

Tune-Up and Performance Maintenance



TUNE-UP PROCEDURES

This section gives specific procedures on how to tune-up your Corvette. It is intended to be as complete and as basic as possible. Those who are familiar with the steps involved in a tune-up may wish to skip the following procedures and use the generalized section in chapter 10. However, it is felt that nothing would be lost by first reading over this section. Perhaps the best procedure to follow would be to read both sections before starting your tune-up.

Spark Plugs

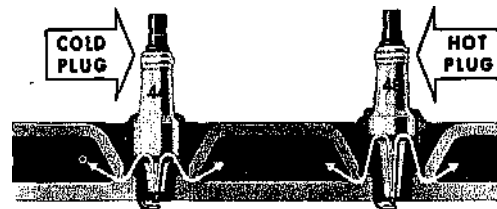
A typical spark plug consists of a metal shell surrounding a ceramic insulator. A metal electrode extends downward through the center of the insulator and protrudes a small distance. Located at the end of the plug and attached to the side of the outer metal shell is the side electrode. The side electrode bends in at a 90° angle so that its tip is even with, and parallel to, the tip of the center electrode. The distance between these two electrodes (measured in thousandths of an inch) is called the spark plug gap. The spark plug in no way produces a spark but merely provides a gap across which the current can arc. The coil produces anywhere from 20,000 to 40,000 volts which travels to the distributor where it is distributed through the spark plug wires to the spark plugs. The current passes along the center electrode and jumps the gap to the side electrode, and, in so doing, ignites the air/fuel mixture in the combustion chamber.

SPARK PLUG HEAT RANGE

Spark plug heat range is the ability of the plug to dissipate heat. The longer the insulator (or

the farther it extends into the engine), the hotter the plug will operate; the shorter the insulator the cooler it will operate. A plug that absorbs little heat and remains too cool will quickly accumulate deposits of oil and carbon since it is not hot enough to burn them off. This leads to plug fouling and consequently to misfiring. A plug that absorbs too much heat will have no deposits, but, due to the excessive heat, the electrodes will burn away quickly and in some instances, preignition may result. Preignition takes place when plug tips get so hot that they glow sufficiently to ignite the fuel/air mixture before the actual spark occurs. This early ignition will usually cause a pinging during low speeds and heavy loads.

The general rule of thumb for choosing the correct heat range when picking a spark plug is: if most of your driving is long distance, high speed travel, use a colder plug; if most of your driving is stop and go, use a hotter plug. Original equipment plugs are compromise plugs, but most people never have oc-



COLDER

HOTTER

Spark plug heat range, the higher the number the hotter the plug

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Tune-Up Specifications (cont.)

Year	Model	Spark Plugs		Distributor		Basic Ignition Timing (deg BTDC)	Valves			Idle Speed (rpm)	Normal Fuel Pressure (psi)		
		Type	Gap (In.)	Point Dwell (deg)	Point Gap (In.)		Clearance (In.)		Intake			Exhaust	(deg BTDC)
1971	270 hp	R44TS	0.035	28-32	0.019	4®	®	®	26	600®	7V2-9		
	330 hp	R43TS	0.035	Transistor Ignition		8©	0.024	0.030	36	700	7 1/2-9		
	365 hp	R43TS	0.035	28-32	0.019	8	®	®	56	600	7Va-9		
	425 hp	R44®	0.035	Transistor Ignition		8	0.024	0.028	44	700	7Va-9		
1972	200 hp	R44T	0.035	29-31	0.019	8	©	©	26	800®	7V2-9		
	255 hp	R44T	0.035	29-31	0.019	4	0.024	0.030	36	900	7V2-9		
	270 hp	R44T	0.035	28-30	0.019	8	®	©	56	750®	7Vz-9		
1973	190hp	R44T	0.035	29-31	0.019	12	®	®	26©	900®®	7 1/2-9		
	250 HP	R44T	0.035	29-31	0.019	8	®	®	40	900®®	7V2-9		
	270 hp	R44T	0.035	29-31	0.019	10	®	®	56	900®®	7V2-9		
1974	195hp	R44T	0.035	29-31	0.019	8®	®	®	26©	900®	7 1/2-9		
	250 hp	R44T	0.035	29-31	0.019	8	©	©	40	900®	7 1/2-9		
	270 hp	R44T	0.035	29-31	0.019	10	©	©	56	800®	7Va-9		
1975-76	165 hp	R44TX	0.060	Electronic		6	©	©	26	800®	7 1/2-9		
	205 hp	R44TX	0.060	Electronic		12	©	©	40	900®	7Va-9		
1977	180 hp	R45TS	0.045	Electronic		8	®	®	26	800®	7V2-9		
	210hp	R45TS	0.045	Electronic		12	®	©	40	900®	7 1/2-9		
1978	185 hp	R45TS	0.045	Electronic		6©	©	®	26	®	7 1/2-9		
	220 hp	R45TS	0.045	Electronic		12	®	®	40	®	7 1/2-9		
1979	195 hp	R45TS	0.045	Electronic		6©	©	®	26	®	7 1/2-9		
	225 hp	R45TS	0.045	Electronic		12	®	©	40	®	7 1/2-9		

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1980	180hp® (305 eng.)	R45TS	0.045	Electronic	4	®	a)	28	®	7 ¹ /a-9
	190 hp (350 eng.)	R45TS	0.045	Electronic	6©	®	a)	26	600®	7 ¹ /z-9
	230 hp (350 eng.)	R45TS	0.045	Electronic	12	®	a)	40	800	7Va-9
1981	190 hp®	R45TS	0.045	Electronic	6	®	a)	38	700®	7 ¹ /2-9
1982	200 hp	R45TS	0.045	Electronic	®	®	a)	NA	®	9-13
1984	205 hp	R45TS	0.045	Electronic	®	®	a)	NA	®	9-13

If the specifications listed on the tune-up sticker under the hood differ from those listed here, the sticker specifications take precedence.

ATDC — After top dead center

BTDC — Before top dead center

TDC — Top dead center

® Hydraulic lifters — one turn down from zero lash

® W/automatic transmission — 450

© W/automatic transmission — 2°ATDC

® W/automatic transmission and A.I.R. — 4°ATDC

©W/automatic transmission and A.I.R. — 700

© W/automatic transmission and A.I.R. — 750

© W/automatic transmission — 600

® W/automatic transmission — 4°BTDC

® W/automatic transmission — 8°BTDC

® W/automatic transmission — 550

© W/automatic transmission — 12°BTDC

©California models— 44°BTDC

©California models— 4°BTDC

Q450 rpm w/idle solenoid disconnected

® Models with aluminum cylinder heads use A.C. R43XL

®W/automatic transmission — 750

©California with automatic transmission — 8°BTDC

® Use the specification listed on the tune-up sticker under the hood

©California only

©Estimated

©High altitude models with automatic transmission — 8°BTDC

@ High altitude models with automatic transmission — 650

©W/automatic transmission — 500 rpm

Note: Idle speeds of automatic transmission vehicles are checked with the transmission in Drive.

Note: Spark plugs listed are original equipment A.C. Delco. These listings are not recommendations by Chilton for any product by name.

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casion to change their plugs from the factory-recommended heat range.

