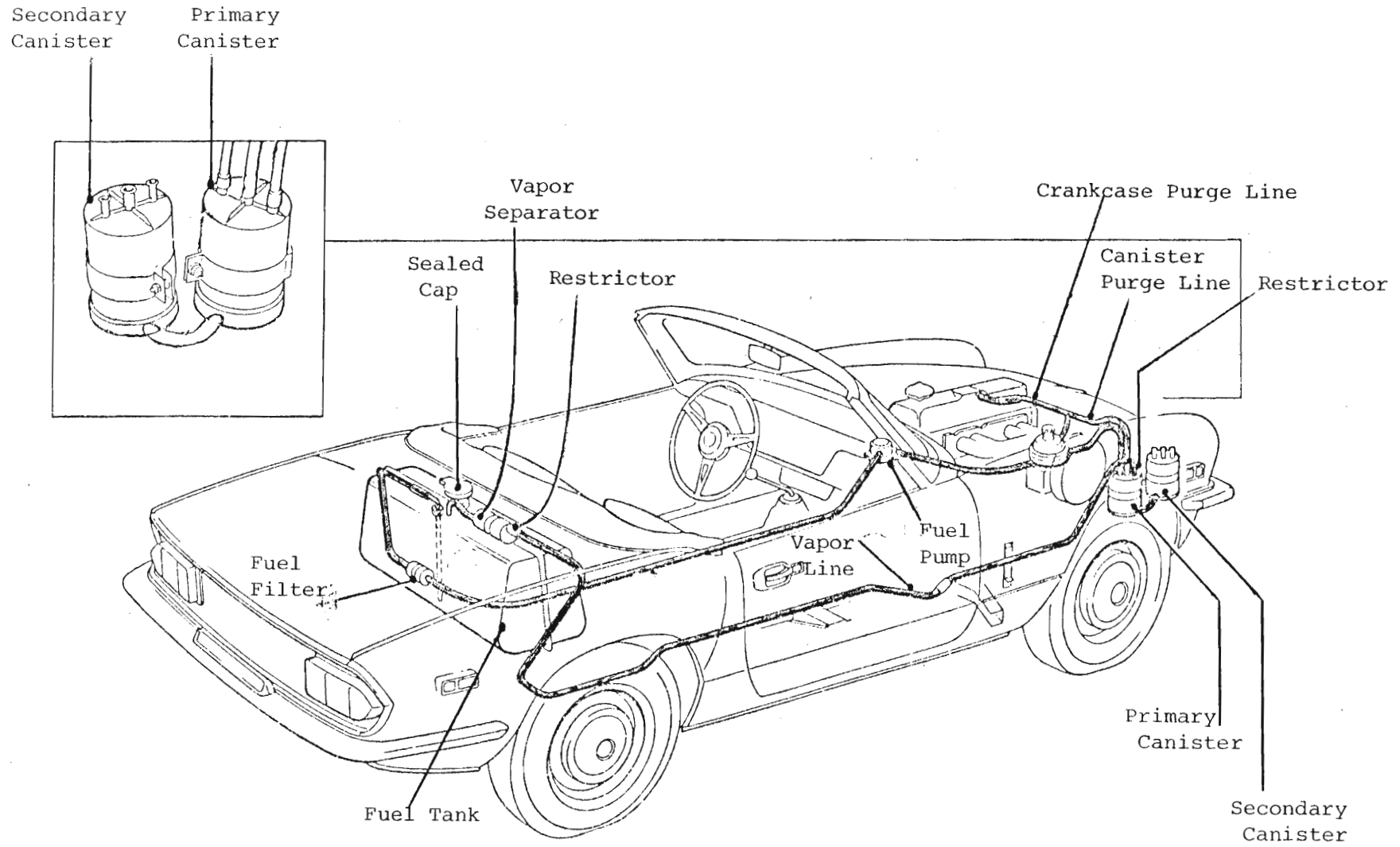
To achieve the same basic function, the MG Midget has an expansion tank within the main tank with a large hole in the bottom face and a small restricted vent in the top. This prevents the expansion tank from filling during normal tank refueling thus providing expansion volume. A small vapor separator tank is placed in circuit. Vapors from the tank and float bowl are piped to the primary canister and then recycled through the induction system.



