

# Exhaust Emission Systems

## ROOTES GROUP TWIN CARBURETOR ENGINE MODIFICATION

Alpine GT (1970)  
Plymouth Cricket (1972-73)

### DESCRIPTION

System consists solely of two Stromberg CDSE (1970) or CDSEV (1972-73) carburetors. Rear carburetor incorporates two internal passages that connect throttle by-pass valve to intake manifold and to air valve side of throttle. There is no control valve, vacuum retard mechanism or external connecting pipes.

**Stromberg CDSE & CDSEV Carburetors** — On 1970 models both carburetors have throttle by-pass valves. On 1972-73 models rear carburetor only is equipped with throttle by-pass valve. Both carburetors have a float chamber vent valve operated from throttle spindle lever. When engine is idling or stopped, these valves allow float chamber outlets to vent to carbon canister off of evaporative emission system. When throttles are opened, vent valves close and float chamber is vented internally through drillings to carburetor side of air cleaner.

**Distributor** — Distributor incorporates usual centrifugal advance and vacuum advance mechanism, and is provided with an external vernier ignition timing control.

### OPERATION

**Carburetor Idling, Part Throttle & Full Throttle** — Throttles of both carburetors are synchronized to give a similar air/fuel mixture through each carburetor.

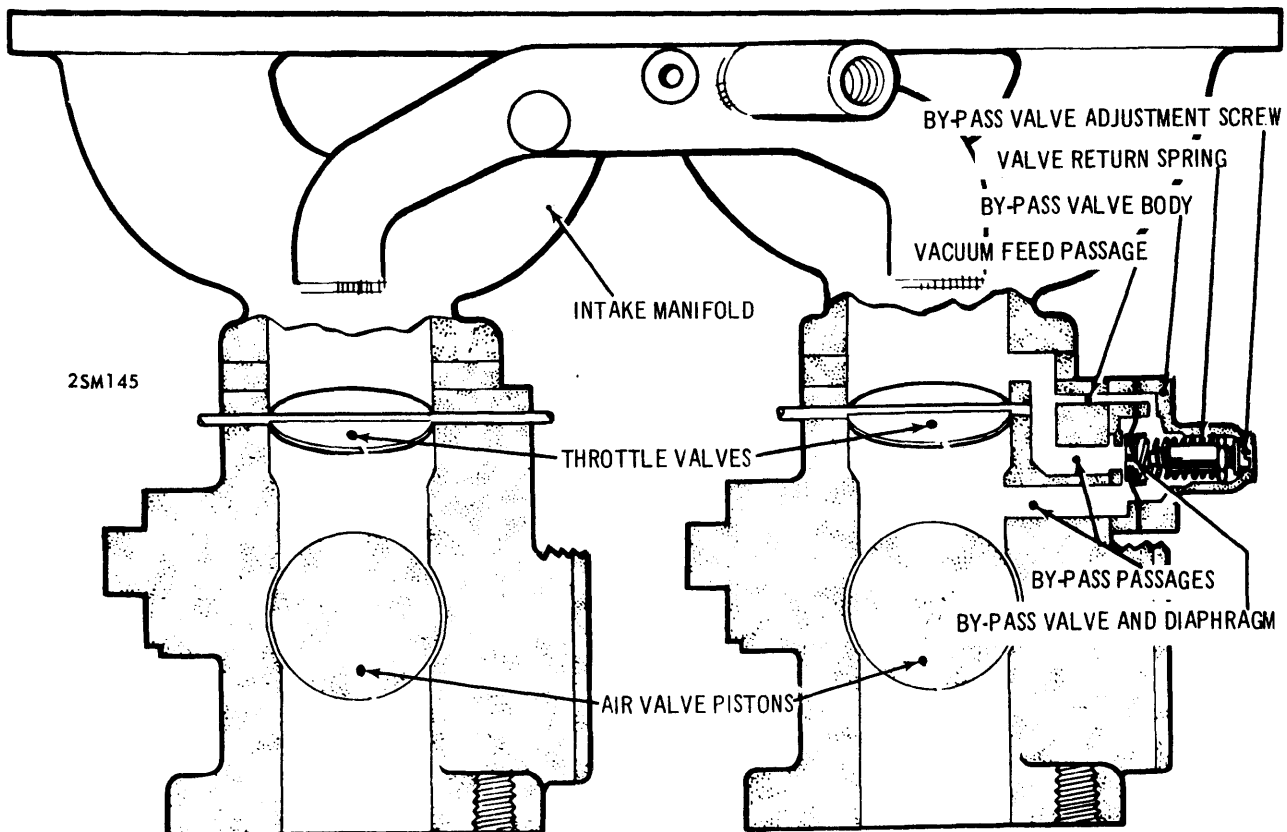
**Engine Overrun Conditions** — During periods of high manifold vacuum, while throttle valves are closed (engine overrun), throttle by-pass valves open allowing enough mixture to be supplied to give proper combustion. This additional air/fuel mixture produces power to reduce effect of engine overrun. Throttle by-pass valves are connected to inlet manifold by internal drillings in carburetor bodies and open when inlet manifold vacuum exceeds 21" Hg.

