

SECTION 2-F COOLING AND OILING SYSTEMS SERVICE

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2-20 COOLING SYSTEM SERVICES

a. Checking and Filling Cooling System

The coolant level should be checked only when the engine is cold and only enough coolant added to bring the level approximately halfway between the top of the core and the top of the upper tank.

It is unnecessary and inadvisable to check the coolant level each time the car is stopped for fuel or oil, as the engine is usually hot at such times.

CAUTION: Never remove the radiator cap quickly when the radiator is hot. Sudden release of cooling system pressure may cause the coolant to boil and escape with some force.

If it becomes necessary to remove the radiator cap when the radiator is hot, rotate the cap slowly counterclockwise till a stop is reached. Leave cap in this position until all system pressure is released, then remove cap.

b. Draining and Flushing the Cooling System

When the cooling system has been drained, reinstall a permanent glycol type corrosion and anti-freeze cooling system protection solution developed for year around use (General Motors Specification

GM 1899-M). Water alone, methanol, or alcohol type anti-freeze is definitely not recommended.

To drain the cooling system, remove radiator cap, open the drain cock in the lower radiator tank and remove the drain plugs on both sides of cylinder block. If car is heater equipped, set heater temperature control valve at full heat position.

After the cooling system is drained, plugs reinstalled and cock closed, fill the system with clean water. Run the engine long enough to open the thermostat for complete circulation through the system, then completely drain the cooling system before sediment has a chance to settle.

c. Conditioning the Cooling System

It is very important to make certain that the cooling system is properly prepared before an anti-freeze solution is installed; otherwise, loss of solution through leakage may occur or seepage may result in damage to the engine. The cooling system should be drained and flushed as described above (subpar. b.), all joints should be checked for leakage and corrected.

Inspect the water pump, radiator core, heater core, drain cocks, water jacket plugs, and edge of cylinder head gaskets for evidence of leaks. Tighten all hose clamps in the cooling and heating systems and replace any deteriorated hoses.

d. Using and Testing Anti-Freeze Solutions

Inhibited year around (permanent type) engine coolant solution which is formulated to withstand two full calendar years of normal operation without draining or adding inhibitors should be used at all times (not less than 0° F. to freeze protection should be provided to protect against corrosion). When adding solution due to loss of coolant for any reason or in areas where temperatures lower than -20° F. may be encountered, a sufficient amount of any of the several brands of year around coolant (Ethylene Glycol base) compatible to GM Specification 1899-M available on the market should be used.

NOTE: Alcohol base coolants are not recommended for this vehicle at any time.

If for any reason water only is used as a coolant in an emergency, it is extremely important that Buick Heavy Duty Cooling System Protector and Water Pump Lubricant be added to the cooling system as soon as possible. This material is available at your Buick dealer under Part #980504. If any other cooling system protector is used, be certain it is labeled to indicate that it meets General Motors Specification GM 1894-M. It should be recognized that this is only a temporary measure. The manufacturer intends that permanent type coolant solution be used year

around in the cooling system of your Buick.

The cooling system should be completely drained and the recommended coolant installed every two (2) years.

It is advisable to test the anti-freeze solution at intervals during the winter to make certain that the solution has not been weakened by evaporation or leakage. Use only hydrometers which are calibrated to read both the specific gravity and the temperature, and have a table or other means of converting the freezing point at various temperatures of the solution. Disregarding the temperature of the solution when making the test may cause an error as large as 30°F. Care

must be exercised to use the correct float or table for the particular type of anti-freeze being tested.

2-21 FAN BELT ADJUSTMENT OR REPLACEMENT

A tight fan belt will cause rapid wear of the delcotron generator and water pump bearings. A loose belt will slip and wear excessively and will cause noise, engine overheating, and unsteady generator output. A fan belt which is cracked or frayed, or which is worn so that it bottoms in the pulleys should be replaced.

The fan belt may be replaced by loosening the generator brace at both ends, slightly loosening

the generator mounting bolts and moving generator inward to provide maximum slack in the belt.