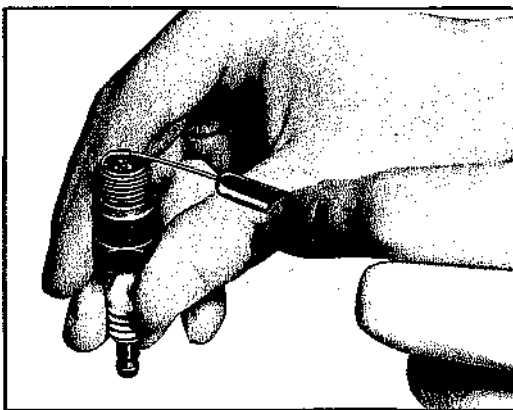
REPLACING SPARK PLUGS

Normally, a set of spark plugs requires replacement about every 10,000 miles on cars with conventional ignition systems (incl. Transistorized) and 20,000-30,000 miles on cars equipped with an H.E.I. (High Energy Ignition) system. Some earlier high performance engines may require more frequent plug changes, especially if idled or operated at low rpm's for extended periods. Any vehicle which is subjected to severe conditions will need more frequent plug replacement.

In normal operation, plug gap increases about 0.001 in. for every 1,000-2,500 miles. As the gap increases, the plug's voltage requirement also increases. It requires a greater voltage to jump the wider gap and about two to three times as much voltage to fire a plug at high speeds than at idle.

When you're removing spark plugs, you should work on one at a time. Don't start by removing the plug wires all at once, because unless you number them, they may become mixed up. Take a minute before you begin and number the wires with tape. The best location for numbering is near where the wires come out of the cap.

1. Remove the radio interference shields which cover the spark plugs and wires (in some models).
2. Twist the spark plug boot and remove the boot and wire from the plug. Do not pull on the wire itself as this will ruin the wire.
3. If possible, use a brush or rag to clean the area around the spark plug. Make sure that all the dirt is removed so that none will enter the cylinder after the plug is removed.
4. Remove the spark plug using the proper



Check the gap with a round wire gauge

size socket. (¹³/₁₆ in. through 1971, ⁹/₁₆ in. 1972 and later.) Turn the socket counterclockwise to remove the plug. If the engine has aluminum cylinder heads, be extremely careful when removing the plugs. If any plug turns with difficulty, spray a penetrating lubricant (Liquid Wrench, WD-40, etc.) around the plug threads and turn the plug back in. Wait a couple of minutes for the oil to work its way through the threads and then "nurse" the plug out about 1/4 turn at a time. Be sure to hold the socket straight on the plug to avoid breaking the plug, or rounding off the hex on the plug.

5. Once the plug is out, check it against the plugs shown in chapter 11 to determine engine condition. This is crucial since plug readings are vital signs of engine condition.

6. Use a round wire feeler gauge to check die plug gap. The correct size gauge should pass through the electrode gap with a slight drag. If you're in doubt, try one size smaller, and one larger. The smaller gauge should go through easily while the larger one shouldn't go through at all. If the gap is incorrect, use the electrode bending tool on the end of the gauge to adjust the gap. When adjusting the gap, always bend the side electrode. The center electrode is non-adjustable.

7. If die engine has cast-iron heads, squirt a DROP of penetrating oil onto die plug threads and install the plug. If the engine has aluminum heads, apply a small amount of anti-seize compound to die plug threads and carefully install the plugs. Turn the plugs in by hand until they are snug.

8. When the plug is finger tight, tighten it with a wrench.

9. Install die plug boot firmly over the plug. Proceed to the next plug.

CHECKING AND REPLACING SPARK PLUG CABLES

Visually inspect the spark plug cables for burns, cuts, or breaks in die insulation. Check die spark plug boots and die nipples on die distributor cap and coil. Replace any damaged wiring. If no physical damage is obvious, the wires can be checked with an ohmmeter for excessive resistance. (See die tune-up and troubleshooting section.)

When installing a new set of spark plug cables, replace the cables one at a time so there will be no mixup. Start by replacing the longest cable first. Install die boot firmly over die spark plug. Route die wire exactly die same as the original. Insert the distributor end of

the wire firmly into the tower on the distributor cap, then seat the boot over the tower. Repeat the process for each cable.

NOTE: Always replace the points and condenser together. Uniset® points are available which combine the point set and condenser, greatly simplifying installation.

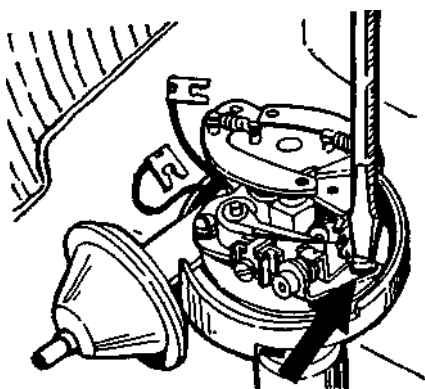
Breaker Points and Condenser

REMOVAL AND REPLACEMENT

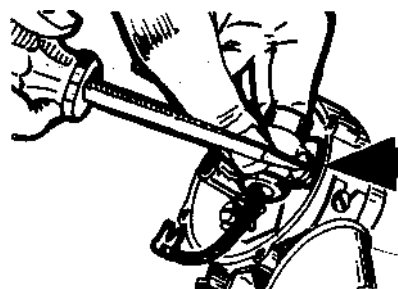
Point alignment is preset at the factory and requires no adjustment. Point sets using the push-in type wiring terminal should be used on those distributors equipped with an R.F.I. (radio frequency interference) shield (1970—74). Points using a lockscrew type terminal may short out due to the shield contacting the screw.

NOTE: The optional magnetic pulse distributor and the HEI (High Energy Ignition) system used on some 1974 and all 1975—79 models requires no maintenance other than checking the condition of the cap and wires. There are no points to wear out or adjust.

1. Remove the radio interference shield from around the distributor. Unlatch and remove the distributor cap.
2. Remove the rotor.
3. If so equipped, remove the two-piece R.F.I. shield.
4. Loosen the two mounting screws and slide the contact point set from the breaker plate.
5. Remove the two wires which are connected to the point set.
6. Loosen the condenser bracket screw and slide the condenser from the bracket.
7. Install the new point set and condenser and then tighten the mounting screws.



The points are retained by screws; use a magnetic screwdriver to avoid losing them



The condenser is held in place by a screw and a damp

8. Install the wires to the terminal so that they will not interfere with the cap, weight base, or breaker advance plate. Install the half of the R.F.I. shield which covers the points first.

9. Have an assistant "tap" the ignition key to turn the engine until the rubbing block of the point set is centered on one of the distributor cam lobes. Turn the ignition key off.