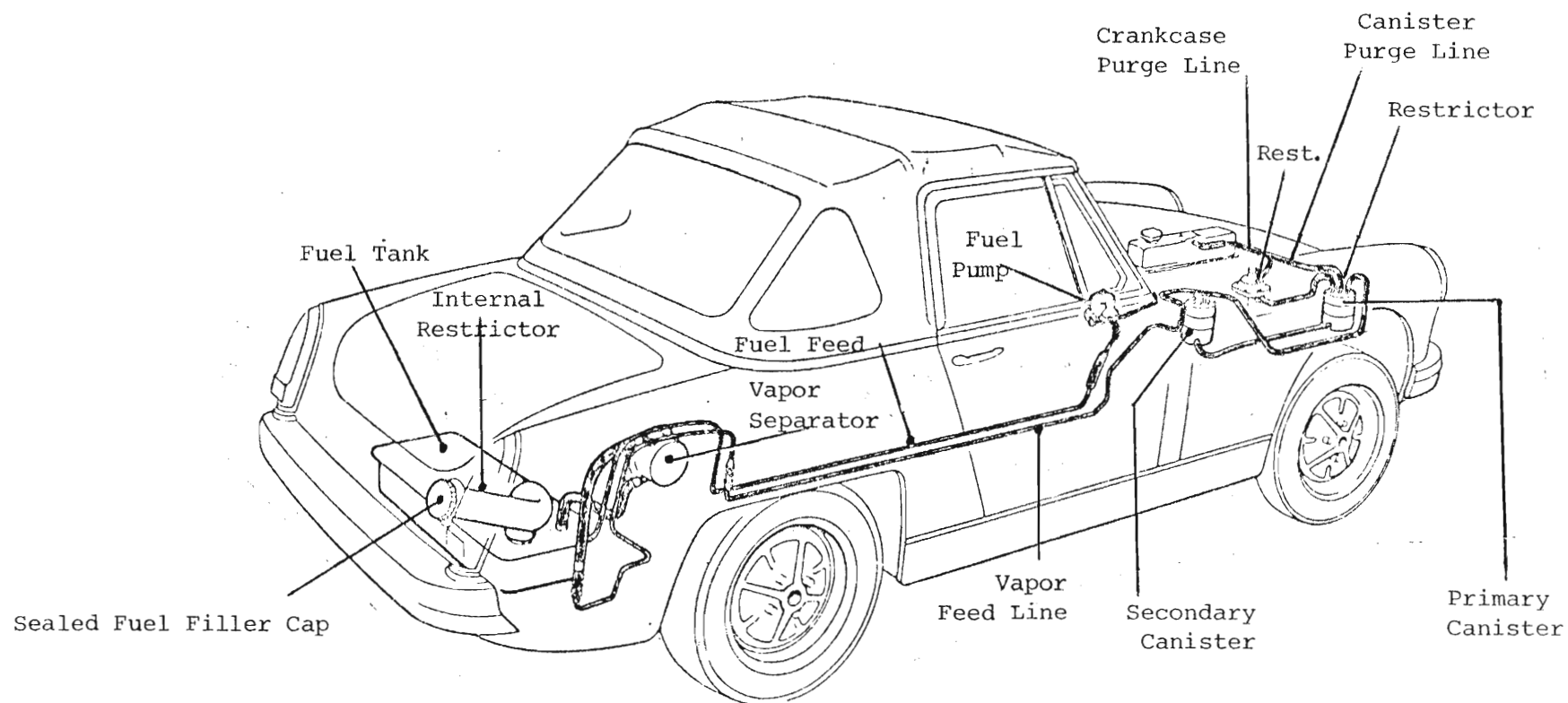
MIDGET



SPITFIRE FUEL SYSTEM AND EVAPORATIVE EMISSION CONTROL SYSTEM



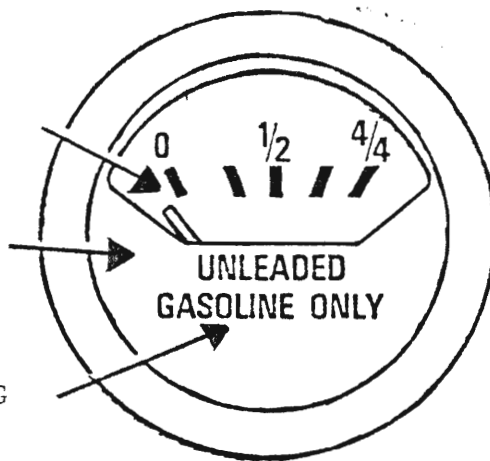
MIDGET FUEL SYSTEM AND EVAPORATIVE EMISSION CONTROL SYSTEM



WHITE NUMBERS AND POINTER

BLACK BACKGROUND

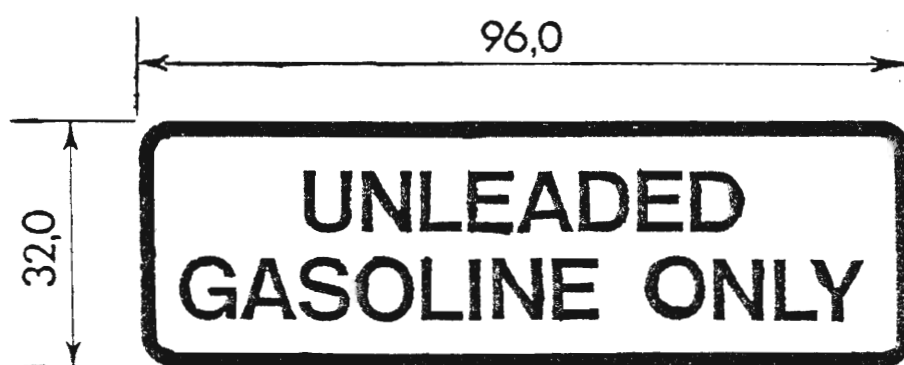
RED LETTERING



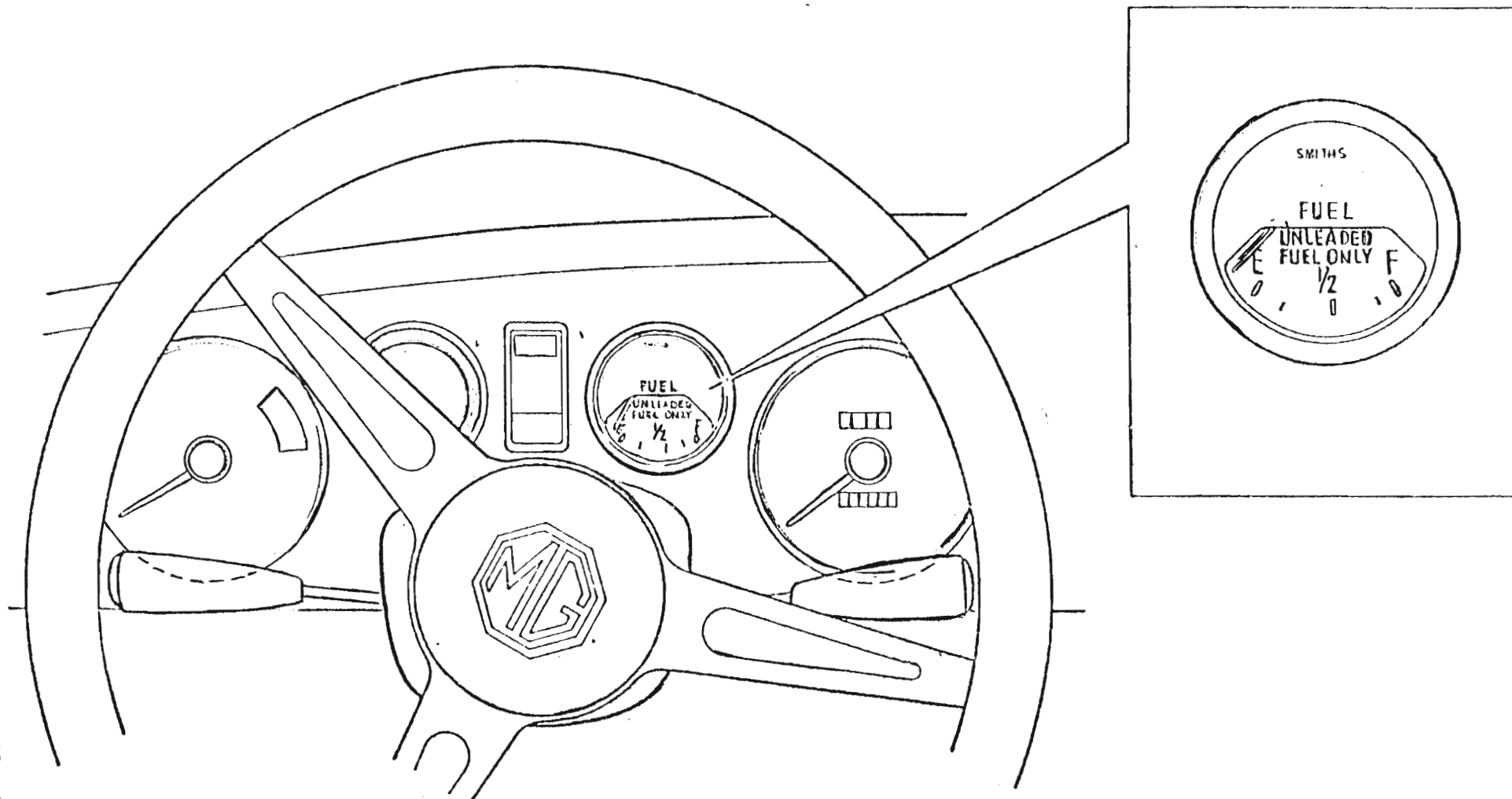
SPITFIRE FUEL GAUGE

FUEL FILLER CAP

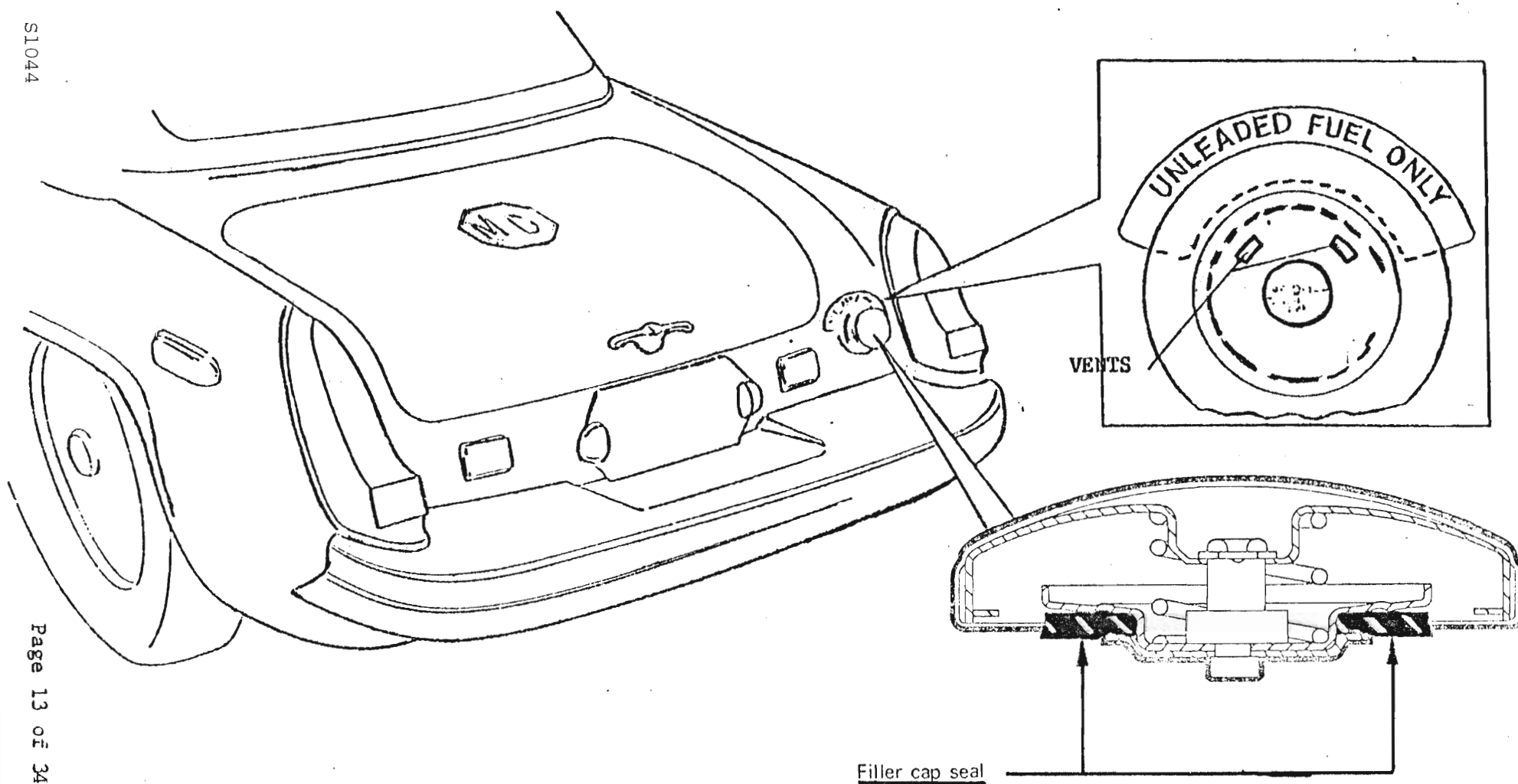
UNLEADED
GASOLINE ONLY



SPITFIRE LEAD FREE FUEL LABEL



MIDGET FUEL GAUGE



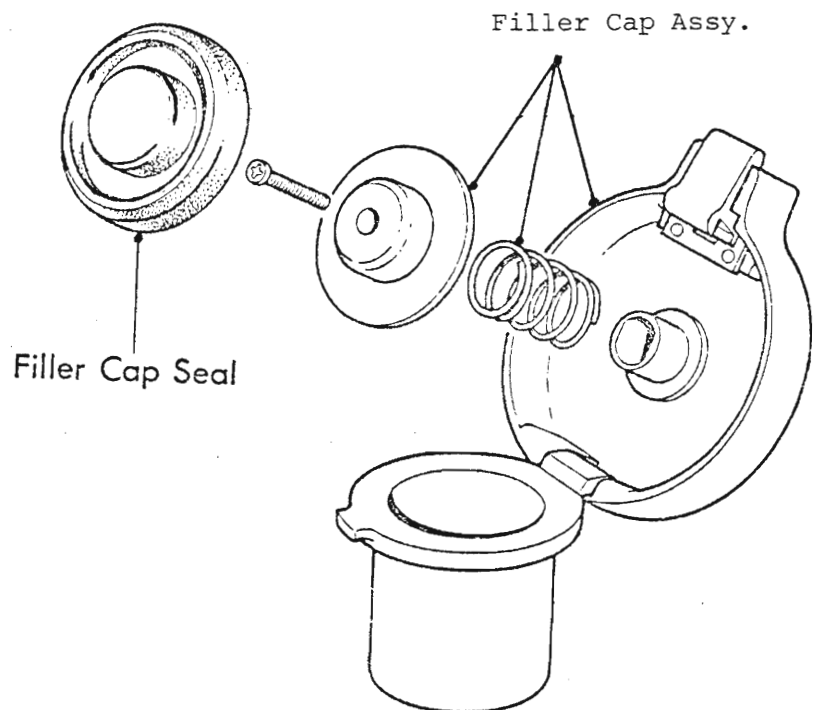
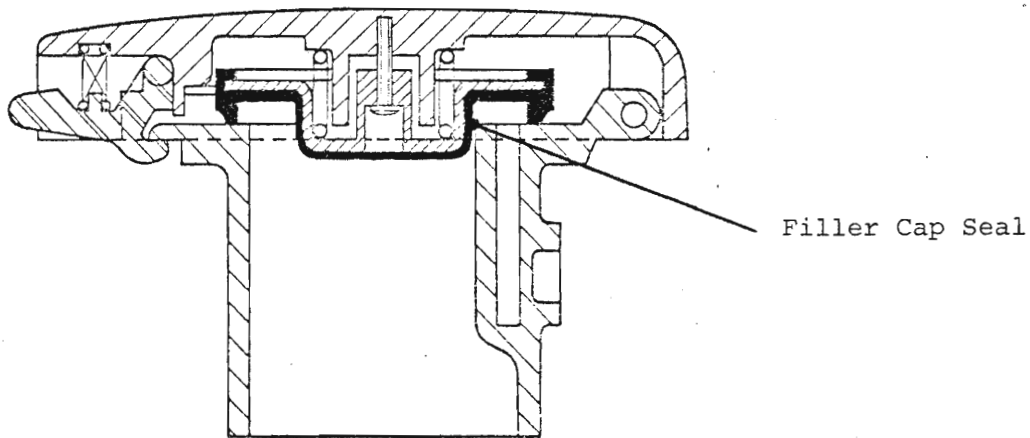
MIDGET FUEL FILLER