The delcotron generator must be moved sideways to adjust the fan belt.

After the delcotron generator brace and mounting bolts are securely tightened, the fan belt tension should be checked as shown in Figure 2-55.

If the power steering oil pump belt is removed it should be adjusted to tension specified, in Figure 2-56.

If the Air Conditioner compressor belt is disturbed it should be adjusted as specified, in Figure 2-56.

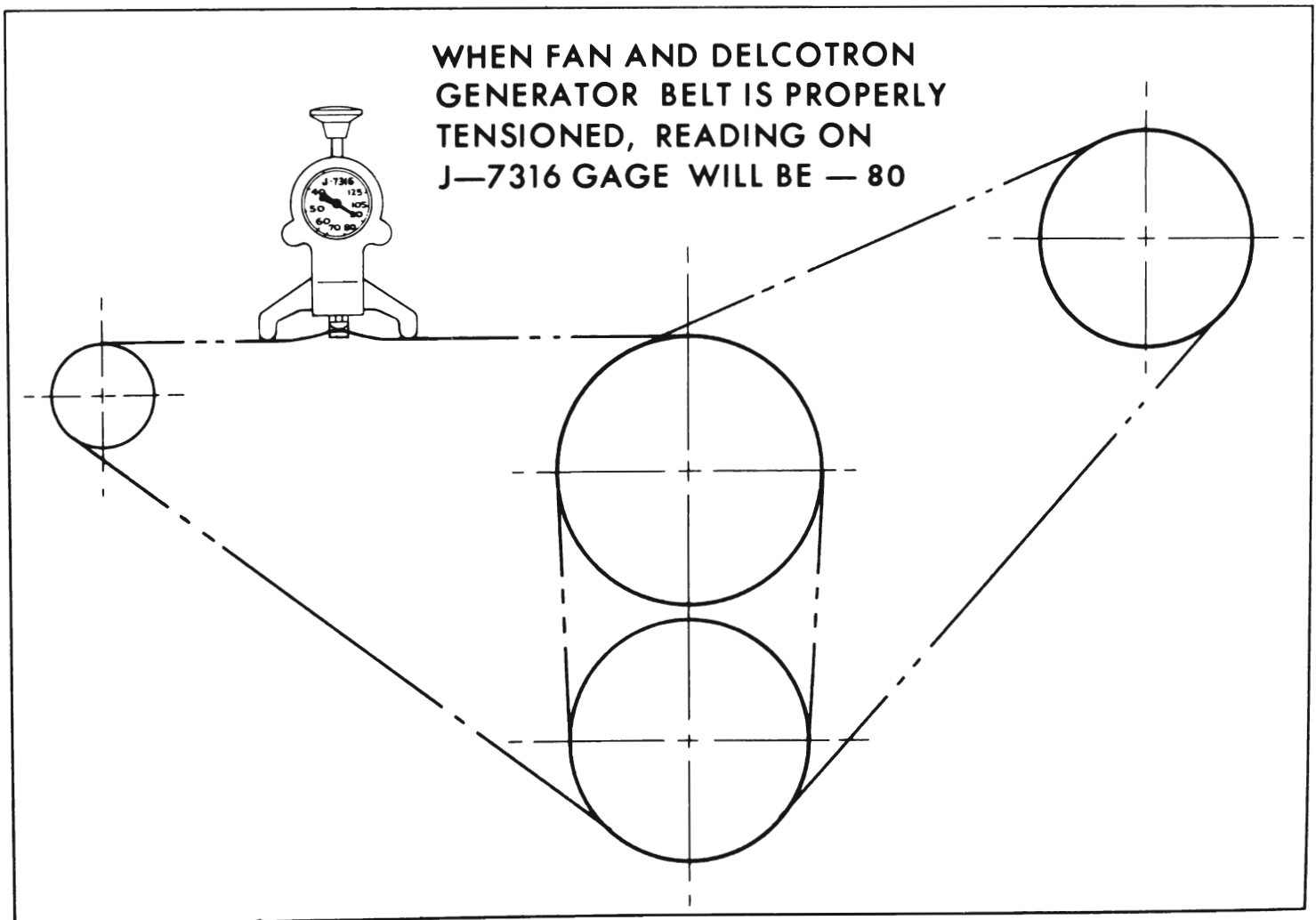


Figure 2-55—Belt Tension Chart 40-41-43-4400 Series (Delcotron Generator)