10. Using a $\frac{7}{8}$ in. allen wrench, make an initial point setting of 0.019 in.

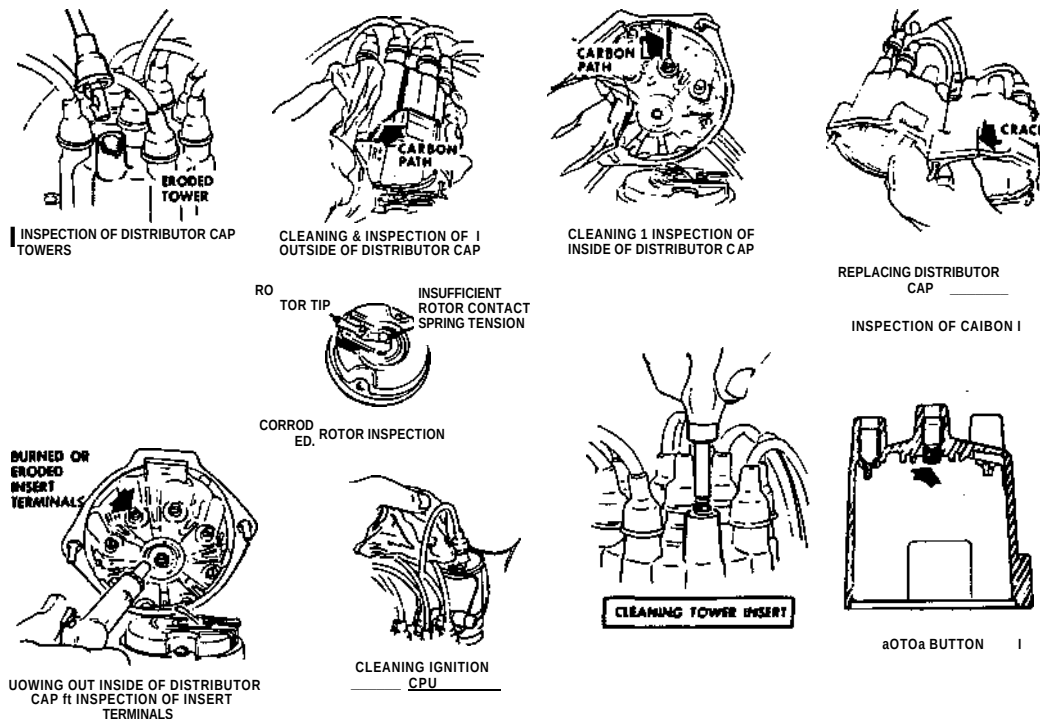
11. The cam lubricator (if so equipped) must be replaced after 12 months or 12,000 miles. The end of the lubricator should be adjusted to just touch the cam lobes. Additional grease should not be applied to the lubricator.

12. Install the rotor. The two lugs on the bottom of the rotor are shaped differently, so that it can only be installed one way. Tighten the screws. Start the engine and check the point dwell and the ignition timing.

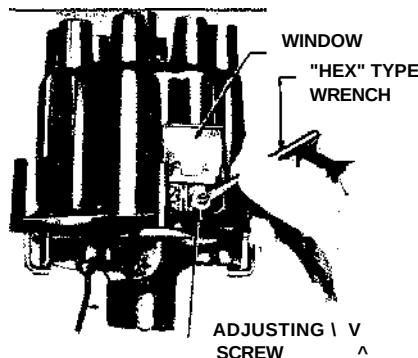
Dwell Angle

Dwell angle is the amount of time (measured in degrees of distributor cam rotation) that the contact points remain closed. Initial point gap (0.019 in.) determines dwell angle. If the points are too wide they open gradually and dwell angle (the time they remain closed) is small. This wide gap causes excessive arcing at the points and, because of this, point burning. This small dwell doesn't give the coil sufficient time to build up maximum energy and so coil output decreases. If the points are set too close, the dwell is increased but the points may bounce at higher speeds and the idle becomes rough and starting is made harder. The wider the point opening, the smaller the dwell and the smaller the gap, the larger the dwell. Adjusting the dwell by making the initial point gap setting with a feeler gauge is sufficient to

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Distributor cap and rotor checkpoints



Adjusting point gap (dwell angle) with $\frac{1}{16}$ in. allen wrench

get the car started but a finer adjustment should be made. A dwell meter is needed to check the adjustment.

NOTE: The ignition timing must be checked and adjusted any time the point set is replaced or the dwell is changed. When the dwell is increased, the ignition timing decreases, and vice-versa.

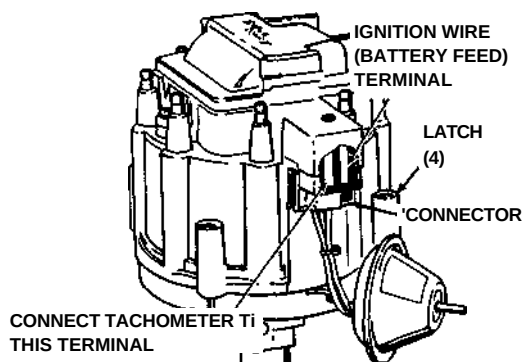
1. Run the engine to normal operating temperatures and then let it idle.
2. Raise the adjusting window on the distributor cap and insert a $\frac{1}{16}$ in. allen wrench into the adjusting screw.
3. Turn the adjusting screw until the spec-

ified dwell angle is obtained on the dwell meter.

HEI SYSTEM TACHOMETER HOOKUP

Connect one tach lead to the "TACH" terminal on the side of the distributor and the other to ground. Some tachometers must be connected to the "TACH" terminal and the battery positive terminal. Not all tachometers will operate correctly with the HEI system. Check with the manufacturer if there is any doubt.

CAUTION: The "TACH" terminal should never be connected to ground.



Hook up one tach lead to the tachometer terminal on the HEI system

When hooking up a remote starter switch, disconnect the "BAIT" terminal.

Ignition Timing Adjustment

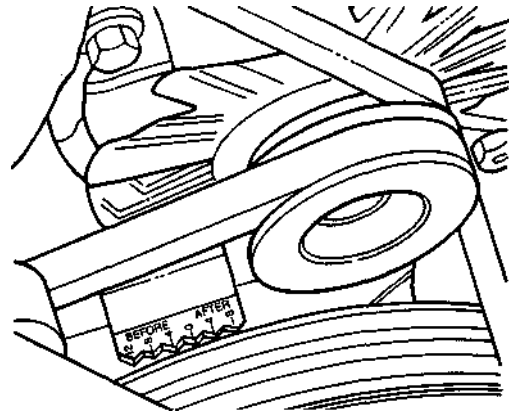
1963-80

Except 1980 California

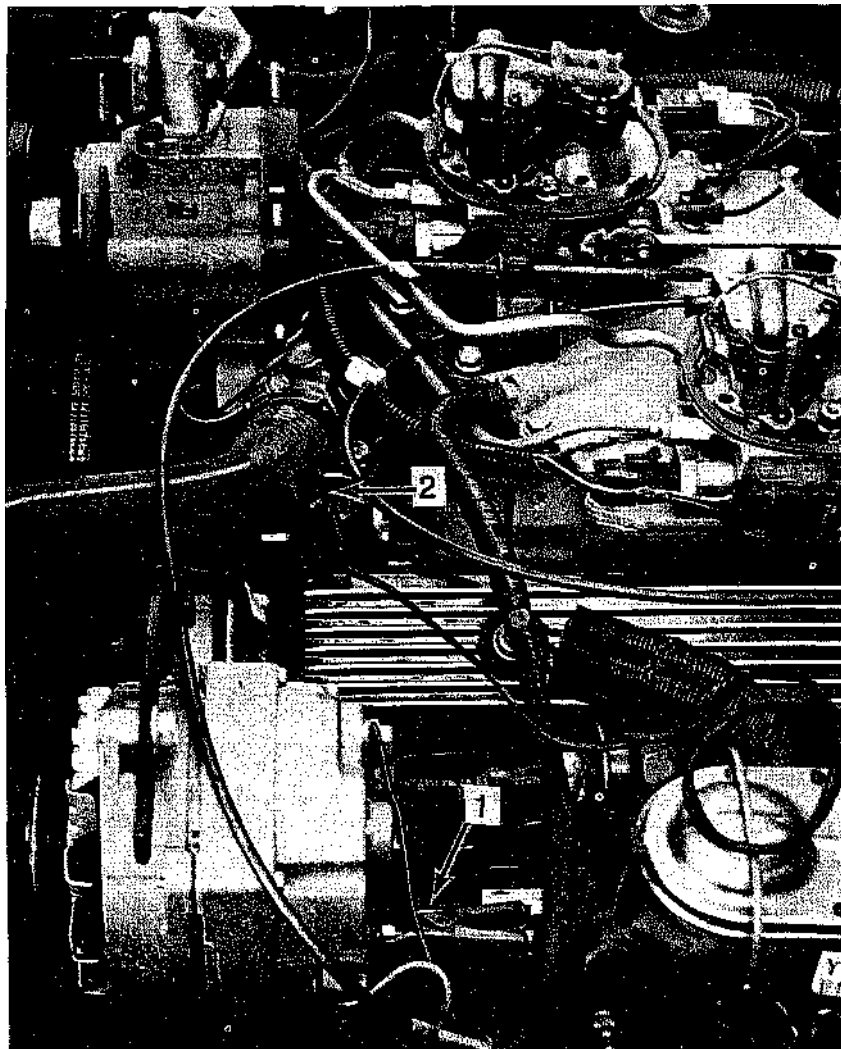
1. Warm the engine to normal operating temperature and check the idle speed. Adjust the idle speed to specifications, if necessary.

