

# Cadillac V8 Engines

## 1968-73 472", 500" V8 ENGINES

GENERAL SPECIFICATIONS							
Year	Displ. Cu. Ins.	Carburetor	HP at RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore	Stroke
1968-69	472"	4-Bbl.	375@4400	525@3000	10.5-1	4.30"	4.06"
1970	472"	4-Bbl.	375@4400	525@3000	10.0-1	4.30"	4.06"
	500"	4-Bbl.	400@4400	550@3000	10.0-1	4.30"	4.304"
1971	472"	4-Bbl.	345@4400	500@2800	8.5-1	4.30"	4.06"
	500"	4-Bbl.	365@4400	535@3000	8.5-1	4.30"	4.304"
1972-73	472"	4-Bbl.	220@4000	365@2400	8.5-1	4.30"	4.06"
	500"	4-Bbl.	235@3800	385@2400	8.5-1	4.30"	4.304"

► **NET HORSEPOWER & TORQUE NOTE** — Horsepower and Torque figures given for 1972 and later are NET. NET Horsepower and Torque represent power at the flywheel when the engine is installed in the vehicle, with wide open throttle and all systems operating such as; air cleaner, exhaust system, water pump, generator, oil pump and air conditioning.

### ENGINE IDENTIFICATION

**Vehicle Identification Number** — Located on forward lower edge of windshield trim molding on driver's side. Number is visible from outside vehicle. Vehicle Identification Number is decoded as follows:

**6C47R3Q100001**

**First Digit** — Designates Cadillac Division.

**Second Digit (Letter)** — Car Line Series.

**Third & Fourth Digits** — Body Type.

**Fifth Digit (Letter)** — Engine Designation (R — 472"), (S — 500")

**Sixth Digit** — Model Year, 3 (1973).

**Seventh Digit (Letter)** — Plant Designation.

**Last Six Digits** — Build Sequence.

**Engine Unit Number** — Located on upper portion of cylinder block, behind intake manifold, and on left side of transmission. First digit indicates model year, next six digits indicate engine build number. In addition to these there may be an L.C. indicating Low Compression engine, or an asterisk, indicating that one or more cylinders are .010" oversize.

**Other Engine Marks** — Identification letter stamped on cylinder head, midway between two cylinders, indicates cylinder or piston size as follows:

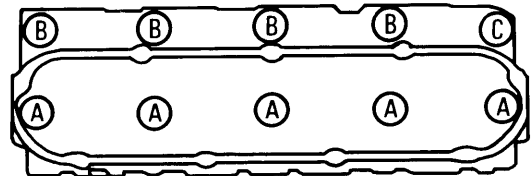
Letter	Cyl. Size	Piston Size
A	4.3000-4.3002"	4.2992-4.2994"
B	4.3002-4.3004"	4.2994-4.2996"
C	4.3004-4.3006"	4.2996-4.2998"
D	4.3006-4.3008"	4.2998-4.3000"
E	3.3008-4.3010"	4.3000-4.3002"
H	4.3010-4.3012"	4.3002-4.3004"
J	4.3012-4.3014"	4.3004-4.3006"
K	4.3014-4.3016"	4.3006-4.3008"
L	4.3016-4.3018"	4.3008-4.3010"
M	4.3018-4.3020"	4.3010-4.3012"

If double letters appear on cylinder block they indicate that cylinder bore is .010" over that of the single letter. **NOTE** — Pistons for the 1971 Cadillac 500" engine are not available in .010" oversizes.

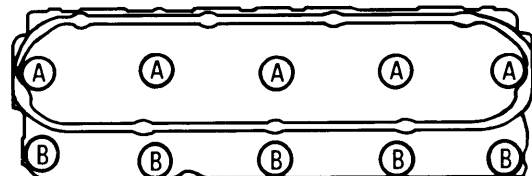
### CYLINDER HEAD INSTALLATION

Place bolts in proper positions, as shown in illustration. Torque all bolts to specifications starting from center and working toward each end.