2-22 RADIATOR THERMOSTAT INSPECTION AND TEST

A sticking radiator thermostat will prevent the cooling system from functioning properly. If the thermostat sticks in the open position, the engine will warm up very slowly. If the thermostat sticks in the closed position, overheating will result.

The thermostat may be removed for inspection and test partially draining the cooling system and disconnecting the water outlet and hose from the intake manifold in which the thermostat is located.

If the thermostat valve does not fully close when cold, check for

the presence of foreign material that could hold it open. If no foreign material is present and valve still does not close, replace the thermostat.

Test the thermostat for correct opening temperature by immersing the unit and a thermometer in a container of water over a heater. While heating the water do not rest either the thermometer or thermostat on bottom of container as this will cause them to be at higher temperature than the water. Agitate the water to insure uniform temperature of water, thermostat and thermometer.

The standard thermostat (170°) valve should start to open at a

temperature of 167°F to 172°F., and should be fully open at a temperature not in excess of 192°F. The high temperature (180°) thermostat valve should start to open at a temperature of 177°F. to 182°F., and should be fully open at a temperature not in excess of 202°F. If thermostat does not operate at specified temperatures it should be replaced as it cannot be adjusted.

2-23 WATER PUMP REPAIRS

The water pump cover is die cast aluminum into which the water pump bearing outer race is shrunk fit. For this reason the cover, shaft bearing and hub are not replaceable. The shaft seal

WHEN AIR CONDITIONER
COMPRESSOR BELT IS
PROPERLY TENSIONED,
READING ON J-7316
GAGE WILL BE — 110

WHEN POWER STEERING
PUMP BELT IS PROPERLY
TENSIONED, READING
ON J-7316 GAGE WILL
BE — 90

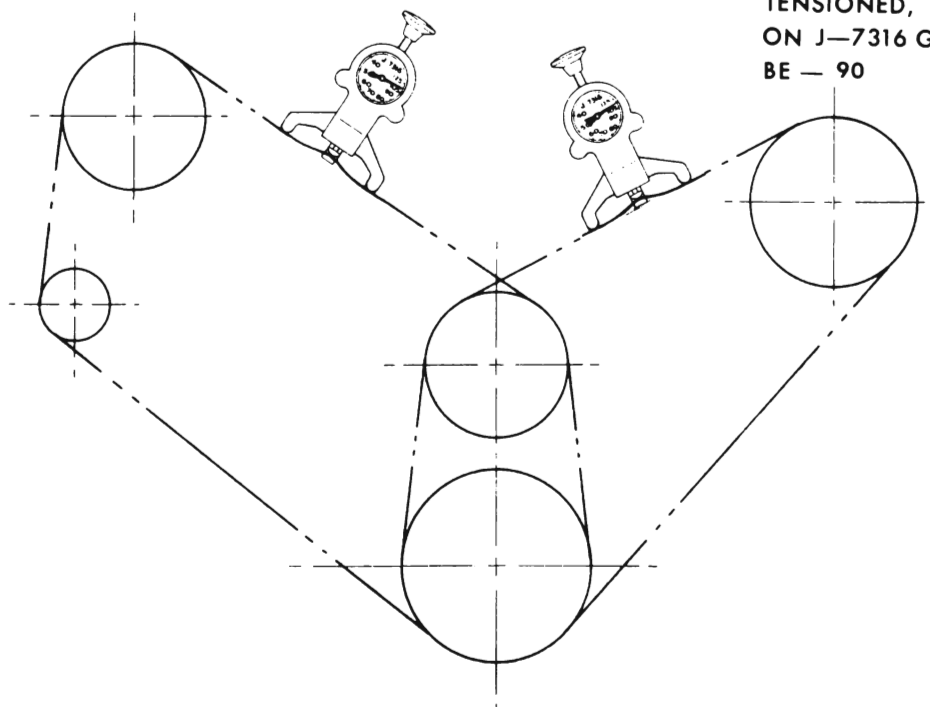


Figure 2-56—Belt Tension Chart 40-41-43-4400 Series (Air Conditioning and Power Steering)

and impeller are the only replaceable parts of the water pump.

