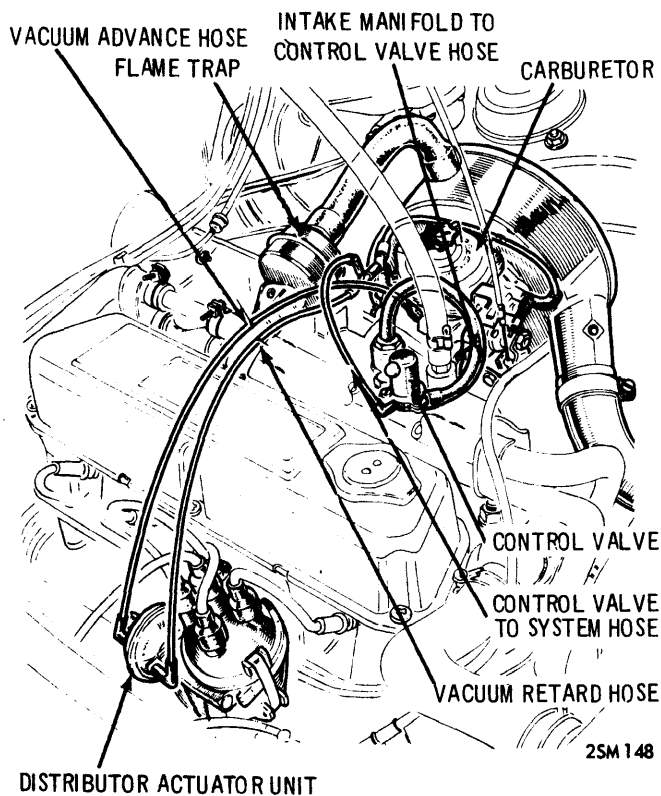


ROOTES GROUP SINGLE CARBURETOR ENGINE MODIFICATION

Arrow Sedan (1970)
Alpine Coupe (1970)
Plymouth Cricket (1971-73)

DESCRIPTION

Single carburetor exhaust emission system consists of the following items: A Stromberg CDSE (CDSET on 1972-73 Cricket) carburetor, equipped with a throttle by-pass valve; control valve and a distributor with overrun (deceleration) retard control. These components operate to give precise control of air/fuel mixture such that hydrocarbon and carbon monoxide emissions are held to a minimum.



SINGLE CARBURETOR EMISSION CONTROL SYSTEM

Stromberg CDSE Carburetor — Carburetor has a fixed non-adjustable jet in which a spring loaded metering needle operates with rise and fall of air valve piston. It also incorporates a throttle by-pass valve, temperature controlled valve and slow running mixture air control screw. Throttle by-pass valve allows a mixture past the closed throttle during periods of high manifold vacuum. Temperature controlled valve provides a means of leaning idle and light load mixture when carburetor is hot. Slow running control screw provides small adjustment of slow running mixture ratio.

Stromberg CDSET Carburetor — Carburetor and carburetor operations are the same as CDSE carburetor, except it is equipped with an automatic choke assembly which replaces hand operated choke used on CDSE carburetors. New choke system consists of a metering jet and needle, fast idle plunger and cam, vacuum kick piston and rod, and a bi-metal temperature sensitive coil spring.