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.

SPITFIRE FUEL CAP



AIR INJECTION SYSTEM

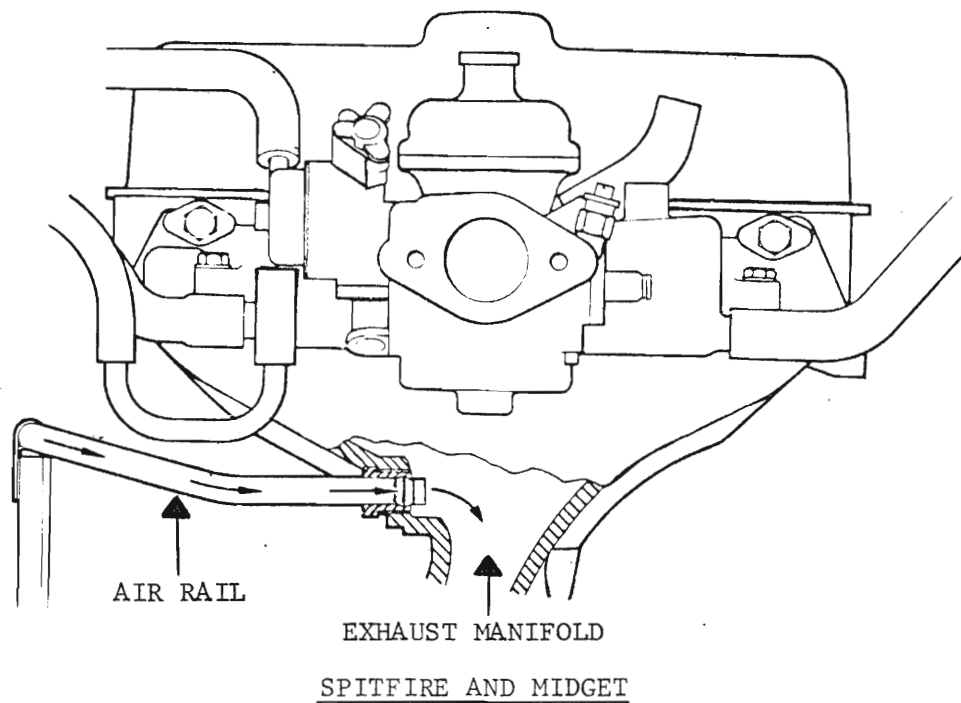
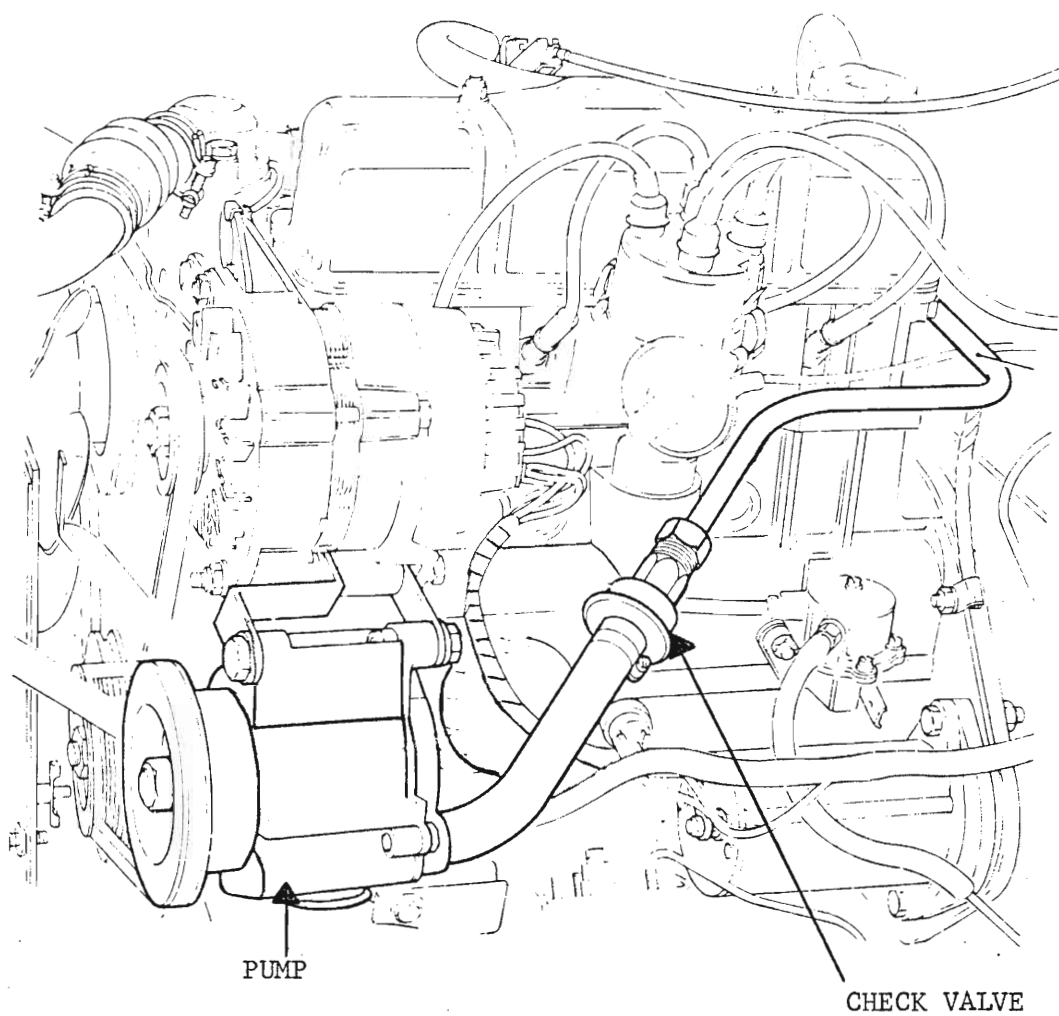
A belt driven air pump supplies air under pressure through a non-return check valve to a single entry point in the exhaust manifold. The air combines with exhaust gases to continue the oxidation process in the exhaust system. The non-return check valve prevents reverse flow in the air injection manifold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

A relief valve is fitted in the air pump to relieve part of the air pump pressure at high pump speeds to prevent pump damage.

