1965-73 199", 232", 258" OHV 6 CYL. ENGINES

GENERAL SPECIFICATIONS

Year	Displ. Cu. Ins.	Carburetor	HP at RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore	Stroke
1965-70	199"	1-Bbl.	128 @ 4400	182 @ 1600	8.5-1	3.75"	3.000"
	232"	1-Bbl.	145 @ 4300	215 @ 1600	8.5-1	3.75"	3.500"
	232"	2-Bbl.	155 @ 4400	222 @ 1600	8.5-1	3.75"	3.500"
1971	232"	1-Bbl.	135 @ 4000	210 @ 1600	8.0-1	3.75"	3.500"
	258"	1-Bbl.	150 @ 3800	240 @ 1800	8.0-1	3.75"	3.895"
1972-73	232"	1-Bbl.	100 @ 3600	185 @ 1800	8.0-1	3.75"	3.500"
	258"	1-Bbl.	110 @ 3500	195 @ 2000	8.0-1	3.75"	3.895"

► *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.*

MODEL IDENTIFICATION

SERIAL NUMBER

1965-67 — Stamped on a plate on the right hand wheelhouse panel under hood.

1968-73 — Stamped on a plate located in upper left hand corner of instrument panel. It is also located on a label affixed to the left front door on 1970-73 models.

1965

Model	Number
Ambassador 232" 2-Bbl.	S 100001
American 232" 2-Bbl.	W 100001
Classic 199" 1-Bbl.	J 100001
232" 1-Bbl.	L 150001

1966

Model	①Number
Ambassador 232" 2-Bbl.	M 100001
American 199" 1-Bbl.	A 100001
232" 2-Bbl.	B 100001
Classic 232" 1-Bbl.	F 100001
232" 2-Bbl.	G 100001
Marlin 232" 1-Bbl.	V 100001
232" 2-Bbl.	S 100001

1967

Model	①Number
Ambassador 232" 1-Bbl.	P 100001
232" 2-Bbl.	M 100001
American 199" 1-Bbl.	A 100001
232" 1-Bbl.	E 100001
232" 2-Bbl.	B 100001
Marlin 232" 1-Bbl.	S 100001
232" 2-Bbl.	T 100001
Rebel 232" 1-Bbl.	F 100001
232" 2-Bbl.	G 100001

① - Only seventh digit and sequential number listed. 1966 and 1967 cars use a thirteen digit serial number. Example: A7KS52B100001. Seventh digit (just before sequential number) identifies series and engine.

The following engines use a thirteen digit number. The fourth digit identifies series, the seventh digit identifies engine as follows:

1968-69

Fourth Digit	Model
0	Rambler
1	Rebel
3	AMX
7	Javelin
8	Ambassador

Seventh Digit	Engine
A	199" OHV 6, 1 Bbl.
B	232" OHV 6, 1 Bbl.
C	232" OHV 6, 2 Bbl.

1970

Fourth Digit	Model
0	Hornet
1	Rebel
3	AMX
7	Javelin
8	Ambassador

Seventh Digit	Engine
A	199" OHV 6, 1 Bbl.
E	232" OHV 6, 1 Bbl.
G	232" OHV 6, 2 Bbl.

1971-73

Fourth Digit	Model
0	Hornet
1	Matador
4	Gremlin
7	Javelin
8	Ambassador

Seventh Digit	Engine
A	258" OHV 6, 1 Bbl.
E	232" OHV 6, 1 Bbl.

CAR MODEL SERIES

Car model series and body style is a four digit number as follows: First two digits are model year designation. Second two digits are body style based on a basic code for each series as listed in table.

1965-73 199", 232", 258" OHV 6 CYL. ENGINES (Cont.)

Series 1965-67	Basic Code
American	01
Classic or Rebel	10
Marlin	50
Ambassador	80

Series 1968-69	Basic Code
Rambler	01
Rebel	10
AMX	30
Javelin	70
Ambassador	80

Series 1970	Basic Code
Hornet	01
Rebel	10
AMX	30
Javelin	70
Ambassador	80

Series 1971-73	Basic Code
Hornet	01
Madator	10
Gremlin	40
Javelin	70
Ambassador	80

ENGINE NUMBER

1965-69 – Engine number code is stamped on a pad on upper left front corner of cylinder block adjacent to distributor.