a. Removal

1. Drain cooling system being sure to drain into a clean container if anti-freeze solution is to be saved.
2. Loosen belt or belts, then remove fan blade, and pulley or pulleys from hub on water pump shaft. Remove belt or belts.
3. Disconnect hose from water pump inlet and heater hose from nipple. Remove bolts then remove pump assembly and gasket from timing chain cover.
4. Check pump shaft bearings for end play or roughness in operation. If bearings are not in serviceable condition, the assembly must be replaced.

b. Disassembly for Seal Replacement

1. Split impeller hub and sleeve with a chisel in two or three places. Remove impeller and sleeve.

IMPORTANT NOTE: Carefully support assembly so when impeller is being split no load or impact is placed on the bearings. Rest hub of impeller on anvil when striking chisel.

2. Insert a punch through the vent hole in pump body and drive out old seal and brass sleeve pressed into pump body.
3. Clean pump cover to remove scale, old gasket, etc. Do not use cleaning solvent as solvent may leak into bearings and destroy the lubricant.
4. Carefully press new seal assembly into body, using thick walled tube of suitable diameter.

CAUTION: Extreme care should be taken so ceramic seal is not broken.

5. Coat face of carbon washer and impeller hub with rust preventative or Seco Oil; then press impeller on shaft until .025" to .050" clearance exists between front face of impeller and pump cover.

CAUTION: Avoid any pressing technique that is likely to impose thrust loads on water pump bearings. Pump must be supported on forward end of shaft only while pressing on impeller. See Figure 2-14.

c. Installation

1. Make sure the gasket surfaces on pump and timing chain covers are clean. Install pump assembly with new gasket. Bolts with lock washers must be tightened uniformly.
2. Connect radiator hose to pump inlet and heater hose to nipple, then fill cooling system and check for leaks at pump and hose joints.
3. Install fan pulley or pulleys and fan blade, tighten attaching bolts securely. Install belt or belts and adjust for proper tension.

2-24 OIL PUMP SERVICE

a. Removal of Oil Pump Cover and Gears

1. Remove oil filter.
2. Disconnect wire from oil pressure indicator switch in filter by-pass valve cap.
3. Remove screws attaching oil pump cover assembly to timing chain cover. Remove cover assembly and slide out oil pump gears.

b. Inspection

1. Wash off gears and inspect for wear, scoring, etc. Replace any gears not found serviceable.

2. Remove the oil pressure relief valve cap, spring and valve. See Figure 2-58. Oil filter by-pass valve and spring are staked in place and should not be removed.

3. Wash the parts thoroughly and inspect the relief valve for wear or scoring. Check the relief valve spring to see that it is not worn on its side or collapsed. Replace any relief valve spring that is questionable. Thoroughly clean the screen staked in the cover.

4. Check the relief valve in its bore in the cover. The valve should have no more clearance than an easy slip fit. If any perceptible side shake can be felt the valve and/or the cover should be replaced.

5. Check filter by-pass valve for cracks, nicks, or warping. The valve should be flat and free of nicks or scratches.

c. Assembly and Installation

1. Lubricate and install pressure relief valve and spring in bore of oil pump cover. See Figures 2-57 and 2-58. Install cap and gasket. Torque cap to 30-35 pounds with a reliable torque wrench. Do not over-tighten.

NOTE: Pressure relief valve cap has no hole tapped for installation of oil pressure switch.