ANTI-RUN ON CONTROL VALVE

(California Only)

California vehicles still employ an anti-run on control valve. Its function and circuitry remain unchanged from previous models, with one exception. The valve is now connected to the secondary canister, at its base fitting.



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

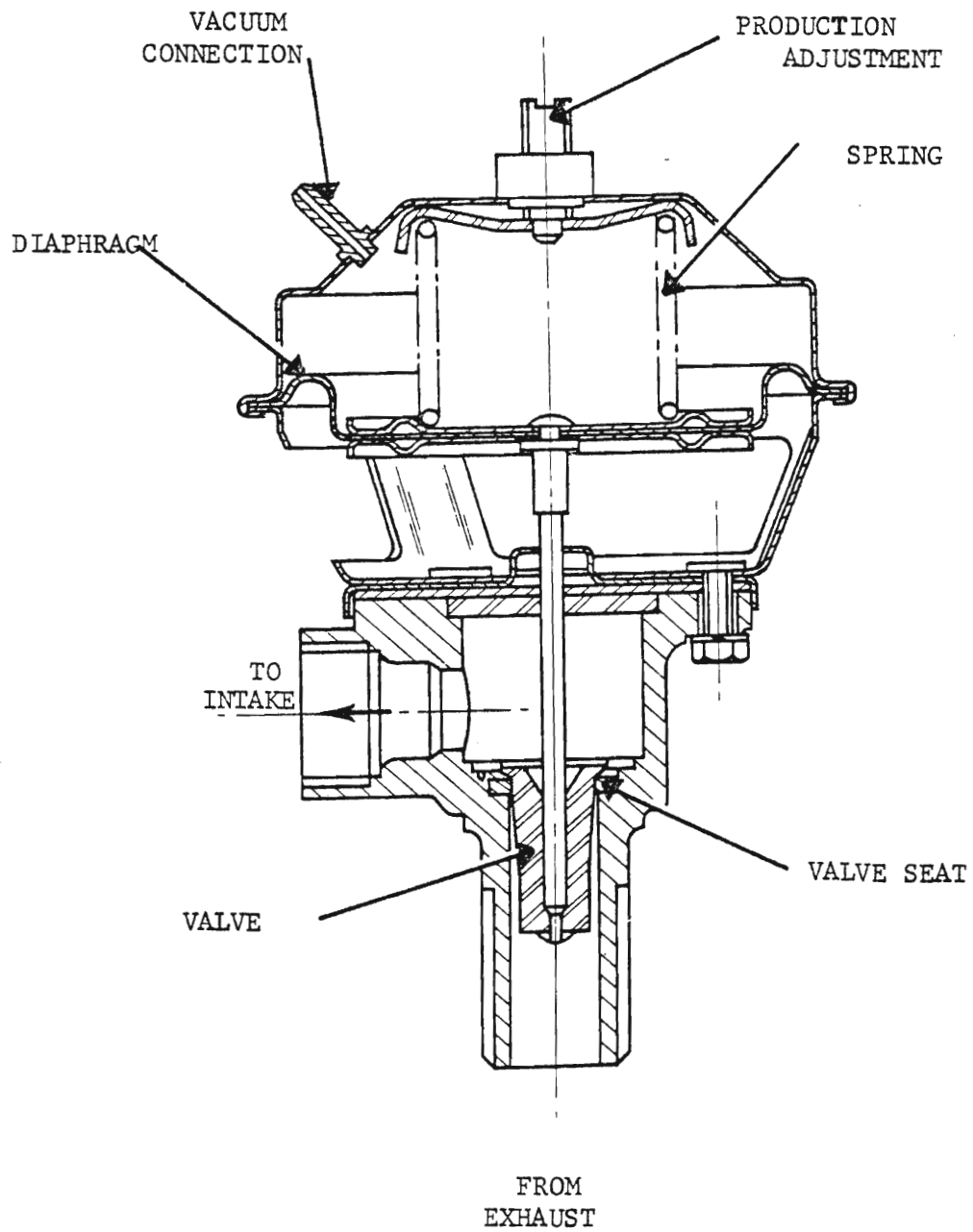
Check that the relief valve dumps pressure at high pump speeds. If air is not relieved, renew valve. If pump pressure does not reach minimum figure, replace pump.

CHECK VALVE

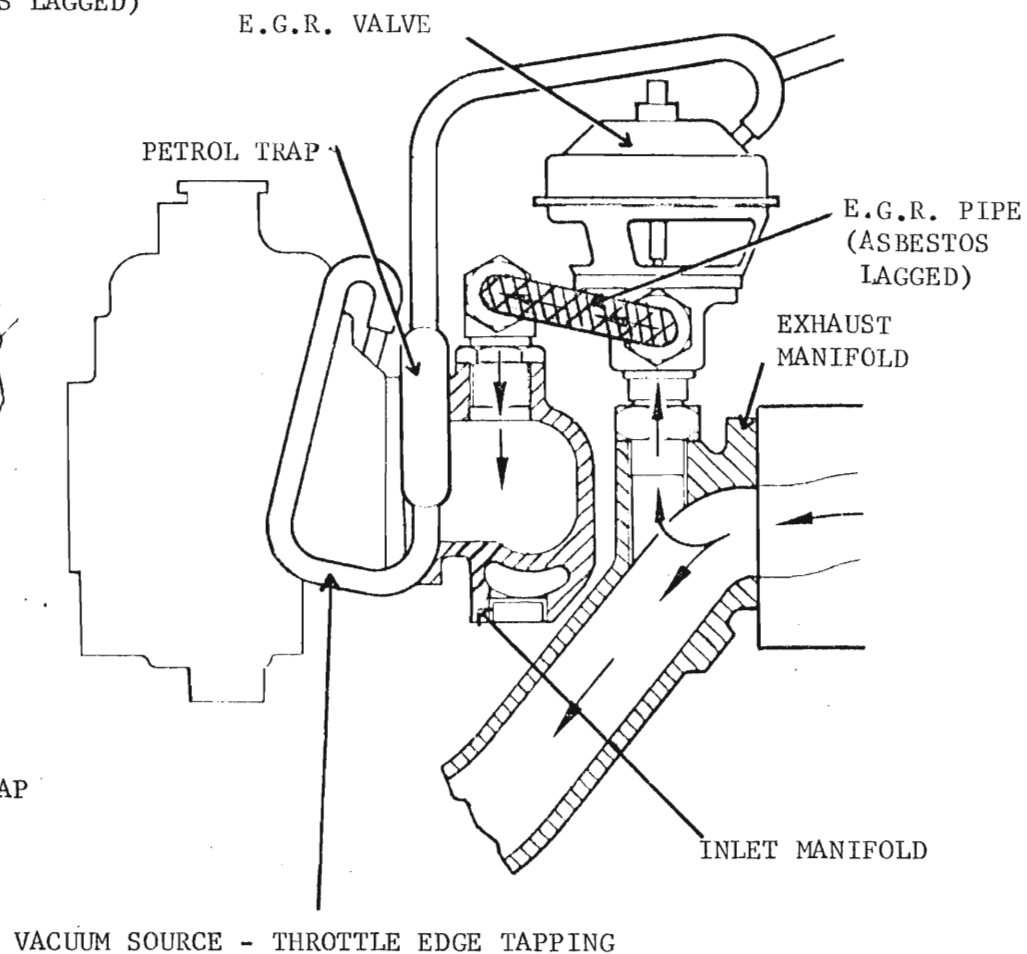
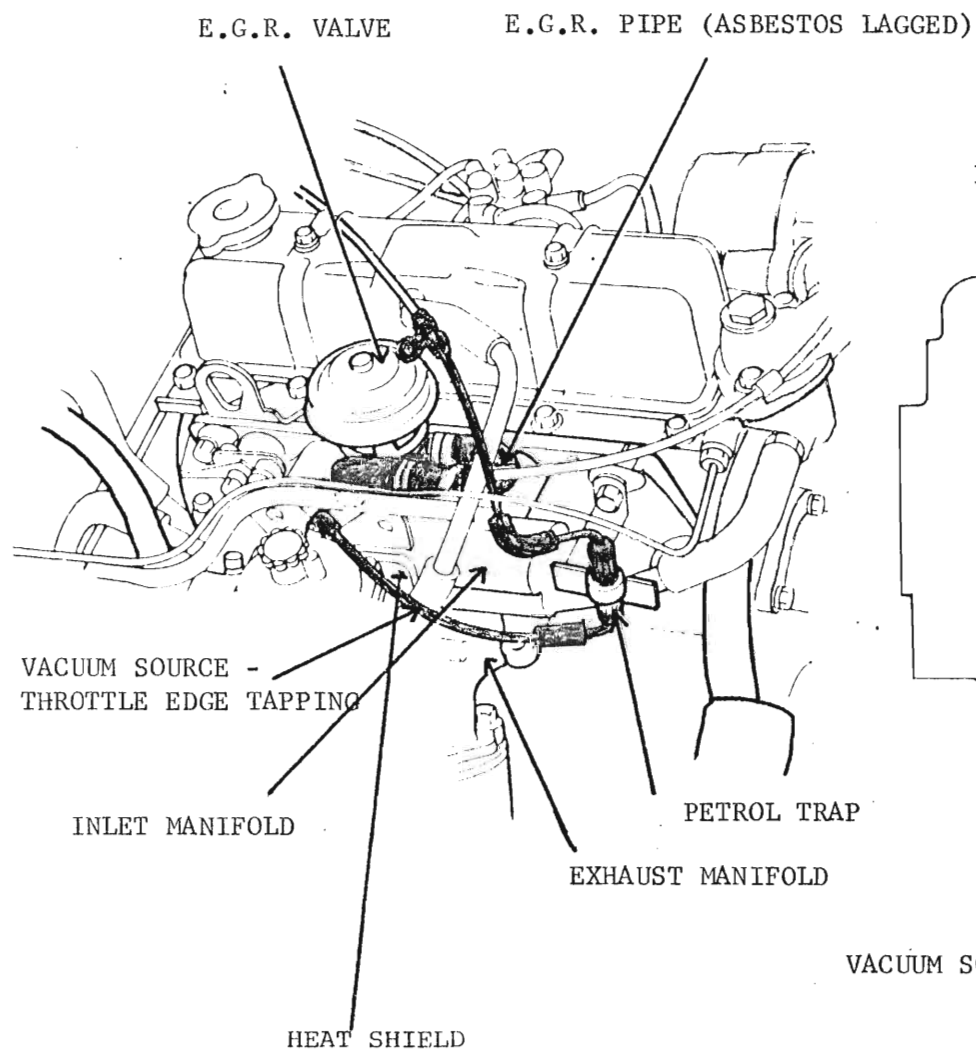
Remove check valve. Blow through the valve orally. Should allow flow pump to manifold end. No flow manifold to pump end. Ensure hose is free from restrictions.