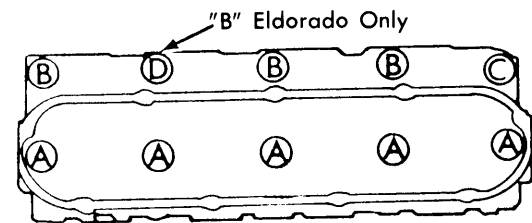
Bolt Location	Length
A (Bolt)	4.36" (Medium)
B (Bolt)	4.77" (Long)
C (Bolt)	3.02" (Short)
D (Bolt/stud)	4.77" (Long)



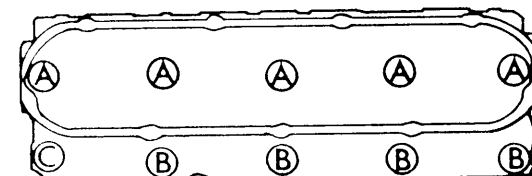
FRONT OF ENGINE 9F3010



1968-69 CYLINDER HEAD BOLT LOCATION



FRONT OF ENGINE 1A105



1970-73 CYLINDER HEAD BOLT LOCATION

## 1968-73 472", 500" V8 ENGINES (Cont.)

### ENGINE REMOVAL

See *Engine Removal* at end of ENGINE Section.

### OIL PAN REMOVAL

See *Oil Pan Removal* at end of ENGINE Section.

### ENGINE NOTES

- ▶ **1968 HIGH SPEED "BOOM" CORRECTION:** May be caused by tubular strut from alternator to cylinder head. To correct, remove strut. Manufacturer recommends no strut be used.
- ▶ **1968 ELDORADO ENGINE TEMPERATURE DIODE LOCATION NOTE:** Engine temperature diode on Eldorado models is located in a portion of the wiring harness that extends from end of left rocker arm cover to cowl. To locate diode, cut through taped loom of harness and trace along greenwhite striped wire until insulation and splice for diode is found.
- ▶ **1970 CADILLAC VALVE NOISE NOTE** – If the valve train develops a tapping noise, the rocker arms may be moving from side to side on their supports. To diagnose and correct this condition, carefully place a screwdriver against each rocker arm retainer end tab. A noisy rocker arm will quiet when end tab is pressed against the arm. Repositioning end tab fore or aft, or bending tab inward to apply more tension may be necessary to eliminate problem. If retainer end tabs are not the cause, check for valve springs which may have been installed upside down; sometimes causing a valve train to be noisy.

### INTAKE MANIFOLD INSTALLATION

Position new gasket on cylinder head and new seals at front and rear rails of block, using suitable sealer. Install manifold and bolts. Tighten to specifications. **NOTE** – *Cement sheet metal gasket and shield to engine.*

### TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Cylinder Head	115
Intake Manifold	30
Exhaust Manifold	35
Oil Pan	10
Main Bearing	90
Connecting Rods	40
Crankshaft Pulley	17
Camshaft Sprocket	18
Valve Chamber Cover	25 INCH Lbs.
Rocker Arm Cover	28 INCH Lbs.
Thermostat Housing	ⓐ 10 Lbs.
Distributor Clamp	15
Water Pump	ⓑ
Front Cover	Ⓒ
Flex Plate-to-Crankshaft	75
Flex Plate-to-Converter	30
Oil Pump	15
Transmission Housing-to-Block	35
Fuel Pump	14

ⓐ – Retorque after engine obtains normal operating temperature.

ⓑ – See *Separate Illustrations*.

### PISTONS, PINS, RINGS

Engine	PISTONS		PINS		RINGS		
	Clearance	Piston Fit	Rod Fit	Rings	End Gap	Side Clearance	
472" 1968-69	.0006-.0010"	.0001-.0002"	Press Fit	Comp. Oil	.013-.025" .015-.055"	.0017-.004" None	
472" & 500" 1970-73	.0006-.0010"	.0002-.0004"	Press Fit	Comp. Oil	.013-.025" .015-.055"	.0017-.004" None	

### FITTING PISTONS

Measure pistons 3/16" below upper cross slot and 1/4" to either side of vertical slot. Measure cylinders 1/8" from top of bore, crosswise to cylinder block.

### PISTON & CONNECTING ROD INSTALLATION

Install piston with "R" mark to rear. Install connecting rods and caps with numbered sides adjacent and down (oil grooves up).