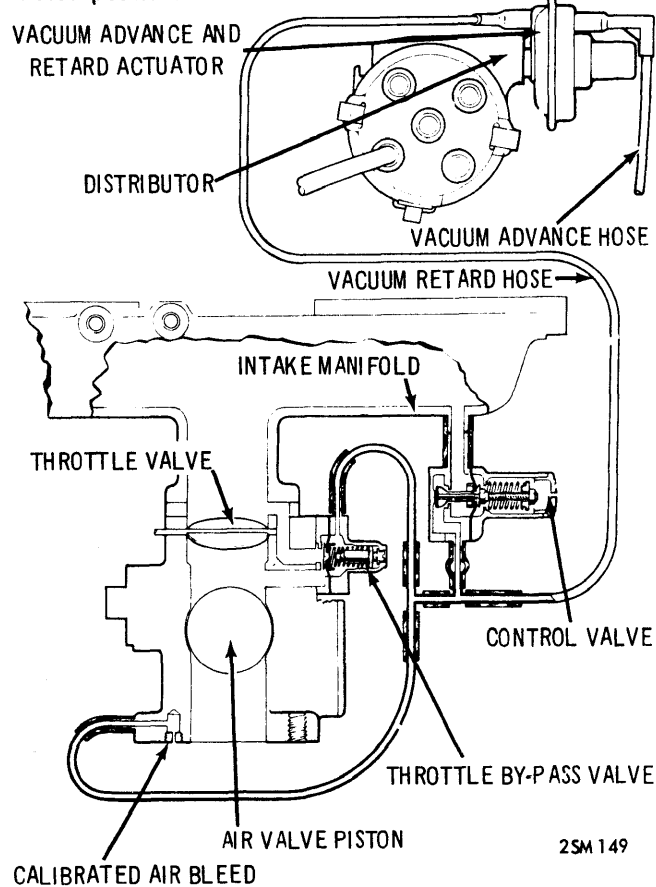
OPERATION

Control Valve — Control valve opens when intake manifold vacuum exceeds 21" Hg (1970-71) or 20" Hg (1972-73). When open, it allows intake manifold vacuum to operate throttle by-pass valve and distributor ignition retard control.

Distributor — Actuator unit for advance and retard control is of tandem design. One actuator chamber works in the normal way to control vacuum advance, while additional chamber operates to retard ignition timing 12° (crankshaft) during deceleration conditions (high manifold vacuum).

Carburetor Idling, Part Throttle & Full Throttle — Under these driving conditions, carburetors fuel metering is controlled more accurately to prevent over richness which can cause air pollution. This is achieved by use of a spring biased metering needle and factory fixed jet, together with leaning of mixture by opening of temperature controlled valve when carburetor is hot.

Engine Overrun Conditions — During engine overrun, carburetor throttle by-pass valve supplies sufficient mixture for proper combustion. This additional air/fuel mixture provides enough power to reduce effect of engine braking. To help overcome this unwanted engine braking feature, ignition is retarded 12° (crankshaft) through action of second distributor vacuum unit. When engine overrun ceases and intake manifold vacuum falls to 18" Hg (1970-71) or 17" Hg (1972-73), air entering calibrated air bleed allows throttle by-pass valve to close and distributor vacuum unit to return to normal closed positions.



EMISSION CONTROL SYSTEM VACUUM CIRCUITS

ROOTES GROUP SINGLE CARBURETOR ENGINE MODIFICATION (Cont.)

MAINTENANCE

1970 MODELS

Every 4,000 Miles — Check idle speed and idle mixture. Check ignition timing. Check time required for engine to decelerate from 2500 RPM to idle, with transmission in neutral.

Every 8,000 Miles — Check valve clearance, spark plug gap, distributor point gap, idle speed, idle mixture, and ignition timing. Check time required for engine to decelerate from 2500 RPM to idle, with transmission in neutral.

1971-73 MODELS

Every 5,000 Miles — Check valve clearance, spark plug gap, distributor point gap, idle speed and idle mixture. Check ignition timing with a timing light. With transmission in neutral, check time required to decelerate engine from 2500 RPM to idle.

SERVICE PROCEDURE

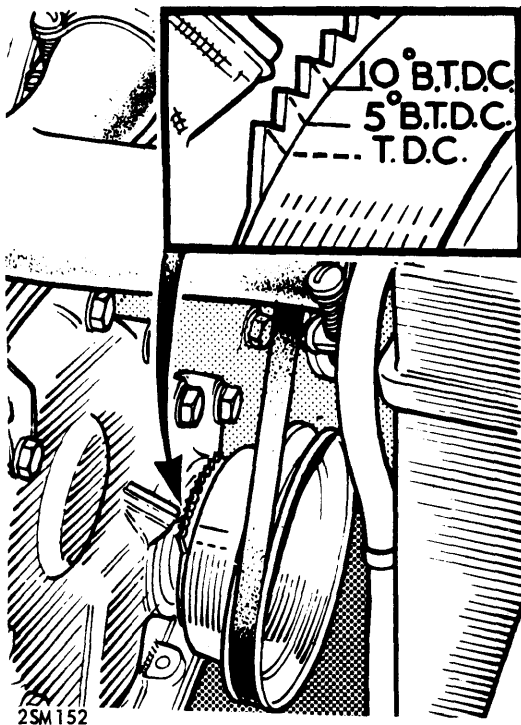
NOTE — Service procedures must be followed in order given below.

Checking Valve Clearance (1970 Models) — Valve clearance should be .012" (intake) and .014" (exhaust) with engine hot.