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.



SPITFIRE AND MIDGET



SPITFIRE AND MIDGET E.G.R. SYSTEM

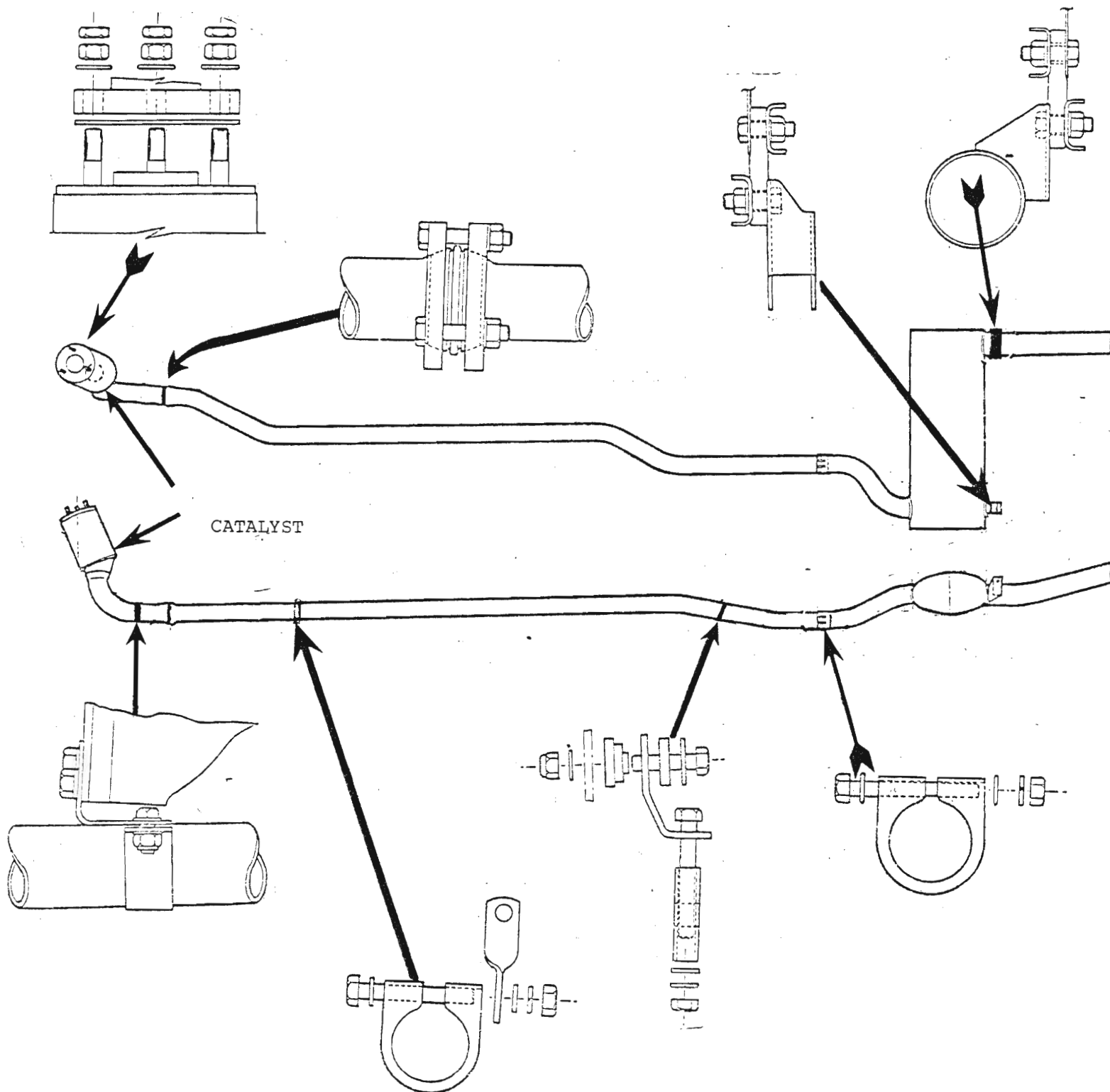
Testing

1. Check all lines and connections for security.
2. Bring engine to normal running temperature. 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.