### PISTON PIN REPLACEMENT

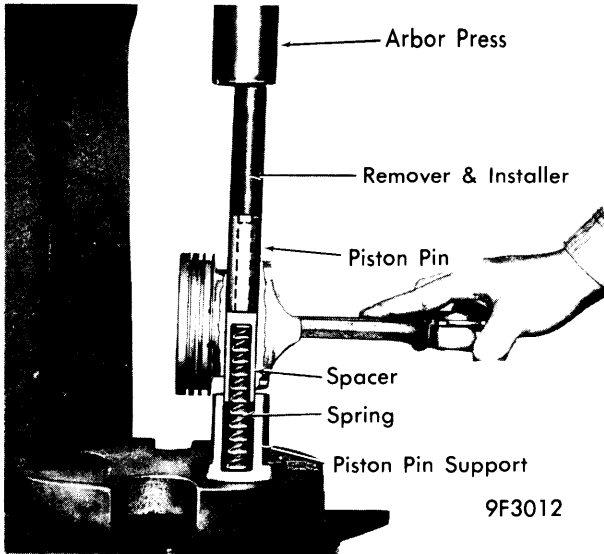
Use Tool Set J-8390 to remove and install piston pins as shown in illustrations. When removing, place piston on support with "R" mark upward.

### RING INSTALLATION

Chamfered inner corner of each compression ring must be toward top of piston.

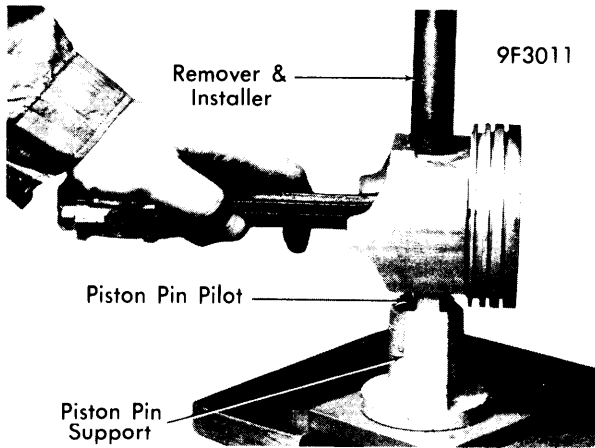
# Cadillac V8 Engines

## 1968-73 472", 500" V8 ENGINES (Cont.)



**PISTON PIN INSTALLATION**

9F3012



**PISTON PIN REMOVAL**

9F3011

### ENGINE FRONT COVER

**NOTE** – On Eldorado, engine must be removed to remove front cover.

1) Disconnect battery, remove air cleaner, drain radiator and cylinder block, remove oil pan. Remove fan, belts, and hoses.

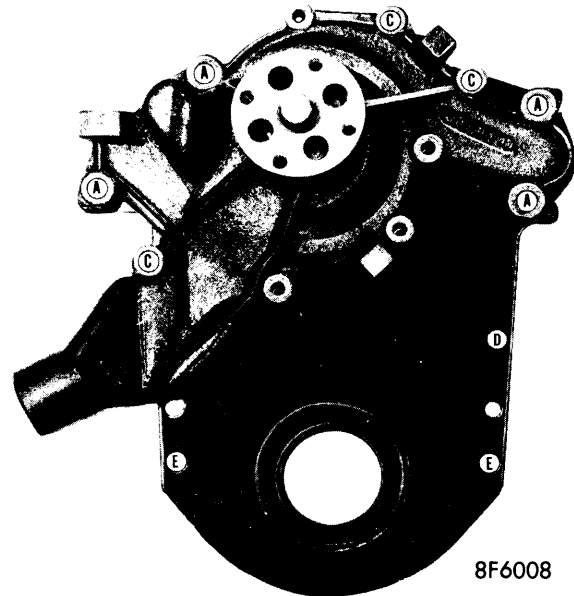
2) Remove vibration damper. Remove engine front cover, with water pump attached. To install, reverse removal procedure. Use new gasket. See illustration for screw location and torque specifications.

### FRONT COVER OIL SEAL REPLACEMENT

**NOTE** – Front cover oil seal may be replaced without removing front cover from engine.

**Removal** – Remove vibration damper and with thin bladed screwdriver pry out old front cover oil seal.

**Installation** – Lubricate a new seal with wheel bearing lubricant and install on crankshaft, with spring side toward engine. Using Seal Installer Tool, J-22770 (or equivalent), drive seal into cover until it bottoms against front cover.



