

Valve Adjusting

Proper valve adjustment allows the hydraulic lifters to operate in the center of their designed travel. Valve adjusting is not a simple one-two operation. Therefore, this procedure is covered in detail in Chapter 3, in the following sections:

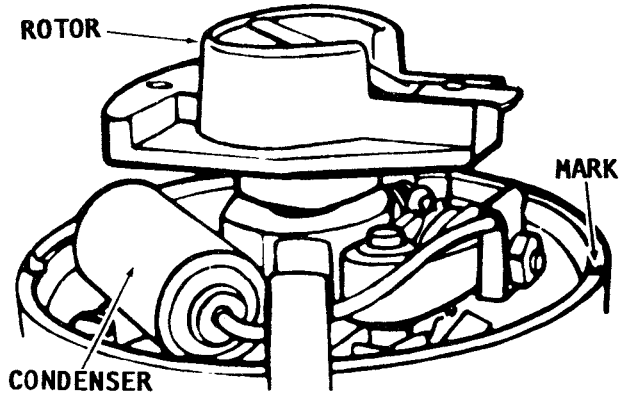
- GMC 4- and 6-cyl. in-line engines -- 3-7.
- GMC V6 engines -- 3-12
- GMC V8 engines -- 3-29.
- Ford V8 engines -- 3-40.

2-4 IGNITION SERVICE

It is not possible to do a good job of replacing the contact points with the distributor in the engine. To remove the distributor, turn the crankshaft until the rotor points to the No. 1 cylinder position. Most distributor caps have a "1" stamped on the cap. Remove the hold-down bolt. Remove the distributor slowly and you will notice the rotor turn. When the rotor stops turning, the distributor gear is free of the camshaft gear. At this point scribe a mark on the distributor housing in line with the edge of the rotor as an aid to installation.



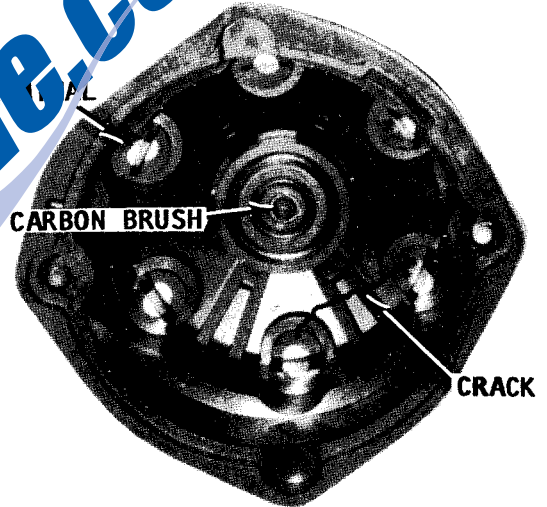
Use a couple squirts of engine oil into the cylinder to determine if the compression loss is a burned valve or worn piston rings, as explained in the text.



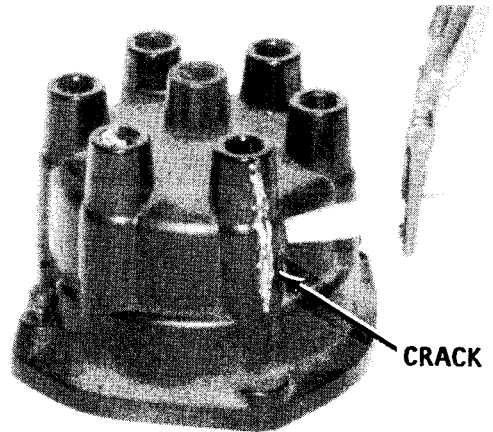
Replace a pitted rotor.

At the time of installation, align the rotor on the mark you scribed on the housing, then lower the distributor slowly and you will see the rotor turn back until it is pointing to the No. 1 cylinder position.