1970-73 – Engine number is located on a pad between number two and three cylinders on cylinder block.

The letter contained in code number identifies engine by C.I.D. In later models it also denotes carburetor type, and compression ratio.

1965-69

Code	CID
J	199" OHV
L	232" OHV

1970

Code	CID	Carb.	Comp. Ratio
A	199"	1-Bbl.	8.5-1
E	232"	1-Bbl.	8.5-1
G	232"	2-Bbl.	8.5-1

1971-73

Code	CID	Carb.	Comp. Ratio
A	258"	1-Bbl.	8.0-1
E	232"	1-Bbl.	8.0-1

SPECIAL ENGINE MARKS

First Type Code (Early Engines) - A three letter code stamped on a boss directly above oil filter indicates special equipment or deviations from standard specifications as follows:

First Letter	Size of Bore
Second Letter	Size of Main Bearings
Third Letter	Size of Connecting Rod Bearings
Letter "A"	Standard
Letter "B"	.010" Undersize
Letter "C"	.010" Oversize

Second Type Code (Late Engines) - A single or two letter code stamped on a boss directly above oil filter indicates special equipment or deviations from standard specifications as follows:

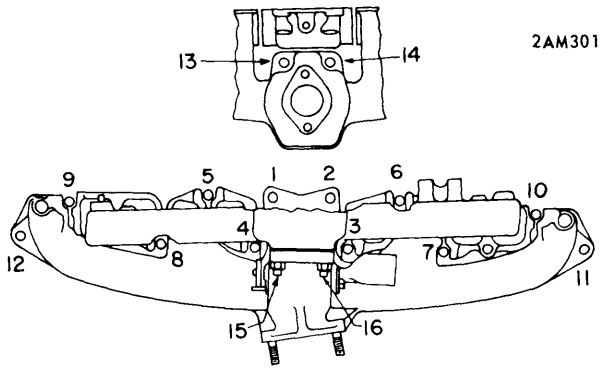
Letter "B"	Cylinder Bore .010" Oversize
Letter "C"	Camshaft Block Bores .010" Oversize
Letter "M"	Main Bearings .010" Undersize
Letter "P"	Rod Bearings .010" Undersize
Letters "PM"	Main & Rod Bearings .010" Undersize

ENGINE REMOVAL

See Engine Removal at end of ENGINE Section.

INTAKE MANIFOLD

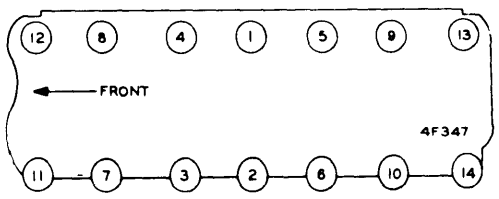
Installation – Assemble two manifolds (intake and exhaust) and tighten retaining nuts finger tight. Install new intake manifold gasket on cylinder head and install manifold assembly. Tighten manifold nuts and bolts to specification in sequence shown in illustration.



INTAKE MANIFOLD TIGHTENING SEQUENCE

CYLINDER HEAD INSTALLATION

Use sealing compound on both sides of head gasket and install gasket with "Top" up. Threads of bolt number 11 must be coated with sealer to prevent coolant leakage. Tighten bolts to correct specifications in sequence shown in diagram while engine is cold, then retighten with engine at normal operating temperature. *NOTE - Follow same procedure with special gasket used on 232" Engines with "Engine Mod".*



CYLINDER HEAD TIGHTENING

1965-73 199", 232", 258" OHV 6 CYL. ENGINES (Cont.)