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1968-71

Key	No.	Size	Torque
A	(4)	3/8-16 x 1-3/8	25 foot-pounds
C	(3)	5/16-18 x 1-1/4	15 foot-pounds
D	(1)	5/16-18 x 5/8	15 foot-pounds
E	(2)	3/8-16 x 5/8	25 foot-pounds

1972-73

Key	(No.)	Size	Torque
A	(4)	3/8-16 x 1-3/8	22 Ft. Lbs.
C	(3)	5/16-18 x 1-1/4	10 Ft. Lbs.
D	(1)	5/16-18 x 5/8	10 Ft. Lbs.
E	(2)	3/8-16 x 5/8	22 Ft. Lbs.

### ENGINE FRONT COVER BOLT LOCATIONS & TORQUE

### VIBRATION DAMPER REPLACEMENT

**NOTE** – It is not necessary to replace vibration damper if it is scored or grooved. A new "dual-lip" type oil seal which straddles worn spots on damper will provide necessary sealing.

Vibration damper is a press fit on crankshaft. Remove and install with suitable pullers (front end of crankshaft has threaded hole under cork plug for puller installation). With damper approximately in place, install 1962 Damper-to-Crankshaft Screw and Washer and torque screw to 125 ft. lbs. to achieve proper fit, then remove screw. Use air pressure to hold one piston on its compression stroke to prevent crankshaft turning. **CAUTION** – To prevent damper from seizing to crankshaft, lubricate bore of damper with hypoid lubricant before installation.

## 1968-73 472", 500" V8 ENGINES (Cont.)

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS							
Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam.	Clearance	Thrust Bearing	Crankshaft Endplay	Journal Diam.	Clearance	⊙Sideplay
1968-72 472" & 500"	3.250"	.0003-.0026"	No.3	.002-.015"	2.500"	.0005-.0028"	.008-.016"
1973 472" & 500"	3.250"	.0003-.0026"	No.3	.002-.012"	2.500"	.0005-.0028"	.011-.021"

⊙ — Total, 2 rods.

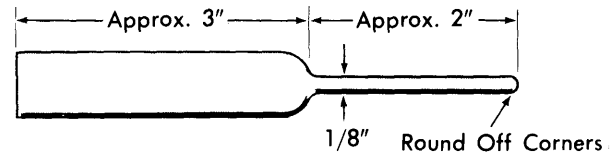
### THRUST BEARING ALIGNMENT

Align thrust bearing surfaces after new bearing has been installed as follows: Install bearing cap screws finger tight and tap crankshaft fore and aft the limits of its travel. Repeat procedure several times, tapping only on counterweight. Tighten bearing cap screws to specified torque.

**Lower Half** — Install seal in bearing cap with lip facing forward and one end of seal over ridge; flush with split line. Seal must protrude evenly on both sides. Apply .010" thick film of rubber cement to contact surfaces of block and cap. **NOTE** — Keep rubber cement off seal. Install bearing cap.

### REAR MAIN BEARING OIL SEAL REPLACEMENT

**Seal Replacement** - **NOTE** - Seal halves are pre-lubricated with a film of wax. Do not damage this film. Do not use silicone on seal when installing or seal will leak. For easier installation, use Lubriplate. Do not press on lips of seal during installation. See illustration for dimensions of oil seal installing tool which can be made locally from suitable shim stock. This tool should be used as a "shoe-horn" in block and bearing cap to prevent outer diameter of seal from scraping against sharp edges as seal is installed.



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**Upper Half** — Slide seal into cylinder block with lip facing forward. Rotate seal into position and ensure seal protrudes evenly on both sides.

### OIL SEAL INSTALLATION TOOL

VALVES								
Engine & Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift	
472" & 500" 1968-71	Int.	2.000"	44°	45°	.063"	.3415-.3425"	.0005-.0025"	.440"
	Exh.	1.625"	44°	45°	.063"	.3415-.3420"	.0010-.0025"	.454"
1972-73	Int.	2.000"	44°	45°	.063"	.3413-.3420"	.0010-.0027"	.490"
	Exh.	1.625"	44°	45°	.063"	.3413-.3418"	.0012-.0027"	.490"

### VALVE STEM-TO-GUIDE CLEARANCE

If hole gauge is not available, use .005" brass shim (1/16" wide) in valve guide bore. Tip of shim should extend toward push rod side of head and not more than 1/4" into guide. If valve stem will enter guide, clearance is excessive.