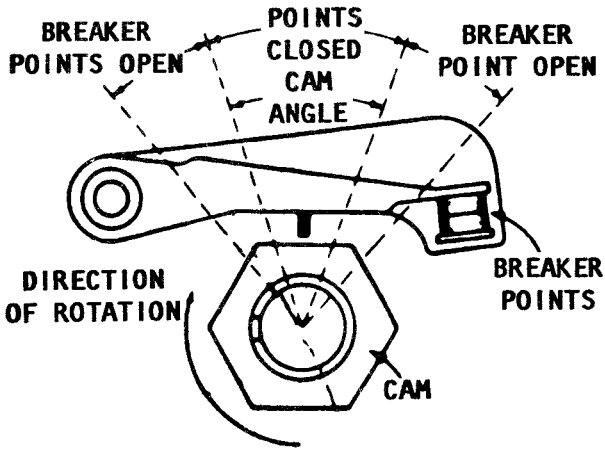
Always replace the contact points rather



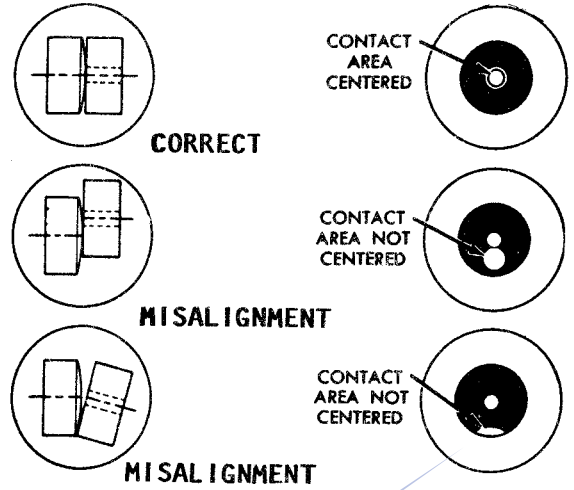
A crack in the distributor cap can cause hard starting and misfire, especially at high speed.



A cracked distributor cap may be the cause of hard starting or misfiring.



The dwell angle is directly related to the point gap.



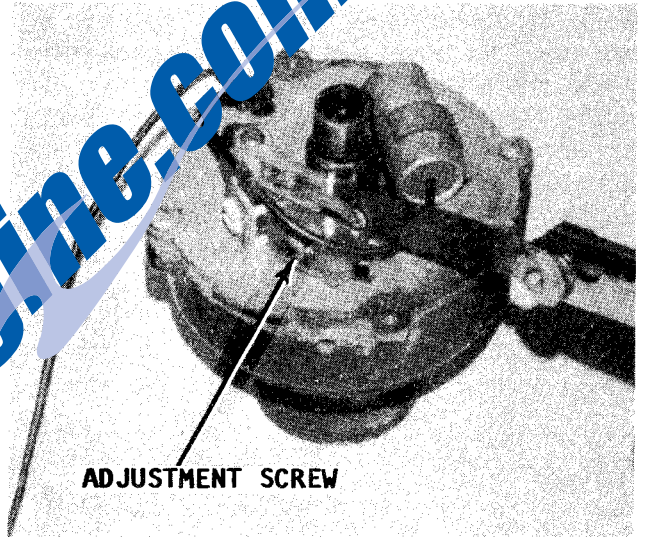
Breaker point alignment guide.

than filing them. It is seldom necessary to replace the condenser.

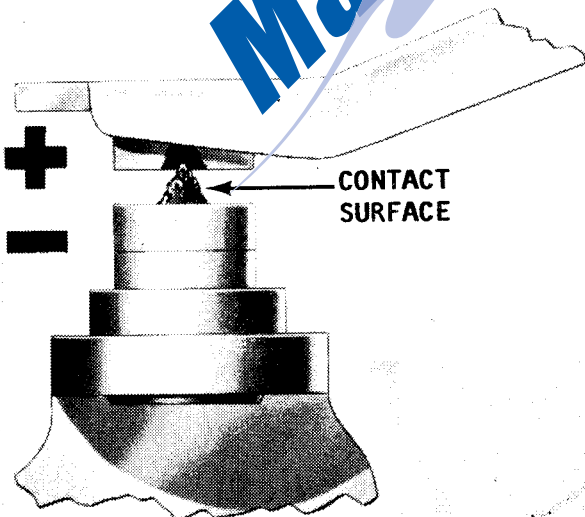
Adjust the point gap according to the specifications listed in the Appendix. Keep the feeler gauge blade clean, because the slightest amount of oil film will cause trouble when it oxidizes.