Checking Valve Clearance (1971-73 Models) — Valve clearance should be .008" (intake) and .016" (exhaust) with engine hot or cold.

Check Spark Plug Gap — Spark plug gap should be .025". Replace plugs every 12,000 miles (1970-71) or every 10,000 miles (1972-73) or sooner if in bad condition.

Check Distributor Point Gap — Point gap should be .015". Replace if pitted excessively.



TIMING MARKS

Checking Timing — Timing should be 7° BTDC. Adjustment must be made by loosening and rotating distributor. Adjustment should be made with engine not running, so that other malfunctions (early vacuum advance or incorrect centrifugal advance) can be detected later. To adjust static ignition timing, proceed as follows:

1) Rotate crankshaft until it reaches 7° BTDC as shown by observing fixed timing pointer and timing mark on crankshaft pulley. Remove distributor cap and connect a 12 volt bulb between primary terminal of distributor and a good ground. When ignition is switched on, bulb will light as contact points open.

2) Loosen distributor clamp and rotate distributor counterclockwise, until contact points are closed. Turn ignition on and apply light finger pressure to rotor in a clockwise direction. Turn distributor body clockwise until bulb just lights. Tighten distributor clamp.

Disconnecting Deceleration Control System — Remove large pipe from control valve and plug the connection to intake manifold. This will immobilize deceleration control system such that malfunctioning system will not interfere with basic settings.

Checking Complete Ignition System — Using a suitable tune-up scope, and following instrument manufactures procedure, check the following: Distributor centrifugal advance curve, vacuum advance curve, vacuum retard movement (by connecting vacuum retard diaphragm unit to intake manifold connection), distributor cam angle, spark plug voltages and coil and condenser performance.

Setting Idle Speed — Adjustment is made by turning slow running speed screw clockwise to increase, counterclockwise to decrease idle speed. Set idle speed to specifications below with manual transmission in neutral or automatic transmission in drive. Vehicles equipped with air conditioning must have compressor operating when setting idle speed. Air/fuel ratio should not be less than 11.4:1. CO level should not exceed 7.5%. If correct idle speed or quality cannot be obtained, carburetor may have to be overhauled. For further information and overhaul procedures, see *Stromberg CDSE in CARBURETOR Section*.

Model	Man. Trans. (RPM)	Auto. Trans. (RPM)
1970.....	850.....	750.....
1971-73	800.....	600.....

Checking Timing With Timing Light — Timing should be same as static setting (7° BTDC), if not, distributor may be faulty. Make sure idle speed stays at specified RPM. Start engine, remove vacuum advance hose and check for vacuum advance at idle. If advance, it could be due to throttle being opened too wide to maintain idle speed or possibly due to incorrect drilling of vacuum advance port, in this case carburetor must be changed.

Rechecking Idle Speed — Stop engine and reconnect pipe to control valve. Idle should remain unchanged, if not, control valve is faulty and must be replaced.

Checking Time For Engine To Decelerate — Open throttle slowly until engine speed reaches 2500 RPM. Release throttle and check time it takes for engine to return to idle. If time is 4-6 seconds, system is working correctly. If not, proceed as follows:

1) If engine stays around 2000 RPM, throttle by-pass valve is opening, but vacuum retard diaphragm is not working.

ROOTES GROUP SINGLE CARBURETOR ENGINE MODIFICATION (Cont.)

Lubricate internal baseplate of distributor if its movement is sticky, and check vacuum retard actions.

2) If engine slows to 1500-1700 RPM, but does not return to idle, it is possible engine has become too hot. Allow to cool for at least 10 minutes (with hood up), and repeat test.

3) If engine still stays at 1500-1700 RPM, make sure air bleed orifice in carburetor air cleaner flange is not plugged. If clear, it indicates that control valve is faulty. To adjust, see *Adjusting Control Valve*.

4) If engine slows down in 2½ seconds or less, throttle by-pass valve is not opening. Remove plastic cover from cylindrical end of control valve, press exposed end of control valve spindle to open valve. Vacuum advance diaphragm should now move inwards and engine may speed up to 1700 RPM.

5) If it does not speed up, hold control valve by hand until engine speed is 2500 RPM. Release throttle, speed should settle to 1700 RPM. This indicates throttle by-pass valve and vacuum retard are working correctly and control valve is not opening under deceleration conditions.

6) If engine slows to idle speed or less, check for broken or plugged lines. If defective line is found, replace it and repeat test. If still unsatisfactory, remove line from vacuum retard diaphragm and plug end.