**NOTE** — Valve guides and valves of .003" oversize may have been installed at factory. They will be indicated by a "3" stamped on cylinder head gasket surface, in line with oversize valve. Oversize valves are so marked, in ink, on valve head.

If stem-to-guide clearance is excessive, valve guides should be reamed to next oversize, and valve with corresponding oversized stem installed. Service valve available in standard (.343") and .003", .006", .013" oversize stems. Reamers are available as follows:

Oversize	Part Number
.003" (.346")	J-5830-1
.006" (.349")	J-5830-6
.013" (.356")	J-5830-7

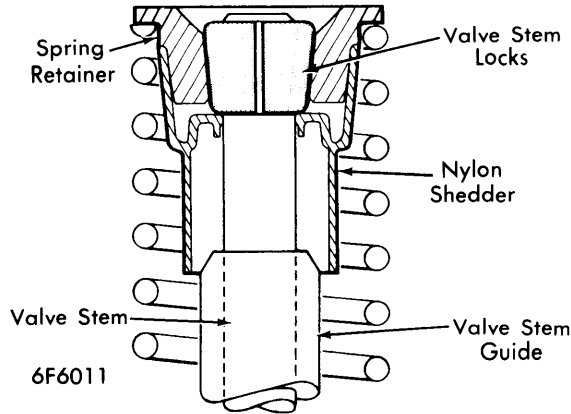
VALVE SPRINGS			
Engine	Free Length	PRESSURE (LBS.)	
		Valve Closed	Valve Open
1968-73 472" & 500"	2.250"	60-65 @ 1.946"	155-165 @ 1.496"

# Cadillac V8 Engines

## 1968-73 472", 500" V8 ENGINES (Cont.)

### VALVE STEM SEALS

An oil shedder is used which is part of the valve spring retainer (see illustration).



**VALVE SPRING RETAINER & OIL SHEDDER**

### VALVE SPRING INSTALLATION

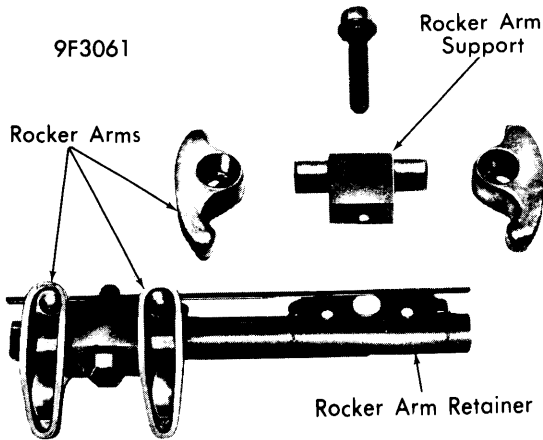
Place spring over valve stem with closed coil end against cylinder head.

### VALVE SPRING INSTALLED HEIGHT

Measure from spring seat on head to underside of spring retainer. See *Valve Spring Specifications*.

### ROCKER ARM ASSEMBLY

Ensure all parts are installed in original positions, as shown in illustration.



**ROCKER ARM ASSEMBLY**

### HYDRAULIC LIFTER LEAKDOWN RATE CHECK

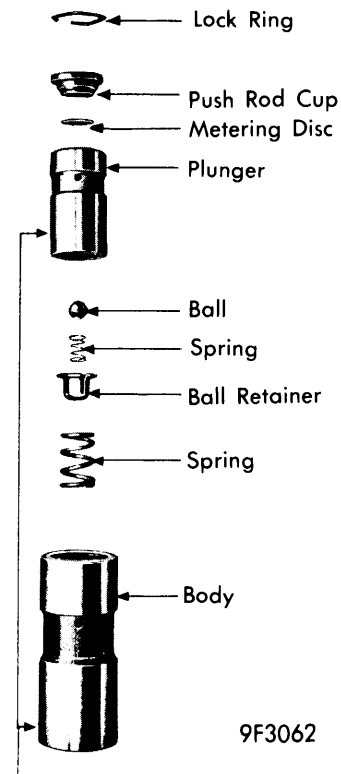
Use Leakdown Rate Tester J-3074 to check for faulty lifters without disassembling engine. This tool uses a feeler gauge between rocker arm and valve stem which causes valve spring pressure to force oil out of lifters. When lifter has leaked down enough for valve to seat, a spring on tool which is compressed against valve spring retainer, ejects feeler gauge. Lifters which leak down quickest (pop out tool fastest) are faulty. Check lifters in the following order: *NOTE - Insert tool quickly to avoid unnecessary leakdown.*