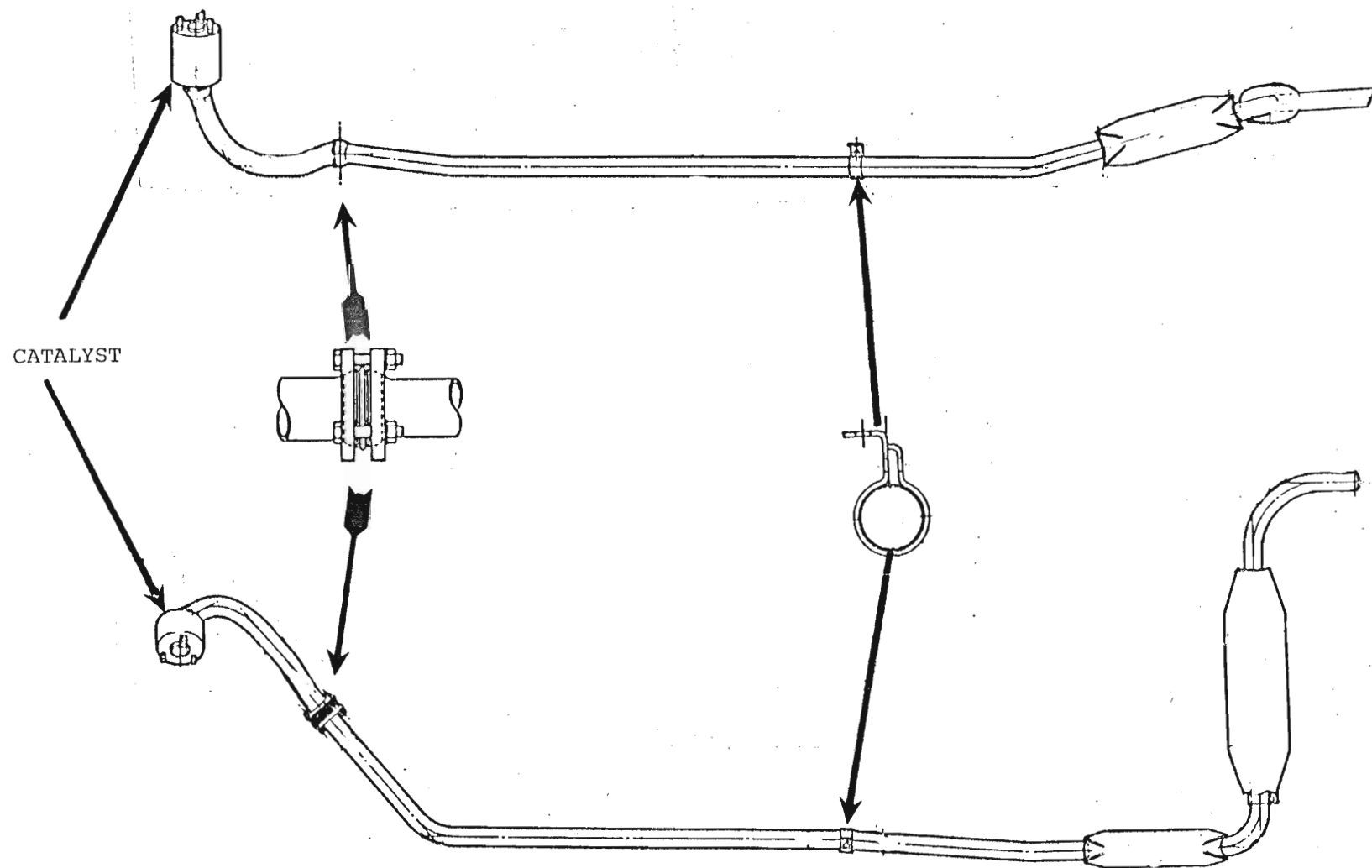
SERVICING EGR

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 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.
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.

SPITFIRE CATALYST, EXHAUST SYSTEM AND MOUNTING POINTS



MIDGET CATALYST, EXHAUST SYSTEM AND MOUNTING POINTS



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

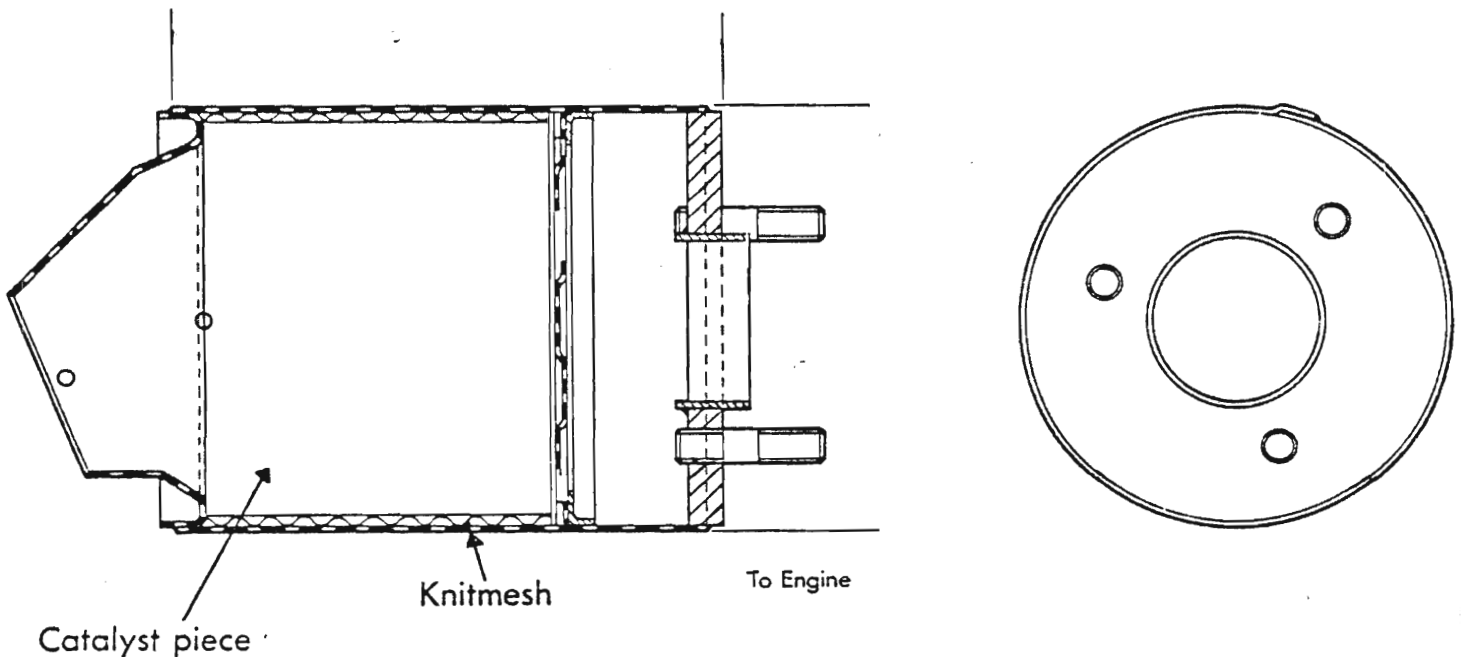
With use of the catalyst some other emission control devices can be eliminated or modified, i.e., thermostatic vacuum switch eliminated. Ignition timing need not be as retarded - carburetion can be set at a richer setting giving better driveability and about 10% better fuel economy.

NOTE:

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. per day for each and every 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



Testing

Replace at 50,000 miles Federal (25,000 miles California)

A label with this information will appear on the sun visor of every car:

BRITISH LEYLAND LTD.



CATALYTIC CONVERTER PRECAUTIONS

Your British Leyland car is equipped with a Catalytic Converter which is an important element in the emission control system required on this car to obtain very low emission levels.

IT IS IMPORTANT TO KEEP YOUR CAR IN PROPER OPERATING CONDITION
FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE CATALYTIC CONVERTER

If an engine malfunction should occur, particularly involving engine misfire or other noticeable loss of performance, do not continue to operate your car . . . have it serviced promptly. Continued operation of your car with severe malfunction could cause the Converter to overheat with possible damage to Converter and car.

Do not operate, idle, or park this car in areas where combustible materials such as grass or leaves can come in contact with the hot exhaust system. Under certain wind or weather conditions these materials could be ignited by a hot exhaust system.

REFER TO YOUR OWNER'S HANDBOOK FOR DETAILS

THE FOLLOWING INFORMATION WILL BE STATED IN THE OWNER'S HANDBOOK

CATALYTIC CONVERTOR PRECAUTIONS

1. Use unleaded gasoline only. This is essential to maintain the efficiency of the emission control system. Unleaded gasoline has the additional advantage that it minimizes spark plug fouling, thereby giving improved engine performance.
2. Do not tamper with the engine settings. The settings have been established to ensure that your vehicle will meet stringent exhaust emission regulations.

Incorrect engine settings could cause excessively high catalytic convertor temperatures which may result in damage to the convertor and car. Take your car to your British Leyland dealer, or other qualified service facilities, if you feel your vehicle requires adjustments to the engine settings.