VALVES

Engine & Valve		Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift
All 1965	Int.	1.787"	29°	30°	.050-.075"	.3715-.3725"	.001-.003"	.381"
	Exh.	1.406"	44°	45°	.060-.075"	.3715-.3725"	.001-.003"	.381"
All 1966-67	Int.	1.787"	29°	30°	.050-.075"	.3715-.3725"	.001-.003"	.381"
	Exh.	1.406"	44°	45°	.040-.060"	.3725-.3725"	.001-.003"	.381"
All 1968-70	Int.	1.787"	29°	30°	.050-.075"	.3715-.3725"	.001-.003"	.381"
	Exh.	1.406"	44°	44°	.040-.060"	.3715-.3725"	.001-.003"	.381"
All 1971-72	Int.	1.787"	29°	30°	.050-.075"	.3715-.3725"	.001-.003"	.381"
	Exh.	1.406"	44°	44 1/2°	.040-.060"	.3715-.3725"	.001-.003"	.381"
All 1973	Int.	1.787"	29°	30°	.040-.060"	.3715-.3725"	.001-.003"	.372"
	Exh.	1.406"	44°	44 1/2°	.040-.060"	.3715-.3725"	.001-.003"	.372"

VALVE ARRANGEMENT

E-I-I-E-I-E-E-I-E-I-I-E.

VALVE TAPPET CLEARANCE

All ..... Zero Lash, Hydraulic

VALVE GUIDE SERVICING

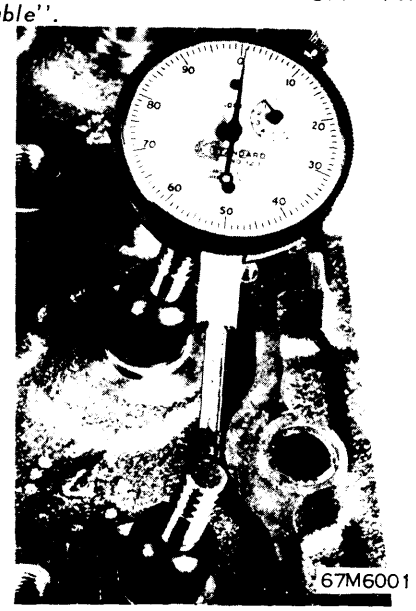
Valve guides are integral with head and have an inner dimension of .3735-.3745" for both intake and exhaust. When the stem-to-guide clearance is excessive, use valve with oversize stem. Use Reamer J-6042-1 (.003" oversize); J-6042-5 (.015" oversize); J-6042-4 (.030" oversize).

VALVE STEM SEALS

Rubber deflector on valve stem on all valves.

CHECKING VALVE STEM CLEARANCE

Use dial indicator to measure sideplay at end of valve stem with valve 1/16" off its seat. *See "Valve Specification Table".*



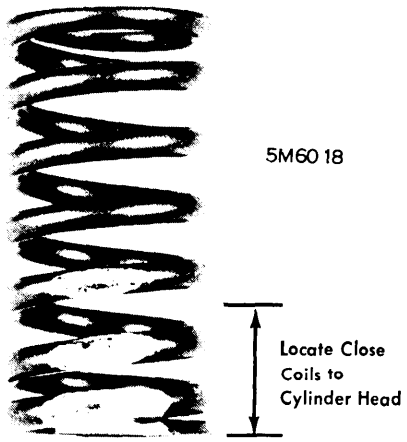
CHECKING VALVE STEM CLEARANCE

VALVE SPRINGS

Engine	Free Length	PRESSURE (LBS.) Valve Closed	PRESSURE (LBS.) Valve Open
All 1965	2 13/64"	85-91@ 1 13/16"	150-160@ 1 7/16"
All 1966-73	2 17/64"	95-105@ 1 13/16"	188-202@ 1 7/16"

VALVE SPRING INSTALLED HEIGHT

Measure from spring seat on cylinder head to underside of valve spring retainer. *See "Valve Closed" spring length in specification table.*



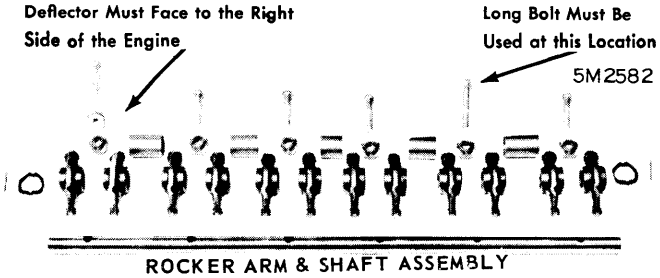
CORRECT VALVE SPRING POSITION

1965-73 199", 232", 258" OHV 6 CYL. ENGINES (Cont.)