1) With No. 1 piston at firing position, check:

- |             |              |
|-------------|--------------|
| No.1 Intake | No.1 Exhaust |
| No.2 Intake | No.3 Exhaust |
| No.5 Intake | No.5 Exhaust |
| No.7 Intake | No.6 Exhaust |
| No.8 Intake | No.8 Exhaust |

2) With No. 4 piston at firing position, check:

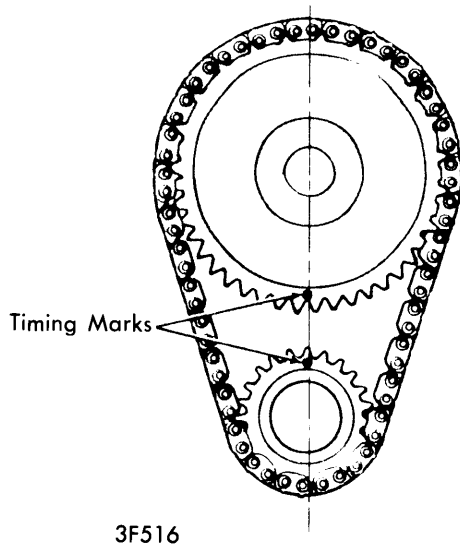
- |             |              |
|-------------|--------------|
| No.3 Intake | No.2 Exhaust |
| No.4 Intake | No.4 Exhaust |
| No.6 Intake | No.7 Exhaust |



Plunger & Body Are Fitted Pairs & Must Not Be Mismatched

**HYDRAULIC VALVE LIFTER ASSEMBLY**

## 1968-73 472", 500" V8 ENGINES (Cont.)



VALVE TIMING MARKS

CAMSHAFT			
Engine	Journal Diam.	Clearance ①	Lobe Lift
1968-71	.....	.001-.0022"	Int. .440" Exh. .454"
1972-73	.....	.001-.0022"	Int. .490"① Exh. .490"①

① - 1972 only.

### CAMSHAFT REMOVAL

Excepting the Eldorado, camshaft may be removed with engine installed. Remove front cover, radiator, air conditioning condenser (if equipped), ignition distributor, fuel pump, and oil slinger from crankshaft. Also remove valve lifters, timing chain and sprockets. Slide camshaft forward carefully.

### CAMSHAFT BEARING REPLACEMENT

Camshaft bearings may be replaced with engine installed in vehicle, however camshaft, crankshaft and transmission must be removed. **NOTE** - If replacer tool J-3063 is available, No.5 bearing may be removed without extracting rear core plug.