**Valve Timing** — Valve timing on engines, to which these carburetors are fitted, allows good combustion to take place without destroying engine overrun braking to a significant extent. Therefore, no vacuum retard unit is needed to restore engine braking and no control valve is needed to give simultaneous operation of vacuum retard and by-pass valve.

### MAINTENANCE

#### 1970 MODELS

Every 4,000 Miles — Set idle speed and check idle mixture. Check ignition timing.



EXHAUST EMISSION CONTROL SYSTEM (TWIN CARBURETORS)

## ROOTES GROUP TWIN CARBURETOR ENGINE MODIFICATION (Cont.)

**Every 8,000 Miles** – Check valve clearances. Check spark plug gaps. Check distributor point gap. Set idle speed and check idle mixture. Check ignition timing.

### 1972-73 MODELS

**Every 5,000 Miles** – Set idle speed and check idle mixture. Check distributor point gap and ignition timing.

**Every 25,000 Miles** – Check valve clearance, spark plug gap, distributor point gap, set idle speed and check idle mixture, check ignition timing. In addition, a overhaul service should be performed involving a repair kit for each carburetor.

### SERVICE PROCEDURES

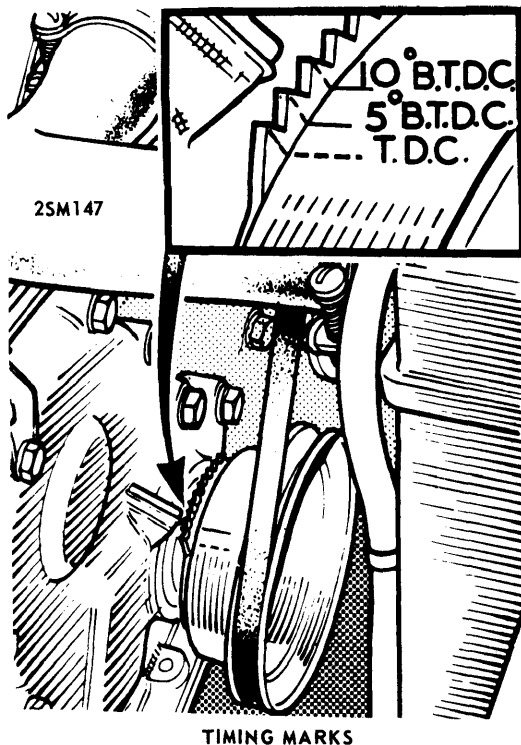
**NOTE** – The service procedures must be followed in the order given below:

**Checking Valve Clearance (1970 Models)** – Valve clearance should be .013" (intake and exhaust) when engine is hot.

**Checking Valve Clearance (1972-73 Models)** – Valve clearance should be .008" (intake) and .016" (exhaust) with engine hot or cold.

**Checking Spark Plug Gap** – Spark plug gap should be .025". Replace plugs every 12,000 miles (1970) or every 10,000 miles (1972-73) or sooner if necessary.

**Checking Distributor Point Gap** – Point gap should be .015". Replace if necessary.



**Checking Timing (Static)** – Timing should be set to 10° BTDC (1970 models) or 7° BTDC (1972-73). 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 correct timing mark (see specifications above) 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 when contact points are open.

2) Loosen distributor clamp screw 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 clockwise until bulb just lights. Tighten distributor clamp screws.

3) Check setting by turning crankshaft one revolution clockwise until bulb again lights. Correct timing mark on crankshaft pulley must be opposite fixed pointer on timing case.