ROCKER ARM ASSEMBLY

1965-72

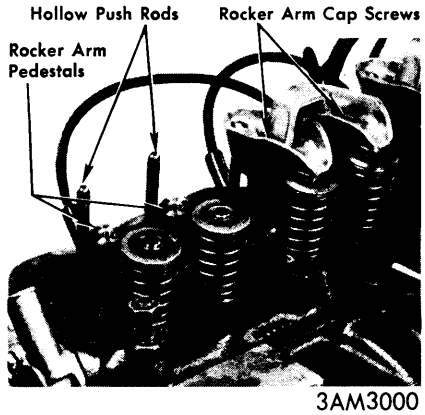
See illustration for arrangement of parts. When installing, lubricating holes in shafts must be down toward cylinder head.



ROCKER ARM & SHAFT ASSEMBLY

1972-73

Rocker arm assembly consists of stamped rocker arms, bridged pivot assemblies and rocker arm cap screws (see illustration).

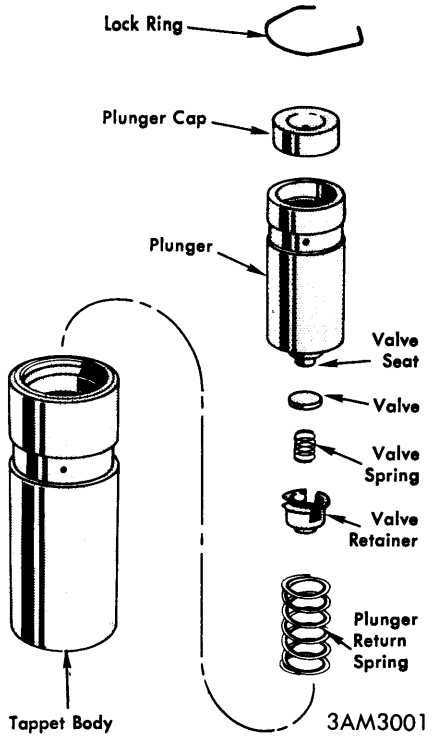


ROCKER ARM ASSEMBLY

HYDRAULIC VALVE LIFTERS

See illustration for arrangement of parts.

Testing - Fill lifter body with kerosene and assemble lifter without snap ring. Check leakdown rate with suitable tester. Normal lifter should require 10-45 seconds to leak down when filled with kerosene (.125" travel with 50 lb. load).



HYDRAULIC VALVE LIFTER ASSEMBLY

Installation - Install lifters **without** an oil charge. They will fill themselves after 3-8 minutes of engine operation.

PISTONS, PINS, RINGS

Engine	PISTONS	PINS		RINGS		
	① Clearance	Piston Fit	Rod Fit	Ring	End Gap	Side Clearance
All						
1965	② .0009-.0025"	.0003-.0005"	Press Fit	Comp. Oil	.010-.020" .015-.055"	.0015-.0035" .000-.005"
1966-67	.0003-.0009"	.0003-.0005"	Press Fit	Comp. Oil	.010-.020" .015-.055"	.0015-.0035" .000-.005"
1968-71	.0005-.0013"	.0003-.0005"	Press Fit	Comp. Oil	.010-.020" .010-.055"	.0015-.0035" .000-.005"
1972-73	.0009-.0017"	.0003-.0005"	Press Fit	Comp. Oil	.010-.020" .010-.025"	.0015-.003" .001-.008"