## ENGINE OILING

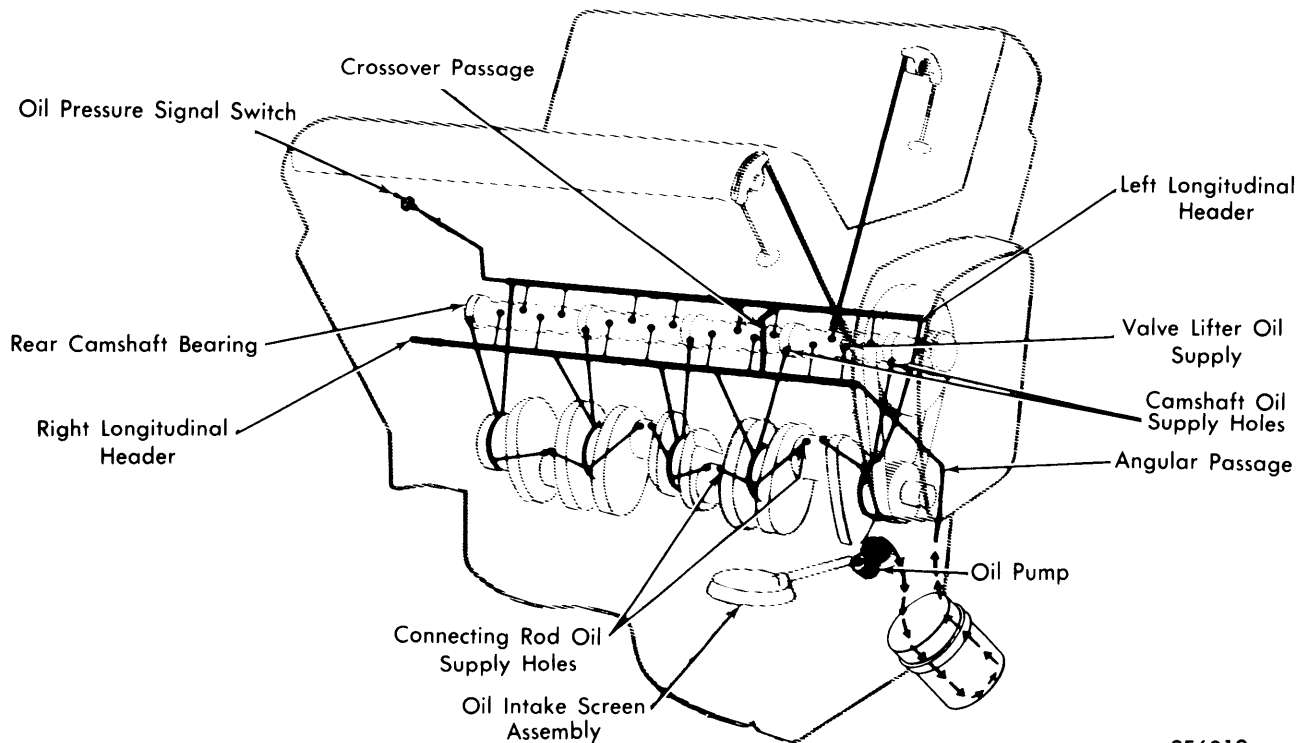
**Crankcase Capacity** - 4 qts. except Eldorado which is 5 qts. Add one quart with filter change.

**Oil Filter Replacement** - Change element every 6,000 miles.

**Oil Pressure** - 35-40 psi at 30 MPH. Average pressure at idle is 10 psi.

### OIL PUMP

Mounted on right side near front of engine. To remove pump, raise car. Screw closest to pressure regulator should be removed last, replaced first. Pump must be packed with petrolatum before reinstalling.



ENGINE OILING SYSTEM

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# Cadillac V8 Engines

1968-73 472", 500" V8 ENGINES (Cont.)

## ENGINE OILING (Cont.)

### Oil Pump Specifications

Application	Measurement
Gear Backlash .....	.008-.012"
Gear Shaft-to-Bore Clearance.....	.0010-.0025"
Wear Limit.....	.005"
Gear-to-Body Clearance.....	.003-.005"
Wear Limit.....	.005"
Gear End Play.....	.001-.002"
Wear Limit.....	.006"
Press. Reg. Valve-to-Bore Clearance .....	.0020-.0035"
Wear Limit.....	.005"
Press. Reg. Valve Free Length	
1968.....	2.77-2.89"
1969-73 .....	2.57-2.69"
Pressure	
1968.....	6 1/4-6 3/4 psi at 1 7/16"
1969-73 .....	7 1/2-8 1/2 psi at 1 7/16"

### ENGINE OILING SYSTEM

Right longitudinal header is fed through angular passage from oil filter and pump. Oil crosses to left longitudinal header through intersecting vertical passages above No. 2 camshaft bearing and continues up vertical header to oil pressure signal switch.

**Crankshaft, Camshaft, Connecting Rods** – Main bearings No. 2, 3, and 4 are lubricated from right longitudinal header through holes drilled in block. Main bearings No. 1 and 5 are lubricated in same manner from left header. Camshaft bearings are lubricated from corresponding main bearings through holes in block. Connecting rod bearings are lubricated from adjacent main bearing through holes in crankshaft.

**Lifters, Rocker Arms, Pistons & Pins** – Longitudinal headers feed the hydraulic valve lifters under pressure through drilled passages. From lifters, oil flows through hollow push rods to rocker arms, controlled by metering disc in lifter. Oil comes through feed hole in rocker arm, flows onto arm, lubricating rocker arm bearings, push rod tips, and valve tips. Pistons, pins, and cylinder walls are lubricated by oil splashed up from crankcase. Oil drains from cylinder heads into valve lifter compartment, returns to crankcase through hole on bottom of compartment.