2. If so equipped, disconnect and plug the vacuum advance hose from the distributor.

3. Connect a timing light according to the timing light manufacturers instructions. DO

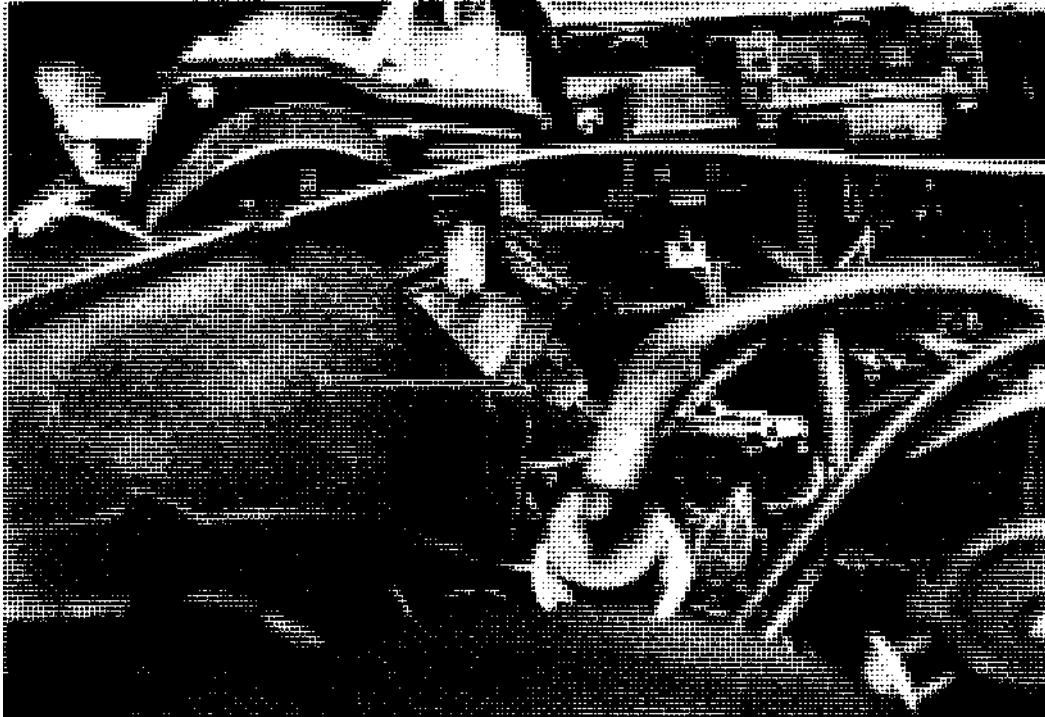


Timing mark location—typical



1. Positive (+) connection at the alternator BAT terminal
2. Negative (-) connection at a good engine ground

12VDC timing light power connections on a typical, externally regulated Delcotron



1982 EST BYPASS wire connector location. On these models, this connector must be separated prior to setting the ignition timing—see text

NOT use a timing light which requires piercing of the spark plug lead. Timing lights which have a lead that must be installed between the plug and the plug wire may be used with conventional ignition systems. On HEI ignition systems, use ONLY an inductive pickup-type timing light.

NOTE: Timing lights requiring a 12 volt DC power source (battery) may be connected as follows: Connect the positive timing light lead to the BAT terminal of the alternator; the negative timing light lead to a good engine ground. CAUTION: Be careful not to ground the positive lead to the alternator case.

4. Locate the timing tab (metal tab marked in graduations) which is attached to the timing cover. Locate the single mark on the vibration damper (one groove). Clean both the timing tab and the damper marking. Use chalk to accentuate the marks if necessary.

5. Be sure that all wiring and tools are clear of the fan and belts. Start the engine and allow it to idle. Aim the timing light at the marks and note where the vibration damper mark aligns with the timing tab.

NOTE: The "O" marking on the tab is the top dead center (TDC) mark and all the before top dead center (BTDC) marks are on

the "before" (advance) side of the zero, or the "A" (advance) side of zero. Later models are marked to indicate Before and After.

6. Loosen the distributor clamp (hold-down) bolt and slowly rotate the distributor as necessary until the damper mark is aligned with the specified mark of the timing tab. Tighten the hold-down bolt and recheck the timing.

7. Turn the engine off and remove the timing light.

8. If so equipped, unplug and reconnect the vacuum advance hose to the distributor.

1980 CALIFORNIA

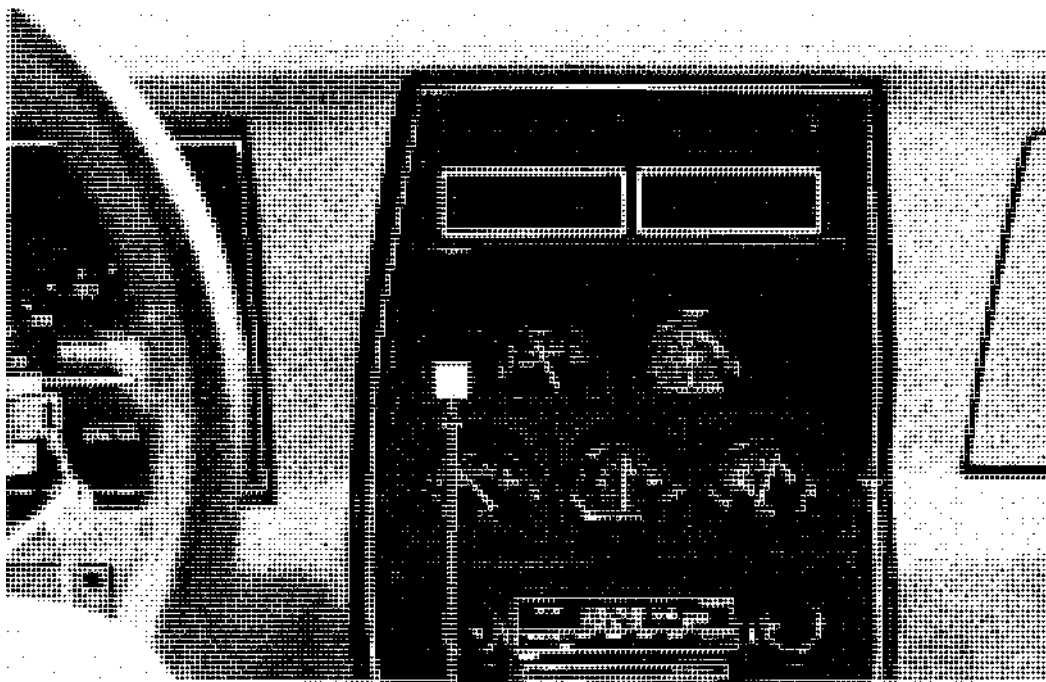
Refer to the underhood emissions label for the proper timing adjustment procedure.