2. Install oil pump gears and shaft in oil pump body section of timing chain cover to check gear end clearance.

3. Place a straight edge over the gears and measure the clearance between the straight edge and the gasket surface. Clearance should be between .0023 and .0058. If clearance is less than .0018" check timing chain cover gear pocket for evidence of wear.

4. If gear end clearance is satisfactory, remove gears and pack gear pocket full of petroleum jelly. Do not use chassis lube!!!

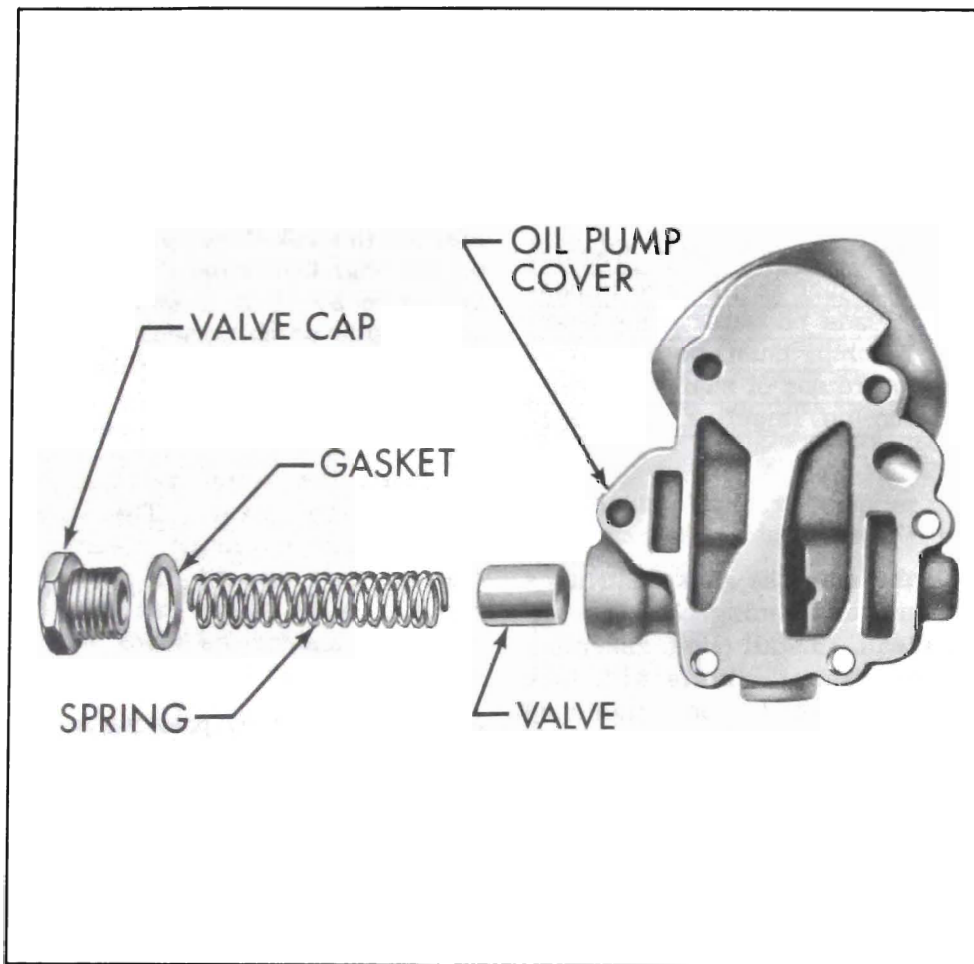


Figure 2-58—Oil Pump Cover

5. Reinstall gears so petroleum jelly is forced into every cavity of the gear pocket and between the teeth of the gears. Place new gasket in position. See Figure 2-70.

NOTE: This step is very important. Unless the pump is packed with petroleum jelly, it

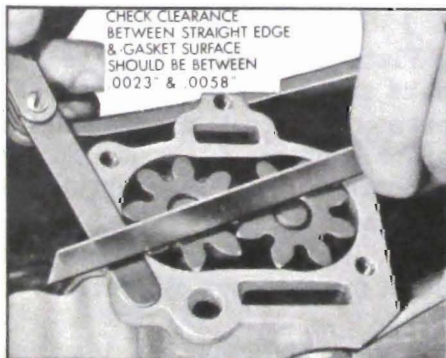


Figure 2-59—Checking Oil Pump Gear End Clearance

may not prime itself when the engine is started.