It is best to add 0.003" to the clearance specification when installing a new set of contact points to compensate for initial rubbing block wear. ALWAYS keep the contact point retaining screw SNUG during the adjustment to prevent the gap from changing when it is finally tightened.

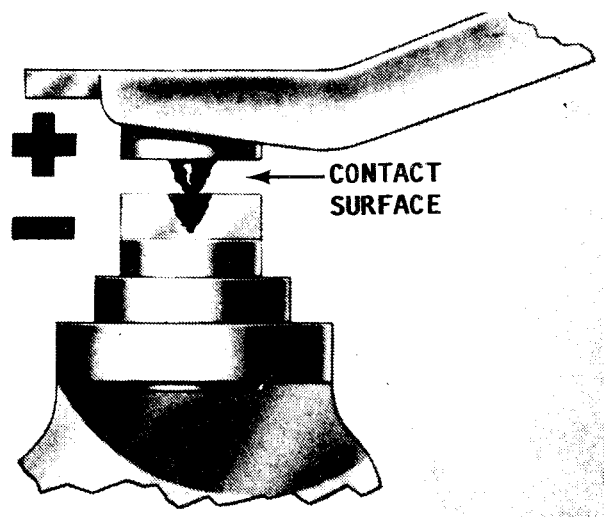
After the proper gap adjustment has been made, apply a light layer of heavy grease to coat the distributor cam and the distributor shaft in the proper direction of rotation so the lubrication is wiped off against the back of the rubbing block. The grease will remain on the rubbing block as a



Adjusting the point gap.



Check the contact points for abnormal wear, burning, or pitting.



A faulty condenser will cause abnormal contact point wear and loss of engine performance.

reservoir to supply lubricant as the block wears. Wipe off any excess lubricant. Leave only the grease stored on the rubbing block.

Replace the distributor in the engine, with the rotor pointing toward the mark you scribed on the housing. Tighten the hold-down bolt. The ignition timing will be adjusted after the engine is running, as described in the following paragraphs.

Ignition Timing

Connect a tachometer to the coil leads. Connect a power timing light to the No. 1 spark plug. Do not puncture the wire or boot when you install the timing light because a puncture could start a voltage leak and lead to problems later.

Start the engine and adjust the speed and timing to the specifications listed in the Appendix.

CAUTION: Water must circulate through the lower unit to the engine any time the engine is run to prevent damage to the water pump in the lower unit. Just five seconds without water will damage the water pump.

If a point adjustment is required, stop the engine, remove the cap, and make the adjustment. Remember, the dwell setting (gap) of the contact points affects the ignition timing; therefore, it is essential the dwell be set before adjusting the ignition timing.

Idle the engine at 600 rpm or less to be sure no centrifugal advance is taking place.

Idle the engine at 600 rpm or less to be sure no centrifugal advance is taking place. Loosen the hold-down bolt, adjust the ignition timing by rotating the distributor housing, then tighten the hold-down bolt.