1981

Refer to the underhood emissions label for the proper timing adjustment procedure.

1982-84

The ignition timing of 1982-84 models is adjusted in basically the same manner as previously described (1963-80). The exception to this is that the EST BYPASS wire from the distributor must be disconnected prior to the timing adjustment. Trace the four wires from



CHECK ENGINE lamp location. This lamp will be illuminated while the EST BYPASS wire is disconnected

the distributor housing which join at a common multi-connector, close to the distributor. Follow the tan wire with a black stripe (EST BYPASS wire) from the multi-connector. Past the multiconnector, the EST BYPASS wire has its own, single connector.

NOTE: On 1984 models, disconnect the 4 terminal EST connector to operate in the bypass timing mode.

Separate this connector before adjusting the timing. While the EST BYPASS wire is disconnected, the CHECK ENGINE light on the instrument panel will illuminate. After adjusting the timing, reconnect the EST BYPASS connector; the CHECK ENGINE light will go out.

NOTE: It is not necessary to adjust the idle speed on 1982—84 models prior to the timing adjustment, though the engine must be at normal operating temperature.

1984 models incorporate an Electronic Spark Control (ESC) into the distributor which retards the spark advance when engine detonation occurs. If the controller fails, the result could be no ignition, no retard or full retard. Some engines will also have a magnetic timing probe hole for use with electronic timing equipment. Consult the manufacturer's instructions for the use of this equipment.

Valve Lash

ADJUSTMENT

Engines equipped with hydraulic lifters VERY rarely need adjustment of the valve lash. If the vehicle runs well and there is no audible "clicking" in the valvetrain, leave it alone. This is because removal of the valve covers on vehicles equipped with air conditioning, various emission controls, cruise control, etc., can be a major project in itself.

On air conditioned models, the A/C compressor must be moved out of the way to gain access to one of the valve covers. Do not disconnect the refrigerant lines to move the compressor. After the cover is removed, either move the compressor to retighten the belt or remove the belt completely so that it will not tangle while the engine is running.

On early models equipped with fuel injection, removal of the left valve cover requires removal of the air cleaner hose, air meter adaptor, and pyrometer housing.

If wiring is attached to metal clips on the valve cover, carefully bend each clip to free the wire from the valve cover. If corrugated plastic tubing containing wiring is attached to the valve cover with plastic clips, the clips can be undone by gently twisting the upper

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part of the clip *while* holding the lower section. If the clip must be removed, press the lowermost arms of the clips together with needle nose pliers and push upward.

If the vehicle uses a PCV valve pressed into the valve cover grommet, pull the valve from the grommet and remove the valve from the hose. Plug the hose with an old bolt to prevent a vacuum leak. Models having a hose running from the air cleaner to the exhaust manifold require removal of the air cleaner assembly and the hose. Plug any vacuum lines which must be disconnected.

Should it be necessary to remove additional components to gain access to the valve covers, note the wire and/or vacuum hose connection locations and sizes of the bolts which retain the components).

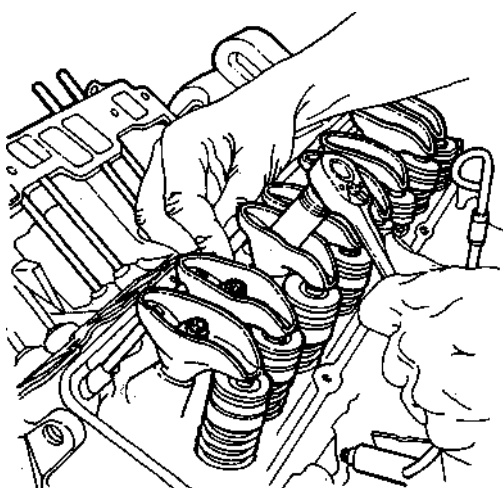
1. Purchase oil stopper clips for the rocker arms. These are available at most auto parts stores. These clips are installed either over (metal style) or in (plastic style) the rocker arm oiling hole located at the pushrod end of the rocker arm. If these clips are not installed, both you and your Corvette will become oil soaked when the engine is started.

2. Start the engine and allow it to reach normal operating temperature.

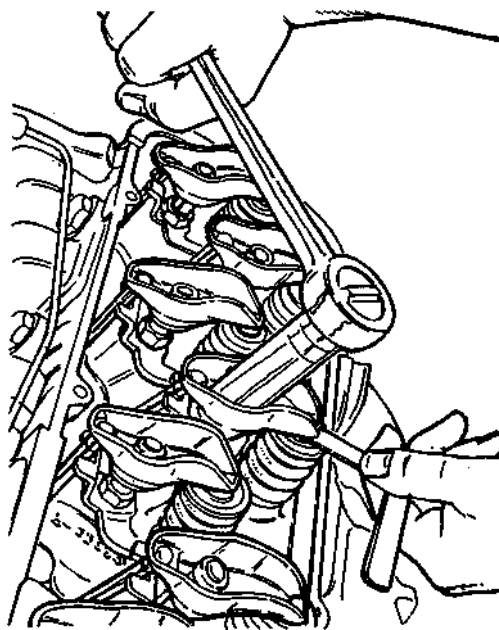
3. Remove the valve covers. If you have only 8 oil stopper clips, remove only one valve cover and adjust the valves. Then adjust the valves on the other side after the first cover has been reinstalled.

4. Start the engine and allow it to idle.

5. **HYDRAULIC LIFTER ENGINES:** Slowly loosen the rocker arm nut until the rocker arm starts to clatter. Tighten the nut



Adjusting the valve lash on a hydraulic lifter engine



Adjusting the solid valve lifters

(clockwise) just until the clatter stops. This position is what is termed "zero lash". Slowly tighten the nut $\frac{1}{4}$ turn then wait about ten seconds for the idle to smooth out. Repeat this until the nut is tightened one full turn past zero lash.

CAUTION: You must wait until the engine smooths out after each V* turn past zero lash. Impatience in this case can cause engine damage due to valve interference.

Repeat step 5 for each remaining valve. 5A.

MECHANICAL (SOLID) LIFTER ENGINES: Find your intake and exhaust valve adjusting specs in the Tune-Up chart. Use feeler gauges the same thickness as the adjusting specs. Insert the appropriate feeler gauge between the rocker arm and the valve. The feeler gauge should fit with a slight drag. If the gauge does not fit, loosen the rocker adjusting nut until it does. Tighten the adjusting nut until the gauge can be moved with a slight pull. Repeat step 5A for each remaining valve.