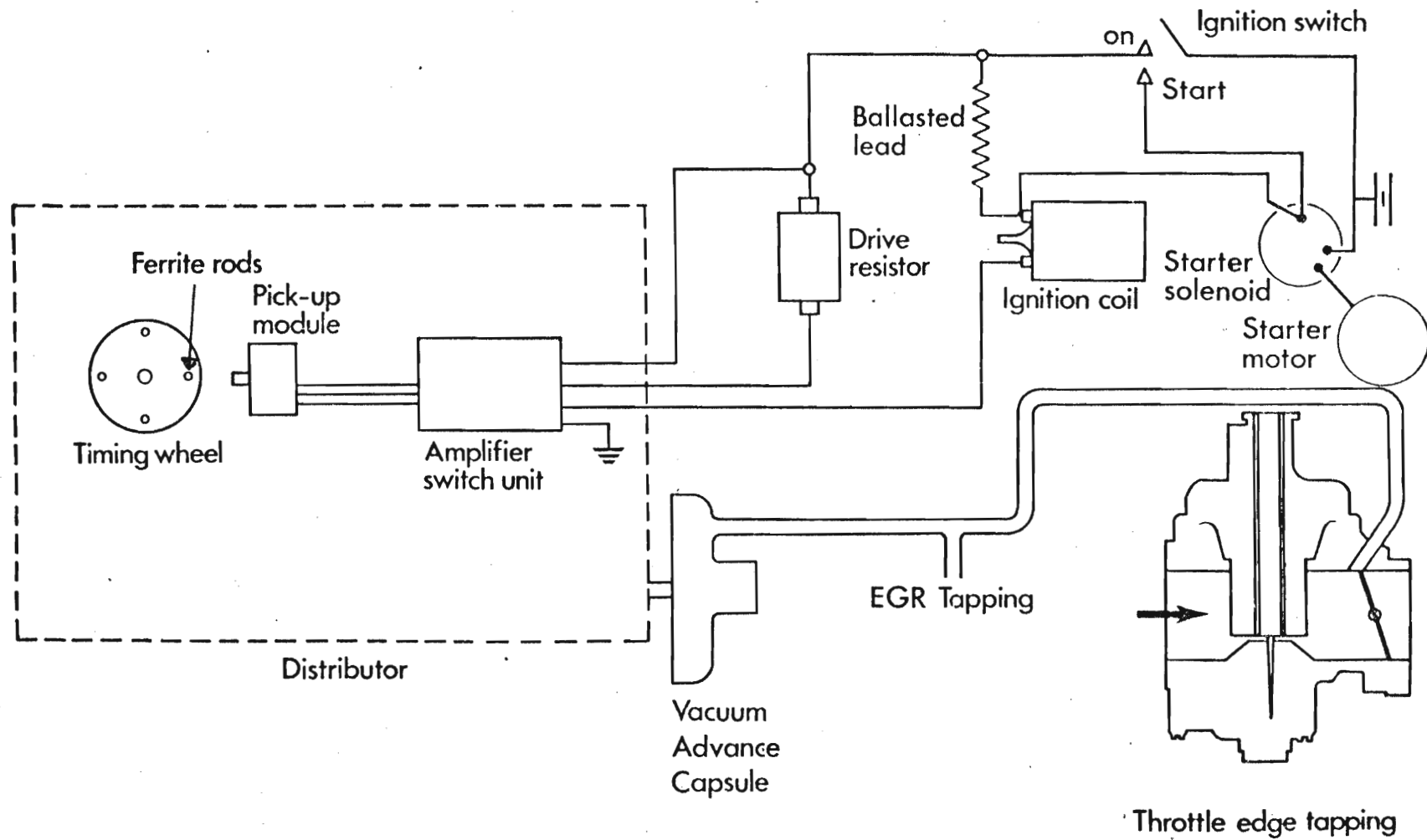
3. Have your car maintained in accordance with the service schedules outlined in your Owner's Handbook. A correctly tuned engine minimizes exhaust emissions and achieves the optimum performance and fuel economy.
4. Do not continue to operate your car if you detect any engine malfunction. Misfire, loss of engine performance, engine run on, may cause unusually high catalytic convertor temperatures which may result in damage to the convertor and car if any such engine malfunctions are not rectified immediately.
5. Do not leave your car unattended with the engine running at any time.
6. The use of a catalytic convertor increases exhaust system temperatures (particularly under engine malfunction). Do not operate or park your car in areas where combustible materials such as dry grass or leaves may come in contact with the exhaust system. The exhaust system could ignite such materials under certain weather conditions.
7. The car is designed for normal road use. The following are examples of abuses which could damage the catalytic convertor and car and may lead to a dangerous condition due to excessively high catalytic convertor temperatures.
 1. Competition use.
 2. Off highway use.
 3. Excessive engine revs.
 4. Overloading vehicle.
 5. Excessive towing loads.
 6. Switching off engine and coasting in gear.
8. Do not run the engine with a spark plug lead disconnected or a spark plug removed or use any device that requires an insert into a spark plug hole in order to generate air pressure (e.g. tire pump, paint spray attachment, etc.) as this could also result in catalytic convertor damage.
9. Do not push or tow your car to start it. Use jumper cables. Under certain conditions, pushing or towing could damage the catalytic convertor.

10. The catalytic convertor contains a ceramic material. Avoid heavy impacts on the convertor casing.

IGNITION SYSTEM

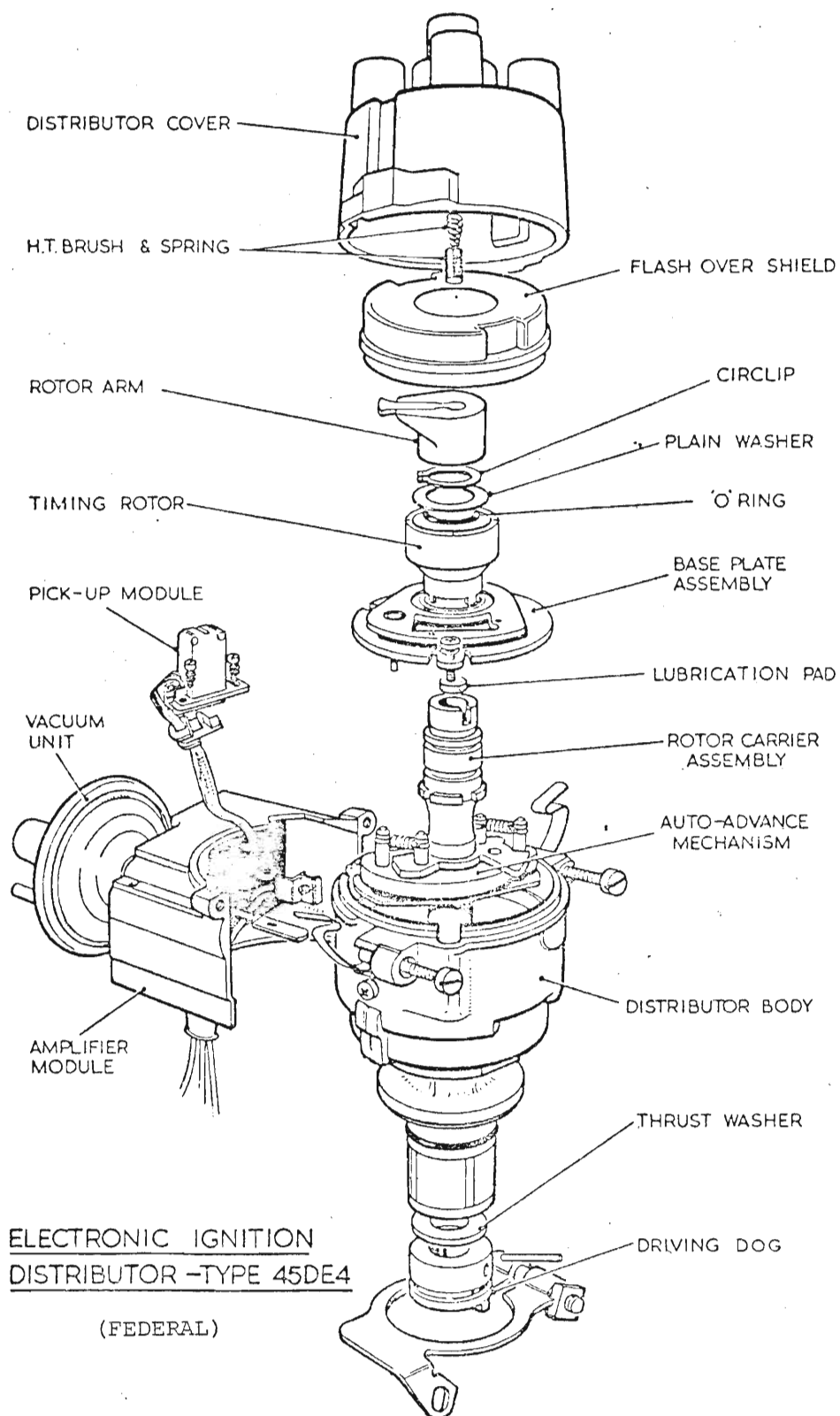
The system is electronic with no contact breaker points. The coil is energized via a power transistor. As a timing rotor containing ferrite rods passes across the coil of the pick-up module, the oscillator breaks into high frequency. The signal switches off the power transistor. The primary circuit of 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

(FEDERAL)



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.