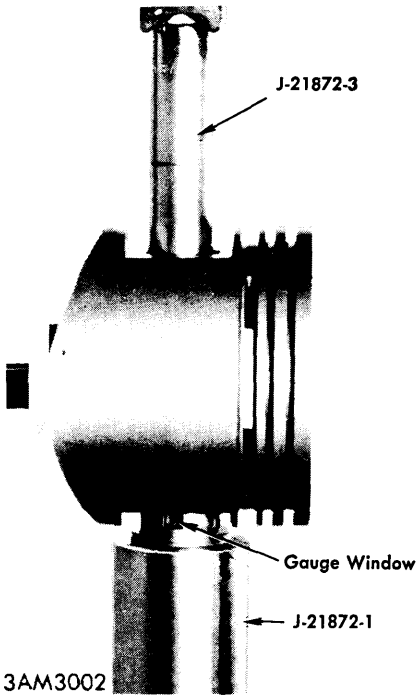
① – Measured at top of skirt.
② – Measured at centerline of piston.

1965-73 199", 232", 258" OHV 6 CYL. ENGINES (Cont.)

PISTON PIN REPLACEMENT

Piston pin must be tight press fit in connecting rod.

Removal - Use a suitable tool set (J-6360 or J-21872), and an arbor press. Place piston in remover support so pin will enter support when pressed out with piloted driver. **Installation** - Place piston pin pilot in support, insert piston and connecting rod to align piston and connecting rod pin bores. Press piston pin into rod (using a minimum of 2000 lbs. pressure) until lower pilot bottoms in support. Pin must be centered in rod ± 1/32".



PISTON PIN REMOVAL AND INSTALLATION

PISTON RING INSTALLATION

For service ring replacement, follow instructions in ring package.

PISTON & ROD INSTALLATION

Notch or indentation in piston head must face toward front of engine and cylinder number on rod and bearing cap together face toward right or camshaft side of engine (oil squirt hole in rod on same side.)

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

	MAIN BEARINGS				CONNECTING ROD BEARINGS		
Engine	Journal Diam.	Clearance	Thrust Bearing	Crankshaft Endplay	Journal Diam.	Clearance	Sideplay
All							
1965-66	2.4988-2.4995"	.001-.002"	No. 3	.003-.007"	2.0948-2.0955"	.001-.002"	.008-.010"
1967-71	2.4981-2.5001"	.001-.002"	No. 3	.0015-.007"	2.0934-2.0955"	.001-.002"	.008-.010"
1972-73	2.4981-2.5001"	.001-.002"	No. 3	.0015-.0065"	2.0934-2.0955"	.001-.002"	.005-.014"

OIL PAN REMOVAL

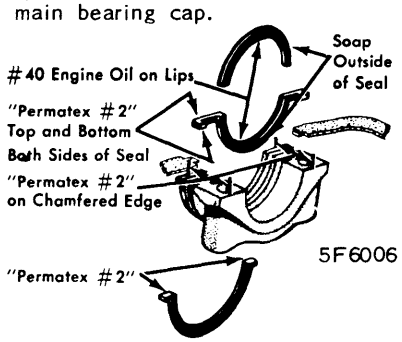
See Oil Pan Removal at end of ENGINE Section.

MAIN BEARINGS

Main bearings are selective fit. Bearings are available in .001", .002", .010" and .012" undersize. It is permissable to use one half of a standard bearing in combination with one half of a .001" undersize bearing to obtain proper clearance. Bearing and journal clearance should be checked using Plastigage (or equivalent) and the measurement checked against specification. When checking main bearing clearance with engine in vehicle, all bearings, other than the one being checked, should be torqued to specification. Crankshaft should be supported by a jack placed under counterweight, adjacent to bearing being checked. The surface of the crankshaft journal and bearing should be wiped clean before using plastic gauging material to measure bearing clearance.

CRANKSHAFT REAR OIL SEAL REPLACEMENT

Upper and lower seals may be replaced without removing crankshaft. Lip of seals when installed must face front of engine. Lubricate main bearing and seal with engine oil. *NOTE* - Tongue of oil pan gasket must be inserted into main bearing cap and oil pan rear seal must be completely seated in main bearing cap.