6. Remove the oil stopper clips and reinstall the valve covers.

7. Reinstall and/or reconnect and related items.

Idle Speed and Mixture Adjustment

Idle mixture and speed adjustments are critical aspects of exhaust emission control. It is

important that all tune-up instructions be carefully followed to ensure satisfactory engine performance and minimum exhaust pollution. The different combinations of emission systems application on the different engine models have resulted in a great variety of tune-up specifications. See the "Tune-Up Specifications" chart at the beginning of this chapter. Beginning in 1968, all models have a decal conspicuously placed in the engine compartment giving tune-up specifications.

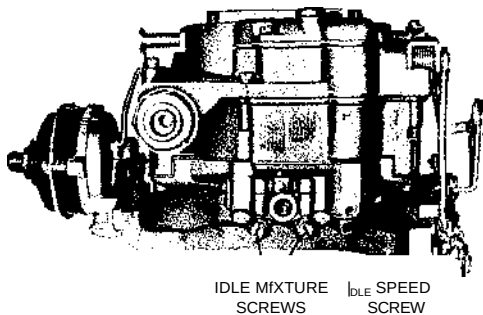
When adjusting a carburetor with two idle mixture screws, adjust them alternately and evenly, unless otherwise stated.

In the following adjustment procedures the term "lean roll" means turning the mixture adjusting screws in (clockwise) from optimum setting to obtain an obvious drop in engine speed (usually 20 rpm).

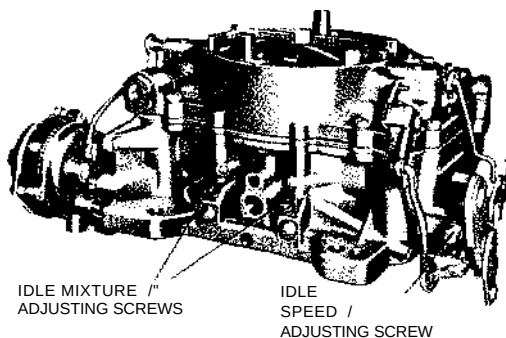
NOTE: Due to the camshaft design of some special high performance engines (350/LT.I, 427/IL88, 454/LS6, etc.) it is normal for these engines to have a "loppy" idle.

1963-67 WITHOUT A.I.R.

NOTE: Adjust with air cleaner removed. 1. Connect a tachometer and vacuum



Carter WCFB idle mixture and speed adjustment screws



Carter AFB idle mixture and speed adjustment screws

gauge to the engine, then set the parking brake and shift the manual transmission into Neutral, automatic into Drive.

2. Turn the idle mixture screw(s) in until lightly seated, then back out $1\frac{1}{2}$ turns.

3. With engine running, adjust the idle speed screw to obtain the specified rpm.

4. Adjust the idle mixture screw(s) to obtain the highest steady manifold vacuum at the specified speed. If necessary, reset the idle speed screw while adjusting mixture.

NOTE: On air conditioned models, the air conditioner is turned on and the hot idle compensator valve is held closed while adjusting idle speed and mixture.

5. Final adjustment should be made with the air cleaner installed.

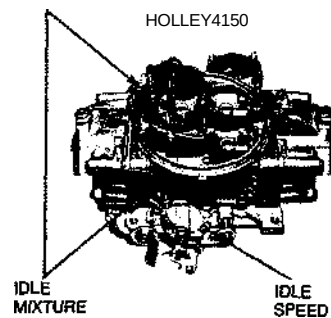
6. Remove tachometer and vacuum gauge.

1966-67 WITH A.I.R.

Adjust with air cleaner removed.

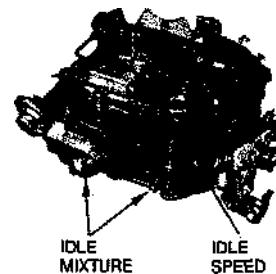
1. Connect a tachometer to the engine, place manual transmission in Neutral, automatic in Drive.

2. Turn idle mixture screw(s) in until lightly seated, then back out 3 turns.



Holley 4150 idle mixture and speed adjustment screws

ROCHESTER 4MV



Rochester Quadrajets idle mixture and speed adjustment screws

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3. With engine running, adjust the idle speed screw to obtain the specified idle speed.

4. Adjust the idle mixture screw(s) in to "lean roll" position, then back them out (rich) V^* turn. Readjust the idle speed screw to keep the engine at the specified idle speed while adjusting the mixture.

NOTE: On air conditioned cars, turn the air conditioner off with 327 cu in. engines. Air conditioner must be on and hot idle compensator held closed with 427 cu in. engines.

5. Final adjustment should be made with the air cleaner installed.

6. Remove the tachometer.

1968-69

Adjust with air cleaner installed.

1. Turn the idle mixture screw(s) in until lightly seated, then back out 3 turns.

2. With engine at operating temperature, adjust idle speed screw to obtain specified rpm, manual transmission in Neutral and automatic in Drive.

NOTE: On all 1968 models except 350 H.P. 327 cu. in. with manual transmission, the air conditioner is turned off. On the above-mentioned vehicles the air conditioner is left on. On 1969 models, turn the air conditioner either on or off according to the instructions on the tune-up decal.

3. Adjust one idle mixture screw to obtain the highest steady idle speed.

4. Adjust the idle speed screw to the speed specified on the tune-up decal.

NOTE: On models equipped with an idle solenoid, adjust the solenoid plunger hex to obtain 600 rpm. Disconnect the wire at the solenoid to deenergize it, allowing the throttle lever to contact the carburetor idle speed screw. Adjust the carburetor idle

speed screw. Adjust the carburetor idle screw to obtain 400 rpm.

5. Adjust the mixture screw in to "lean roll" position, then back out (rich) $\frac{1}{2}$ turn.

6. Repeat Steps 3, 4, and 5 for the other idle mixture screw.

7. Readjust the idle speed screw to obtain final specified rpm, if necessary.

1970

Adjust with air cleaner installed.

If the vehicle is equipped with Evaporative Emission, disconnect the fuel tank line from the vapor canister while making the idle speed and mixture adjustments. Warm up the engine and leave it running while adjusting. The choke valve and, if applicable, air cleaner damper door should remain open. Leave the air conditioning off.

350 (300, 350 and 370 hp) Engines

1. Adjust the idle mixture screws equally to obtain maximum idle speed.

2. On the 300 H.P. engine with manual transmission in Neutral adjust the idle speed screw to obtain 700 rpm. On the 300 H.P. engine with automatic transmission in Drive, adjust the idle speed screw to obtain 600 rpm.

3. On the 350 and 370 H.P. engines, adjust the idle speed screw to obtain 750 rpm with the manual transmission in Neutral.

454 (450 hp) Engine

1. Remove the air cleaner.

2. Disconnect the distributor vacuum hose at the distributor and plug the hose.

3. Adjust the mixture screws for maximum idle speed.

4. With manual transmission in Neutral, adjust the carburetor idle speed screw to obtain 750 rpm. With automatic transmission in Drive, adjust the carburetor idle speed screw to obtain 700 rpm.

5. Turn one idle mixture screw to obtain a 20 rpm drop in idle speed, then back the screw out $\frac{1}{2}$ turn. Repeat for the second idle mixture screw.