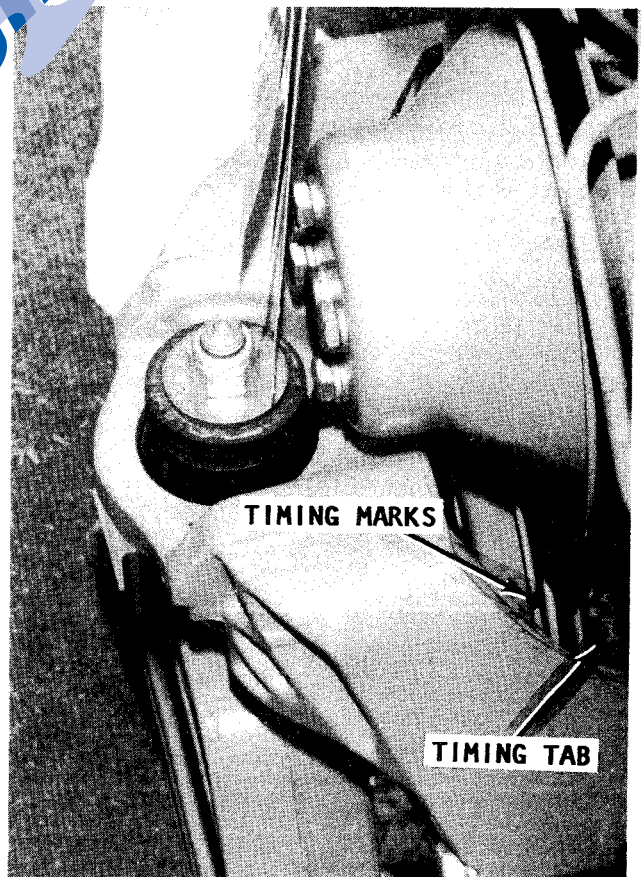
Checking Ignition Advance

Ignition timing is varied according to engine speed by means of a centrifugal advance unit. During tune-up, it is essential to check the operation of this unit. An accurate check can be made using a timing light with a timing gauge and an advance control knob. If you do not have this piece of test equipment, a rough check can be made to be sure the system is functioning properly.

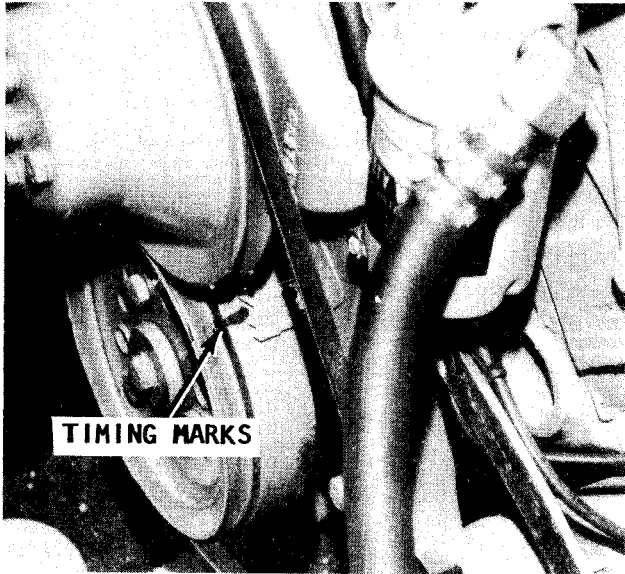
With the ignition timing properly adjusted and the timing light connected to No. 1 spark plug wire, increase engine speed to the rpm given in the Centrifugal Timing Table in the Appendix. The ignition timing must advance to the range (in degrees) shown in the table. If the speed fails to advance to the required range, remove the distributor and check the advance mechanism under the breaker plate.



Using a timing light connected to the No. 1 spark plug lead to adjust the timing.

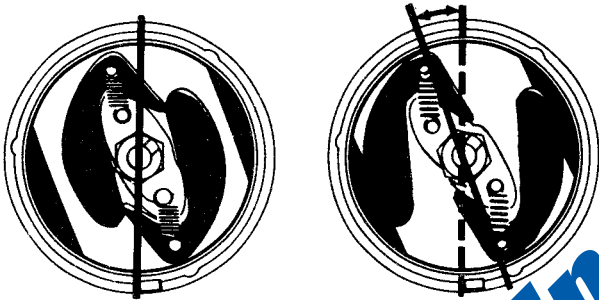


Timing marks on late model in-line engines.