**Checking Complete Ignition System** – Using a suitable tune-up scope (Sun or similar instrumentation, preferably incorporating an oscilloscope) and following instrument manufactures procedure, check the following: Distributor centrifugal advance curve, vacuum advance curve, distributor cam angle, spark plug voltages, coil and condenser performance. See *Tune-Up Charts for ignition specifications, and Distributor Charts for advance curves.*

**Setting Idle Speed** – **NOTE** – Adjustments must be made with engine running. If equipped with air conditioning, compressor must be operating. To set idle speed, proceed as follows, setting idle speed to specifications below with manual transmission in neutral or automatic transmission in drive.

Model	Idle RPM	
	Man. Trans.	Auto. Trans.
1970.....	950.....	750.....
1972-73 .....	700.....	700.....

Model	Air/Fuel Ratio	Idle CO%
	1970.....	11.4:1.....
1972-73 .....		2.5-4.5.....

1) If idle speed is abnormally high and cannot be reduced by adjustment of throttle stop screws, malfunction of by-pass valve is indicated. Refer to Throttle By-Pass Valve before proceeding with idle adjustments.

2) Normal adjustments are made by turning both throttle screws equal amounts, however, most likely cause of poor idling is unbalance between throttles.

3) Check throttle synchronization by removing air cleaner and check air flow through each carburetor using a suitable balance meter.

4) When throttles are balanced and idle speed is correct, a rough idle indicates a rich mixture. Using a CO or air/fuel ratio meter, check that CO or air/fuel ratio is as specified. For further information and overhaul procedures see *Stramberg CDSE and CDSEV in CARBURETOR Section.*

**Throttle By-Pass Valve** – Valves are part of carburetor and have no external connections. It is preset and does not normally require adjustment. Should a malfunction exist (see Setting Idle Speed) proceed as follows:

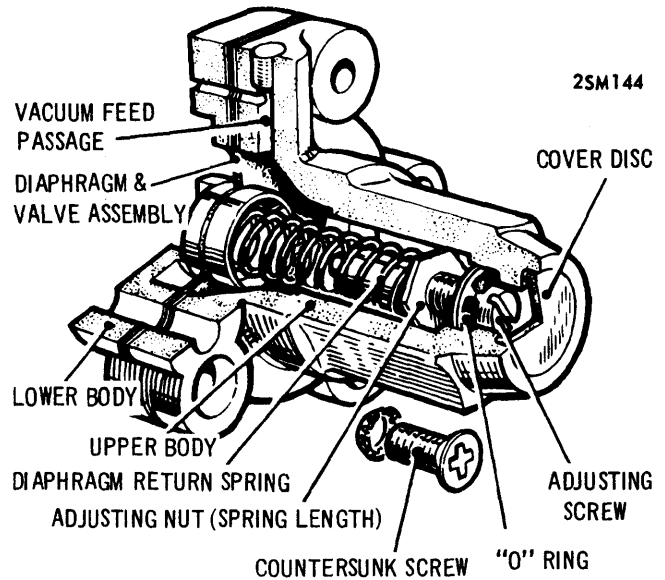
1) If valve is not opening enough, it affects emissions but is not noticeable when driving. Condition can only be detected by testing vehicle using a non-dispersive infra-red analyzer.