6. Repeat Step 4 above.

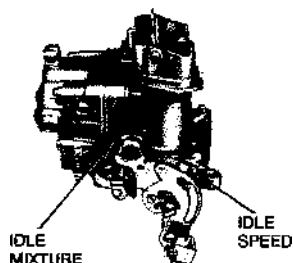
7. Reconnect the distributor vacuum hose and install the air cleaner.

454 (345 hp) and 454 (390 hp) Engines

1. Disconnect the distributor vacuum hose at the distributor and plug the hose.

2. Turn the idle mixture screws in until

HOLLEY 2300C (PRIMARY)



Holley 2300 idle mixture and speed adjustment screws

they are lightly seated, then back them out 4 turns.

3. With automatic transmission in Drive, adjust the carburetor idle speed screw to obtain 630 rpm. Adjust the idle mixture screws in equally to obtain 600 rpm.

4. With manual transmission in Neutral, adjust the carburetor idle speed screw to obtain 700 rpm. Turn one of the mixture screws in until the engine speed drops 40 rpm. Readjust the idle speed screw to obtain 700 rpm. Turn in the other mixture screw until the engine speed drops 40 rpm. Readjust the idle speed screw to obtain 700 rpm.

5. Reconnect the distributor vacuum hose.

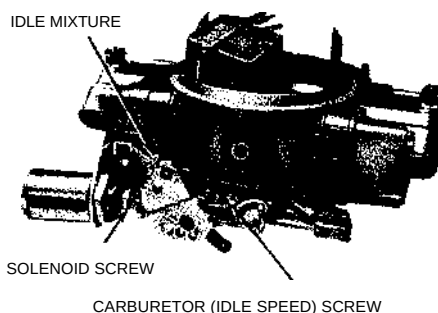
1971

Adjust with air cleaner installed.

The following initial idle adjustments are part of the normal engine tune-up. There is a tune-up decal placed conspicuously in the engine compartment outlining the specific procedure and settings for each engine application. Follow all of the instructions when adjusting the idle. These tuning procedures are necessary to obtain the delicate balance of variables for the maintenance of both reliable engine performance and efficient exhaust emission control.

NOTE: All engines except the 350 (330 hp) and 454 (425 hp) have limiter caps on the mixture-adjusting screws. The idle mixture is preset and the limiter caps installed at the factory in order to meet emission control standards. Do not remove these limiter caps unless all other possible causes of poor idle condition have been thoroughly checked out.

The solenoid used on 1971 carburetors is different from the one used on earlier models.



Holley 4150 (with idle solenoid) idle mixture and speed adjustment locations

Combination Emission Control System (C.E.C. solenoid) valve regulates distributor vacuum as a function of transmission gear position.

CAUTION: The C.E.C. solenoid is adjusted only after: 1) replacement of the solenoid, 2) major carburetor overhaul, or 3) after the throttle body is removed or replaced.

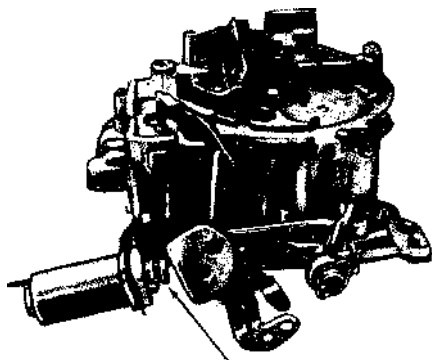
All initial adjustments described below are made:

1. With the engine warmed up and running.
2. With the choke fully open.
3. With the fuel tank gas cap removed.
4. With the vacuum hose disconnected at the distributor and plugged.

Be sure to reconnect the distributor vacuum hose and to connect the fuel tank to evaporative emission canister line or install the gas cap when idle adjustments are complete.

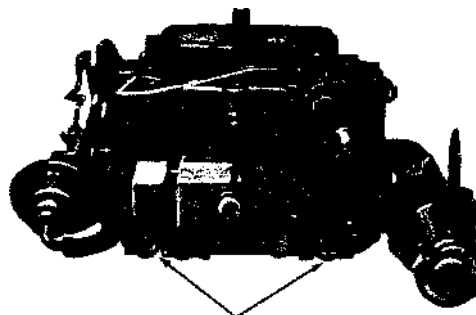
350 (4-BBL Quadrajet) Engines

Adjust the carburetor idle speed screw (NOT the solenoid plunger) to obtain 600 rpm (manual transmission in Neutral with the air



IDLE SPEED (SOLENOID) SCREW

Rochester Quadrajet (with idle solenoid) idle speed screw



IDLE MIXTURE SCREWS

Rochester Quadrajet (with idle solenoid) idle mixture screws

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conditioner off) or 550 rpm (automatic transmission in Drive with the air conditioner on).

350 and 454 (4-BBL Holley) Engines

1. Adjust the carburetor idle speed screw (NOT the solenoid plunger) to obtain 700 rpm (manual transmission in Neutral or automatic transmission in Drive).

2. Adjust the idle mixture screws alternately to obtain the maximum smooth idle speed.

3. Adjust one of the idle mixture screws to obtain a 20 rpm drop ("lean roll"), then back it out %, turn.

4. Repeat Step 4 above for the other idle mixture screw.

5. Readjust the carburetor idle speed screw to obtain 700 rpm if necessary.

454 (4-BBL Quadrajet) Engines

Turn the air conditioner off. Adjust the carburetor idle speed screw (NOT the solenoid plunger) to obtain 600 rpm (manual transmission in Neutral or automatic transmission in Drive).

1972

NOTE: All carburetors are equipped with idle limiter caps and idle mixture is preset at the factory and should not require adjustment.

1. Remove the fuel filler cap but do not remove the vapor line.

2. Detach the distributor vacuum hose and plug the hose.

3. Set the parking brake and turn the air conditioner (if so equipped) off. On cars equipped with an automatic transmission, check the wheels.

4. Allow the engine to reach normal operating temperature. Be sure that the choke is open.

5. If the car has an automatic transmission, set the selector in Drive. If the car has a manual transmission keep the transmission in Neutral.

6. Adjust the anti-dieseling solenoid to the *higher* of the two rpm figures given in the specifications.

CAUTION: Do not turn the solenoid more than one complete turn unless the electrical lead is disconnected (solenoid deenergized).

7. Disconnect the solenoid lead and set the idle speed to the *lower* of the two figures given in the specifications. Use the normal idle speed adjusting screw.

NOTE: If no lower figure is given, adjust the idle to 450 rpm.

8. Reconnect all of the wires and hoses which were disconnected in order to perform these adjustments.

1973

Ah¹ models are equipped with idle limiter caps and idle solenoids. Disconnect the fuel tank line from the evaporative canister. The engine must be running at operating temperature, choke off, parking brake on, and rear wheels blocked. Disconnect the distributor vacuum hose and plug it. After adjustment, reconnect the vacuum and evaporative hoses.

Four-barrel 350 and 454 cu in. V8s

1. Adjust the idle stop solenoid screw for 900 rpm on manual, 600 rpm on automatic.

2. Connect the distributor vacuum hose and position the fast idle cam follower on the top step of the fast idle cam (turn air conditioning off) and adjust the fast idle to 1300 rpm on manual transmission 350 engines; 1600 on manual 454 engines and all automatics (in Park).

Optional 350 cu in. (L82) V8

1. Adjust the idle stop solenoid screw (air conditioning off) for a speed of 900 rpm on manual transmission; 700 rpm on automatic (in Drive).