REAR MAIN BEARING OIL SEAL

CRANKSHAFT FRONT SEAL REPLACEMENT

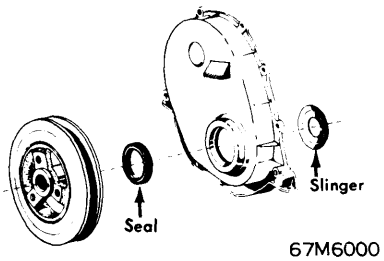
Remove belts, fan blades and pulley, and remove vibration damper. Use Tool J-9256, which threads into front seal and has a center screw which pushes against end of crankshaft to pull seal. Clean recess in cover and coat new seal with a thin film of sealer, then use Tool J-22248, which has a

1965-73 199", 232", 258" OHV 6 CYL. ENGINES (Cont.)

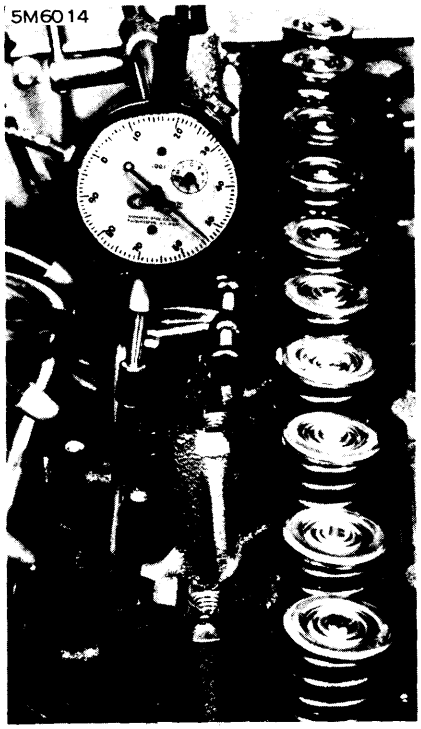
center screw that threads into end of crankshaft, and a nut to push seal into position. Put a light film of oil on seal lip before installing vibration damper. Seal lip should face rear of engine.

ENGINE FRONT COVER REPLACEMENT

When removing cover, raise cover and pull oil pan front gasket up enough to pull retaining nibs from holes in cover so that gasket remains on lip of oil pan. Use razor blade to cut off gasket flush with front face of block. Install new gasket and cut off tab to match original gasket. To prevent seal damage, install vibration damper through new seal in cover to center cover, then tighten cover screws.



ENGINE FRONT COVER



CHECKING CAM LIFT

CAMSHAFT

Engine & Year	Bearing Clearance	Camshaft Endplay	Camshaft Lobe Lift
199" 1965-70	.001-.003"	①	.254" Int. .254" Exh.
232" & 258" 1965-73	.001-.003"	①	.254" Int. .254" Exh.

① - No play during engine operation.

CAMSHAFT & BEARING

Camshaft bearings are step-bored (largest at front, smallest at rear), for easy removal and installation of camshaft.

CAMSHAFT END THRUST

Helical distributor drive gear creates a load which holds the camshaft sprocket thrust face against the cylinder block. Therefore, camshaft endplay is zero during engine operation.

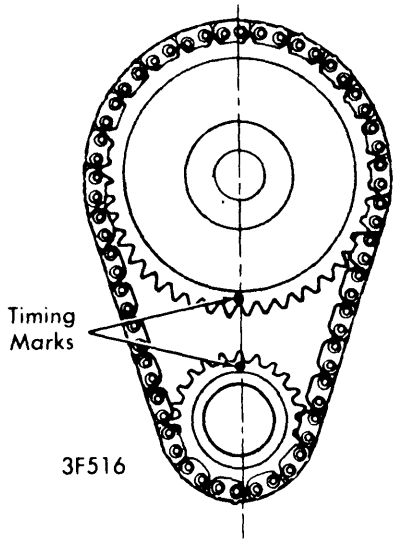
CHECKING CAM LOBE LIFT

Check with dial indicator to specifications listed in "Camshaft" Specification Table.

► *1965 VALVE TIMING MARK LOCATION NOTE:* Valve timing mark on camshaft sprocket is an integral part of die casting, and is pointer shaped. DO NOT use circular depression on nylon covering over gear teeth as a timing mark.