TIMING MARKS

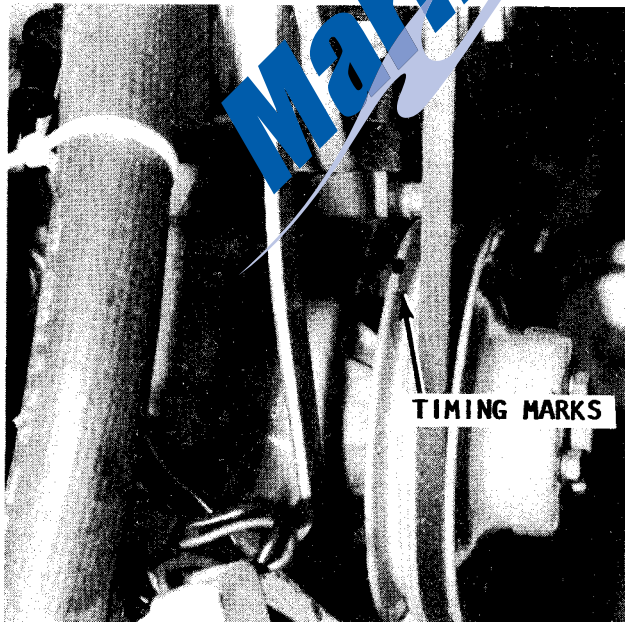
Typical timing marks.



NO ADVANCE

FULL ADVANCE

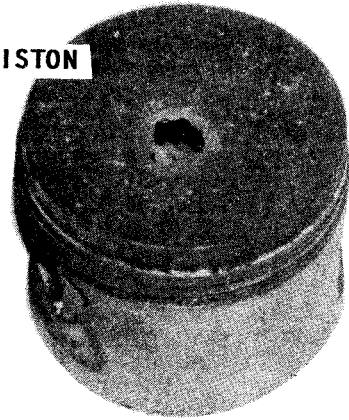
Twist the rotor and check the automatic advance weights for good movement. The rotor should feel springy in one direction and solid in the opposite direction. Engine performance will suffer if the rotor turns sluggishly.



TIMING MARKS

Typical timing marks on the crankshaft pulley.

DAMAGED PISTON



Damage to this piston was caused by abnormal combustion because the fuel exploded violently, causing the spark plug, piston, and valves to overheat. Proper adjustment of the spark advance or a change in fuel to a higher octane rating may correct the problem.

2-5 FUEL SYSTEM SERVICE

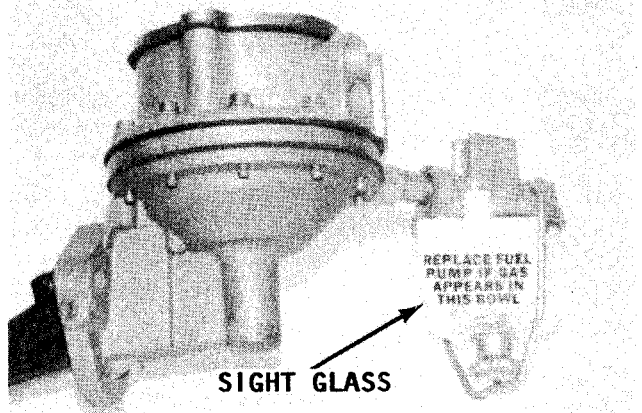
General Practices

Change the fuel filter in the base of the carburetor at least once a year. When the filter is changed, be sure to use a new gasket under the nut to prevent fuel from leaking out of the filter.

Change the water separator every year. Clean the flame arrestor after every 100 hours of operation.

Dual-Diaphragm Fuel Pump

As the name implies, the dual-diaphragm fuel pump has two diaphragms separated by a metal spacer and an attached sight gauge. Three important safety features are built into this type of pump. The pump will continue to operate on the second diaphragm if the main diaphragm fails. Gasoline can only leak into the space between



SIGHT GLASS

REPLACE FUEL PUMP IF GAS APPEARS IN THIS BOWL

Fuel in the sight glass means the diaphragms are leaking and the fuel pump must be replaced.

the two diaphragms and not out of the pump. If gasoline is detected in the sight gauge, it means the pump is defective.