2. Connect the distributor vacuum hose and position the fast idle cam follower on the top step of the cam (turn air conditioning off) and adjust the fast idle to 1300 rpm on manual; 1600 rpm on automatic.

1974

The same preconditions as for 1973 apply.

Four-barrel 350 cu in. V8

1. Turn the air conditioning off. Adjust the idle stop solenoid screw for 900 rpm on manual transmission models; 600 rpm on automatic (in Drive).

2. Connect the distributor vacuum hose. Position the fast idle cam follower on the top step of the fast idle cam and adjust the fast idle speed to 1300 rpm on manual; 1600 on automatic (in Park).

Optional 350 cu in. (L82) V8

1. Turn the air conditioning off. Adjust the idle stop solenoid for 900 rpm on manual; 700 rpm on automatic (in Drive).

2. Connect the distributor vacuum hose.

Position the fast idle cam follower on the top step of the cam and adjust the fast idle to 1300 rpm on manual; 1600 rpm on automatic (in Park).

454 cu in. V8

1. Shut off the air conditioning. Adjust the idle stop solenoid screw for 800 rpm on manual; 600 rpm on automatic (in Drive).

2. Connect the distributor vacuum hose and position the fast idle cam follower on the top step of the cam and adjust the fast idle to 1600 rpm on manual; 1500 rpm on automatic (in Park).

1975-76

The same preconditions as for 1973 apply.

1. Turn the air conditioning off.

2. Disconnect the idle speed solenoid. Turn the idle speed screw to adjust for the lower of the two idle speeds specified on the underhood tune-up decal. Adjust automatic transmission cars in Drive with wheels blocked; manual transmission cars in Neutral.

3. Connect the idle speed solenoid. Open the throttle to extend the solenoid plunger.

4. Use the solenoid plunger to adjust the idle speed to the higher of the two speeds on the underhood tune-up decal.

1977-IDLE SPEED

Run the engine to normal operating temperature, A/C off, vacuum advance line disconnected and plugged, FUEL TANK line at the canister disconnected. Place the manual transmission in neutral; automatic transmission in drive. Connect a tachometer to the engine.

NOTE: Make sure the parking brake is on and the drive wheels are sufficiently blocked when placing the transmission in drive.

Without A/C

1. Turn the idle speed screw to achieve the rpm specified on the underhood tune-up decal.

With A/C

1. Turn the idle speed screw to the lower of the two idle speeds specified on the underhood tune-up decal.

2. Turn the A/C system on.

3. Disconnect the A/C compressor lead at the compressor.

4. Open the throttle slightly to allow the solenoid plunger to fully extend.

5. Turn the solenoid screw to higher of the two idle speeds specified on the underhood tune-up decal.

6. Reconnect the A/C compressor lead.

1977-IDLE MIXTURE

NOTE: Idle mixture screws have been pre-set at the factory and capped and should not require adjustment, however if the need arises follow the procedure listed below.

1. Set the parking brake and block the drive wheels.

2. Remove the air cleaner to gain access to the carburetor, but keep the vacuum hoses connected.

3. Run the engine to normal operating temperature with the choke open.

4. Turn the A/C off.

5. Disconnect and plug the vacuum advance hose at the distributor.

6. Check the ignition timing and adjust as necessary.

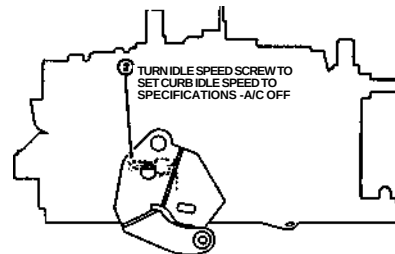
7. Using a sharp knife, carefully remove the plastic caps from the idle mixture screws. Use extreme caution to avoid bending the mixture screws.

8. Lightly seat the screws then back out equally just enough so the engine will run.

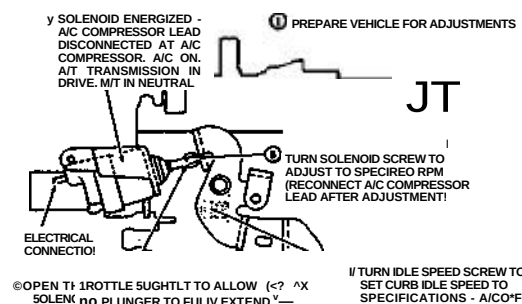
9. Place the automatic transmission in drive or the manual transmission in neutral.

10. Back out each screw (richen) % turn at

PREPARE VEHICLE FOR ADJUSTMENTS



IDLE SPEED ADJUSTMENT - WITHOUT SOLENOID



A/C IDLE SPEED ADJUSTMENT - WITH SOLENOID

Idle speed adjustment (1977-80 M4MC)

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a time until the maximum idle speed is obtained. Then set the idle speed screw to: Standard engine (180 hp) M.T.-800 rpm, A.T.-550 rpm; Optional engine (210 hp) M.T.-900 rpm, A.T. (low altitude) 750 rpm, A.T. (high altitude) 650 rpm.

11. Turn in each screw (lean) Vs turn at a time until the idle reaches the following rpm: Standard engine (180 hp)-M.T.-700 rpm, A.T.-500 rpm. Optional engine (210 hp)-800 rpm, A.T. (low altitude), 600 rpm for A.T., high altitude.

12. Reset the idle speed to specification.

13. Reconnect the vacuum hoses and install the air cleaner.

1978-80 IDLE SPEED

This procedure applies only to those models which DO NOT have the computer controlled emissions system. Vehicles having the computer system have 13 screws retaining the air horn of the carburetor; vehicles without the computer system have 9 screws retaining the carburetor air horn. Also, computer equipped vehicles do not have the familiar vacuum advance unit installed on the distributor, as the spark advance is controlled by the computer.

CAUTION: // *your vehicle has the computer emissions system, DO NOT attempt to adjust either the idle speed or mixture, as the fuel system calibration could become severely upset.*

Run the engine to normal operating temperature, A/C off, disconnect the purge hose at the vapor canister and the vacuum hose at the EGR valve disconnected and plugged. Place the manual transmission in Neutral and the automatic transmission in Drive. **NOTE:** *Make sure the parking brake is on and the drive wheels are safely blocked before the transmission is placed in Drive.*

Without A/C

1. Turn the idle speed screw to achieve the rpm specified on the underhood specifications decal.

With A/C

1. Turn the idle speed screw to the lower of the two idle speeds listed on the underhood specifications decal.

2. Turn the air conditioning on.

3. Disconnect the A/C compressor lead at the compressor (two-wire connector).

4. Open the throttle slightly to allow the solenoid plunger to extend fully.

5. Turn the solenoid screw to adjust the engine speed to the higher of the two speeds listed on the specifications decal under the hood. Use the higher idle speed, NOT the fast idle speed specification.

6. Reconnect the A/C compressor lead.

1978-80 IDLE MIXTURE

Changes in the idle systems of these models make it impossible to properly adjust the mixture without the use of a propane enrichment system, not available to the general public.

In some 1978 and all 1979-80 models, the idle mixture screws are sealed within the diaphragm body of the carburetor. Idle mixture adjustments should be left to the professional technician with the proper equipment and experience.

1981-84 IDLE MIXTURE

Idle speed and mixture are controlled strictly by the computer emissions system. Do not attempt to adjust the idle speed or mixture as these functions are controlled by the computer.

NOTE: *For all throttle body injection adjustments, see the Fuel Injection section.*