6. Install cover assembly screws. Tighten alternately and evenly. The torque specification is 10-15 ft. lbs.

7. Install filter on nipple.

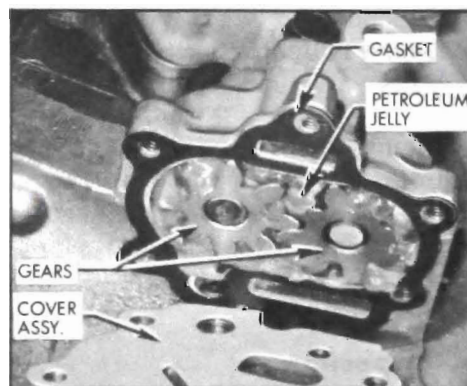


Figure 2-60—Oil Pump Packed With Petroleum Jelly

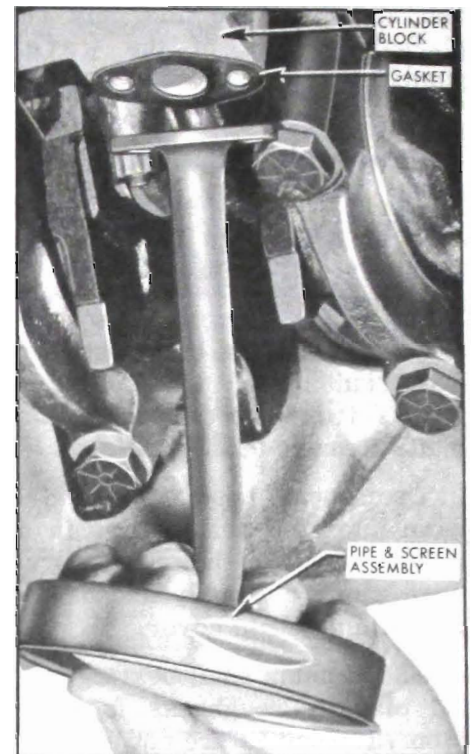


Figure 2-61—Installation of Oil Pump Pipe and Screen Assembly

d. Removal and Inspection of Oil Pump Pipe and Screen Assembly

1. Raise car and support on stands.
2. Remove air cleaner.
3. Drain oil.
4. If Synchromesh equipped, loosen clutch equalizer bracket to frame attaching bolts.
5. Loosen shift linkage attaching bolts.
6. Remove steering idler arm bracket to suspension cross member attaching bolts.
7. Support engine either with a jack under the oil pan, or with chains around the exhaust manifold.
8. Remove bolts and nuts attaching engine mounts to mount brackets.

9. Raise engine and insert bolts through bracket bolt holes, then lower engine so mounts rest on bolts.

10. Remove lower flywheel housing bolts. Remove housing.

11. Remove oil pan bolts and lower oil pan enough to remove oil pump pipe and screen to cylinder block bolts. See Figure 2-61.

12. Rotate crankshaft to provide maximum clearance at forward end of oil pan. Move front of pan to the right and lower pan through

opening between cross member and steering linkage intermediate shaft.

13. Clean oil pan. Pry screen out of housing and examine for evidence of clogging due to deposit of sludge or other foreign material.

14. Clean the screen and housing thoroughly in solvent and blow dry with air stream.

15. Snap screen into housing.

e. Installation of Oil Pan, Oil Pump Pipe and Screen Assembly

Install by reversing removal procedure, paying particular attention to the following points.

1. Make sure oil pump pipe flange gasket surface of block is smooth and free of dirt.

2. Use a new gasket and tighten bolts to 10-15 ft. lbs. torque.

3. Tighten pan bolts evenly. Do not over tighten.