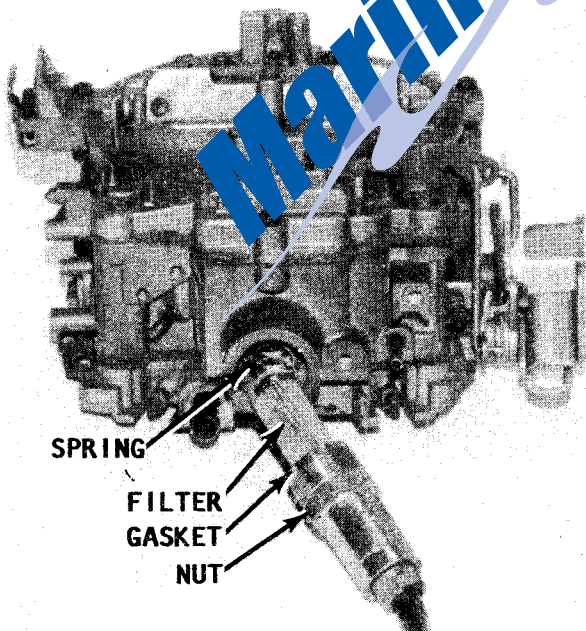
If the dual-diaphragm becomes defective for any reason, it must be replaced. Do not attempt to repair this type of pump.

Carburetor Adjustment

Because the carburetor is required to accurately control and mix the air and fuel quantities entering the combustion chamber, proper adjustments are critical to efficient engine operation. Dirt and gum in the passages restrict the flow of air or fuel causing a lean operating condition; hesitation on acceleration; and lack of power on demand.

The carburetor control linkage is subject to wear which will change the synchronization and fuel mixture. These changes will affect engine performance and fuel economy. Therefore, accurate fine carburetor adjustments can hardly be made or expected if the carburetor is not in satisfactory condition. If considerable difficulty is encountered in making the adjustments, the remedy may be to take time for a carburetor overhaul, see Chapter 4.

To make a preliminary adjustment, turn the idle mixture adjusting needles inward until they **BARELY** make contact with their seats, then back the needle out the specified number of turns.



The fuel filter in the base of the carburetor should be replaced every year.

NEVER turn the idle mixture screws **TIGHTLY** against their seats or they will be **DAMAGED**. Disconnect the throttle cable. Start the engine and run it at idle speed.

CAUTION: Water must circulate through the lower unit to the engine any time the engine is run to prevent damage to the water pump in the lower unit. Just five seconds without water will damage the water pump.

Adjust each idle mixture needle to obtain the highest and steadiest manifold vacuum reading. If a vacuum gauge is not available, obtain the smoothest running, maximum idle speed by turning one of the idle adjusting needles in until engine speed begins to fall off, then back the needle off over the "high spot" until the engine rpm again drops off, then set the idle adjusting needle halfway between the two points for an acceptable mixture setting. Repeat this procedure with the other needle.

If these adjustments result in an increase in idle rpm, reset the idle speed adjusting screw to obtain the specified idle rpm and adjust the idle mixture adjusting needles.

Shift the unit into forward gear and adjust the idle speed screw to obtain the recommended idle speed as given in the appendix.

Stop the engine and install the throttle cable. Check to be sure the throttle valves are in the full open position when the remote-control is in the full forward position. On the 120 hp to 165 hp units, with the throttle valves fully open, turn the wide-open throttle stop adjusting screw clockwise until the screw just touches the throttle lever. Tighten the set nut securely to prevent the adjustment screw from turning. Return the shift lever to the neutral gear and idle position. The idle-stop screw should be against its stop.

Calibration for High Altitudes

Increased spark advance or carburetor recalibration have very little effect on high-altitude performance. Tests have proven this statement to be true. However, a marked increase in performance can be obtained by changing propellers for high-altitude operation.

Changing the prop should be the only modification considered to obtain the rated rpm. Any other recommendation should be considered a special case and should be