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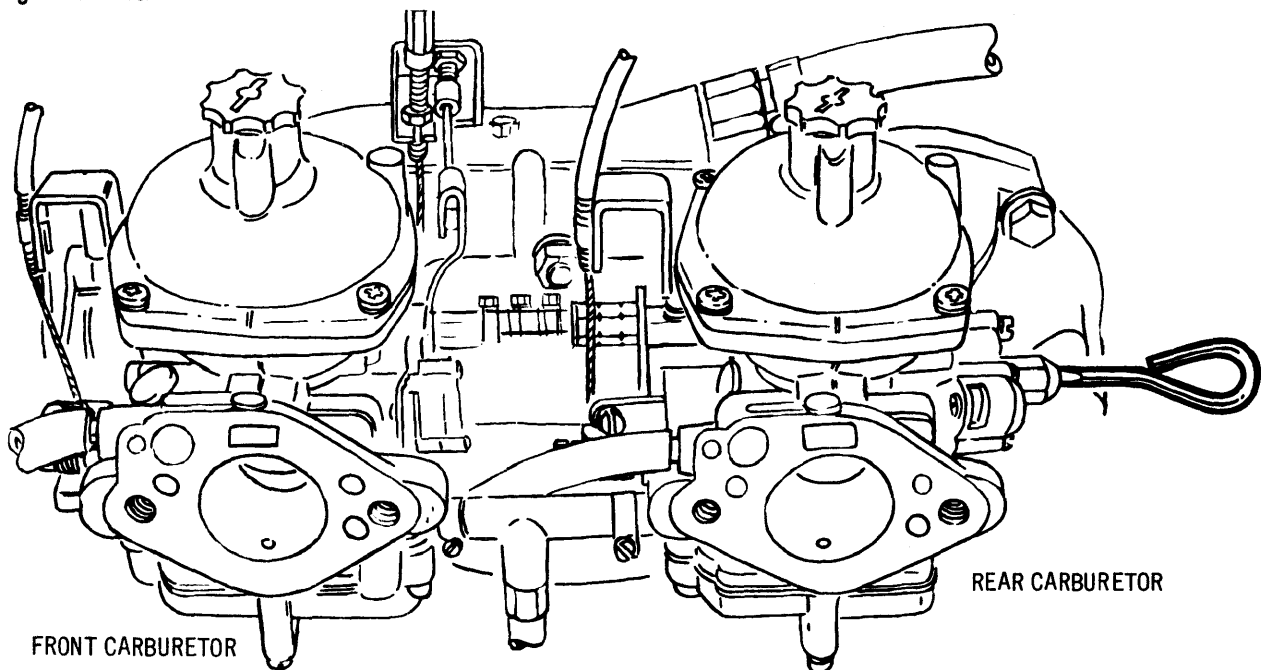
## ROOTES GROUP TWIN CARBURETOR ENGINE MODIFICATION (Cont.)

- 2) If valve is opening too far, it causes a lack of engine braking during overrun (deceleration). Test, with transmission in neutral, by opening throttle slowly until speed is 3500 RPM. Release throttle and using stop watch, note time required for speed to decrease to 1500 RPM. Time should not exceed 3.5 seconds.
- 3) If new valve is available replace unit. If new valve cannot be obtained, the following method of adjustment can be used in an emergency.
- 4) Remove screws securing valve to carburetor body and remove valve as complete assembly. Remove countersunk screws and separate by-pass valve lower body and remove diaphragm with its return spring, floating nut and adjusting screw. Take care not to lose sealing "O" ring under adjusting screw head.
- 5) Using punch placed inside upper body hexagon bore, drive out upper body end brass sealing disc. Retain disc for replacement when valve has been adjusted. Reassemble valve making sure that "O" ring is correctly positioned, install on carburetor.
- 6) Adjust screw (counterclockwise to reduce slow down time or clockwise to increase time) until engine slow down time is between 3.0-3.5 seconds.
- 7) One full turn on each adjusting screw is equivalent to approximately one second. Check deceleration time after each adjustment. **CAUTION** - Do not turn screws further than necessary or tensioner may become disengaged from adjusting screw. When adjustment completed, reseal access hole by installing cover disc.

**NOTE** - Adjustment procedure is given only for rare occasions it may be needed. Adjustment should be made when barometer reading is 30" Hg or above. Valves set at low barometer readings (high altitudes) will adversely affect engine braking at higher barometer readings (lower altitudes).



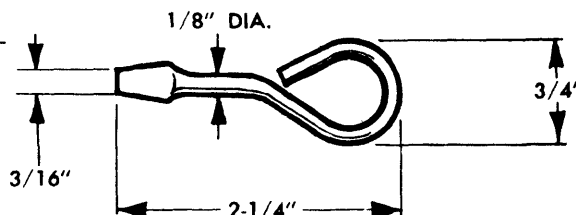
BY-PASS VALVE



FRONT CARBURETOR

REAR CARBURETOR

BY-PASS VALVE  
ADJUSTMENT TOOL  
MAKE SECOND  
TOOL 9" LONG  
FOR ADJUSTING  
FRONT CARB-  
URETOR ON 1970  
MODELS



BY-PASS VALVE ADJUSTMENT (REAR CARBURETOR ONLY)