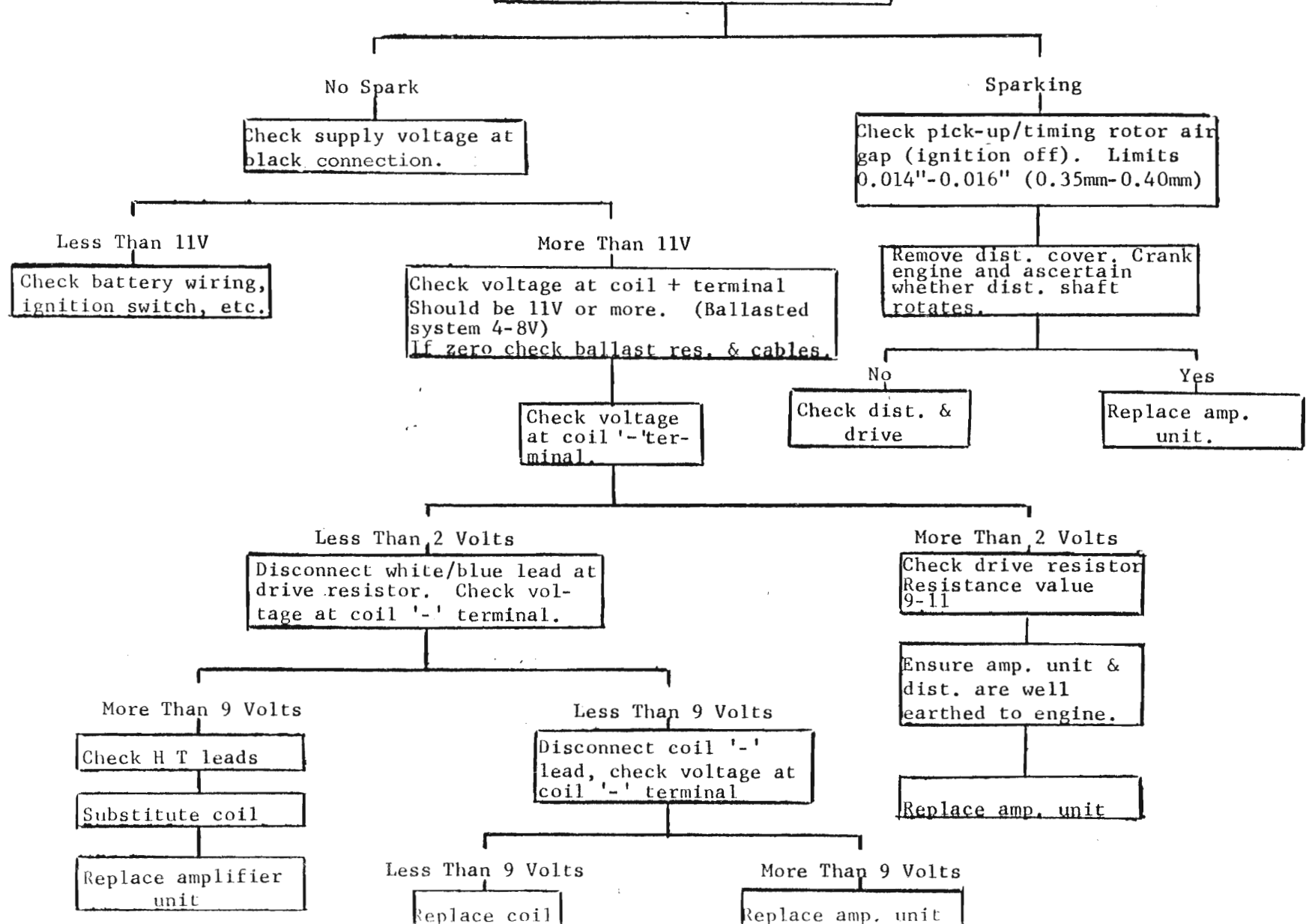
TESTING TO LOCATE CAUSE OF MISFIRE

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 $\frac{1}{4}$ " (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.



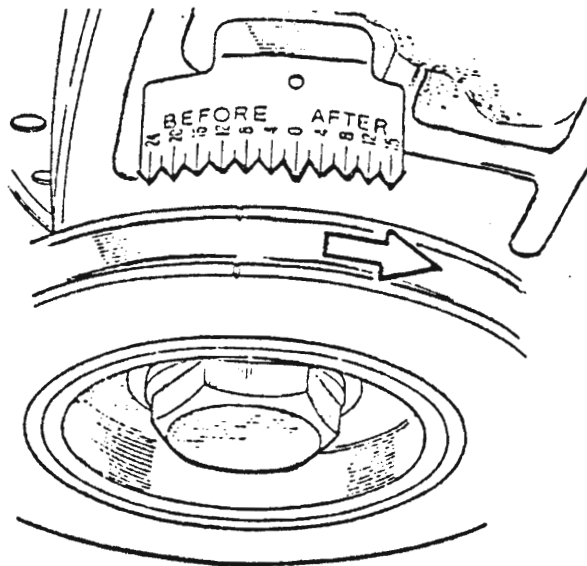
Testing

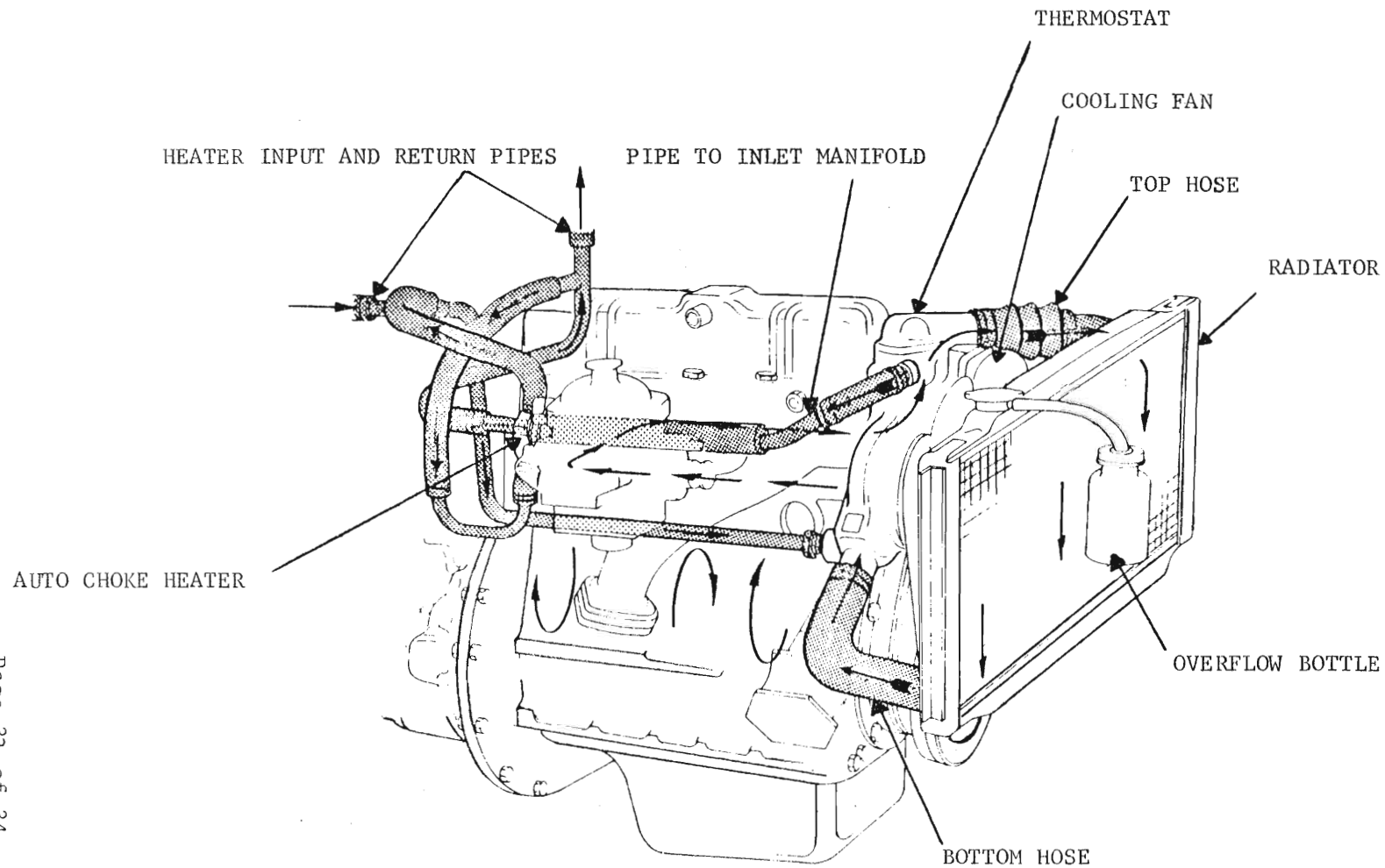
RETARD UNIT (Calif. Only)

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 (Calif.), 10° BTDC (Fed.), slacken distributor clamp bolt and rotate distributor until 2° ATDC (Calif.), 10° BTDC (Fed.) is obtained.



SPITFIRE COOLING SYSTEM

MIDGET COOLING SYSTEM