7) With engine idling, press control valve spindle, engine speed should now rise to 2000 RPM. This indicates throttle by-pass valve is now opening and vacuum retard diaphragm is leaking. Distributor must be replaced.

8) If engine speed does not increase, check setting of throttle by-pass valve. Remove screws holding by-pass valve base and cover together, separate these parts. Take care not to lose spring, or adjusting screw and "O" ring. Drive sealing disc out of outer body, reassembly valve unit. Adjustment screw is now accessible. Turn adjusting screw clockwise as far as possible and then turn counterclockwise one turn. This is the normal setting.

9) Install by-pass valve and check its action by pressing control valve spindle while engine is idling. If engine speed does not increase, replace valve. Connect vacuum feed hose to retard side of vacuum actuator. Recheck slow down time from 2500 RPM. If time is above 4-6 seconds, adjust screw up to two full turns counterclockwise from the set position.

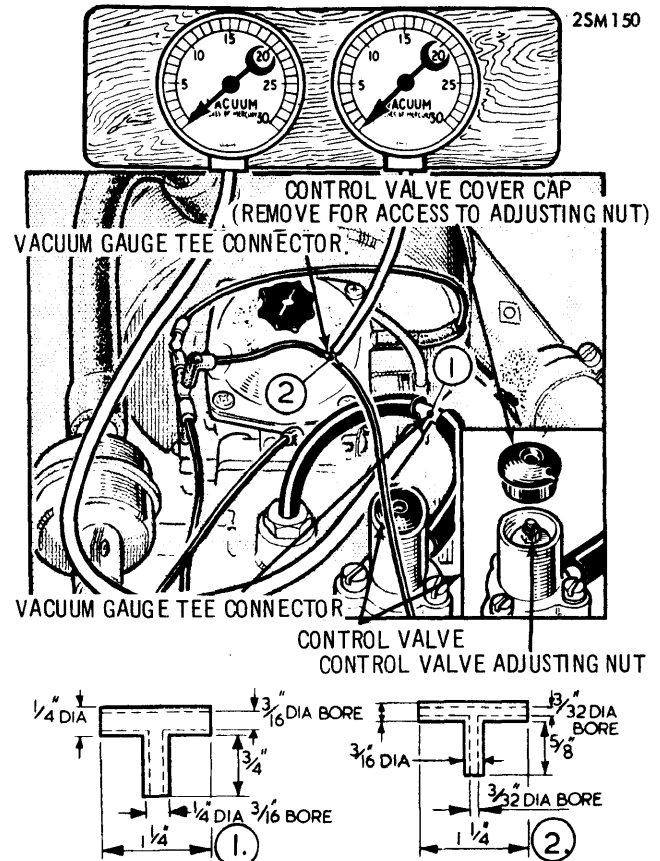
10) Reconnect all components and check that all lines and fittings are correct.

Adjusting Control Valve - 1) Connect vacuum gauges as shown in illustration. Gauges must have accuracy of $\pm \frac{1}{2}$ " Hg over its operating range. Open throttle gently by hand and increase speed slowly to 3000 RPM.

NOTE - Values for inches of mercury given below are for 1972-73 models. For 1970-71 models add 1" Hg to these values.

2) Observe vacuum gauges. One gauge will indicate manifold vacuum and should rise from about 17" to 19". Second gauge reads zero when control valve is closed, and slightly less than manifold vacuum when control valve is open.

3) Control valve should not open as manifold vacuum rises to 19". If valve opens, stop engine to bleed vacuum, and screw adjusting nut clockwise to increase spring tension.



CONTROL VALVE TEST CONNECTIONS (VACUUM GAUGES)

4) Repeat procedure until valve does not open at 19". Then increase engine speed to 3000 RPM and close throttle very slightly. Observe the slight rise in manifold vacuum. Control valve should now be adjusted so that it opens at 20" manifold vacuum.

5) Run engine at 2500 RPM and release throttle. Engine should slow to idle in 4-6 seconds. If engine remains at 1500-1700 RPM, stop engine and allow to cool for 10 minutes (hood up).

6) Repeat test and if engine still does not return to idle, recheck that control valve does not open below 19" manifold vacuum. If this setting is still correct, control valve is faulty and must be replaced. Remove all test equipment, reinstall hoses and other components, and finally recheck time to slow down from 2500 RPM to idle.