CHECKING VALVE TIMING

Locate #6 piston on TDC in firing position. Rock crankshaft back and forth. If timing is properly set, #1 exhaust valve should start to open before the TDC mark on vibration damper lines up with pointer. Note this distance. #1 intake valve should start to open an equal distance after pointer passes the TDC mark. Replace timing chain if over ½" deflection exists.



VALVE TIMING MARKS

1965-73 199", 232", 258" OHV 6 CYL. ENGINES (Cont.)

ENGINE NOTES

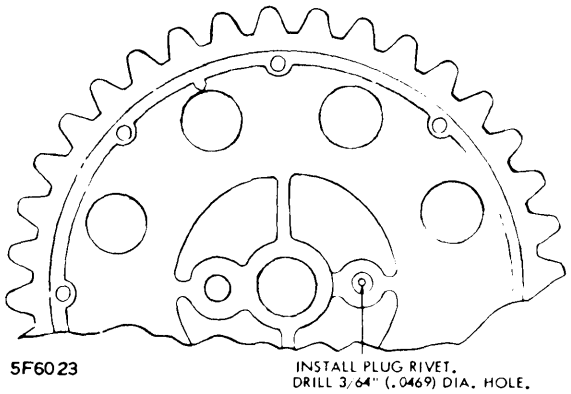
►*1964-65 TIMING CASE COVER-OIL PAN GASKET REPLACEMENT NOTE:* Gasket now has seven nibs, and timing case cover has seven holes in lower flange to accommodate gasket. If new gasket used with early cover, cut two unused nibs off flush. If early gasket used with new type cover, fill two unused holes in cover to prevent possible oil leakage.

►*1972 6 CYLINDER ENGINES WITH NON-HARDENED PUSH RODS:* When encountering worn push rods on any 6 Cyl. engine built prior to Engine Code 412 (A or E) 01-7200 Series, it is recommended that all push rods be removed and inspected for evidence of hardening. Push rods which have been hardened can be identified by a bluish-black discoloration at each end. Replace any push rod which is not discolored (hardened) at each end.

►*1972 MID YEAR PRODUCTION CHANGE IN ROCKER ARM ASSEMBLIES:* Six cylinder engines with engine code 502 (A or E) 07 or later, have stamped rocker arms and bridged pivot assemblies.

►*1965 VALVE TIMING MARK LOCATION NOTE:* Valve timing mark on camshaft sprocket is an integral part of die casting, and is pointer shaped. DO NOT use circular depression on nylon covering over gear teeth as timing mark. *See timing mark location illustration on Page 5-20.*

►*1965 ENGINE CLICKING NOISE CORRECTION:* Clicking noise at idle speed or slightly above idle speed which stops as engine RPM increases may not be a lifter noise. Sound comes from right side of engine near distributor mounting area, and may be caused by fluctuation of oil pump pressure relief valve plunger. To correct, install Carburetor Plug Rivet, No. 3203805 in camshaft sprocket lubrication outlet. *See illustration.*



RIVET PLUG LOCATION

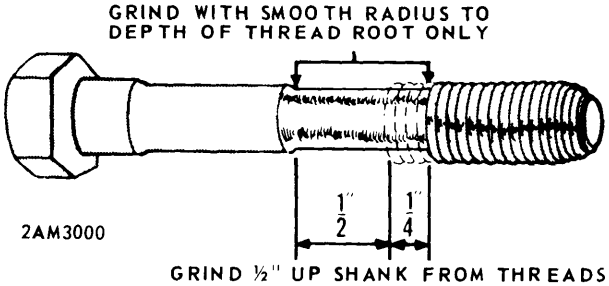
►*1966 232" ENGINE CONNECTING ROD CHANGE:* A new, heavier connecting rod is being used on all 232" engines beginning with Engine Date Code **710 L 21**. Part No. for new rod is 3180444. Old rod Part No. is 3172341. When replacing a connecting rod, engine date code must be checked to be sure the correct rod is installed. Use of wrong rod will cause engine unbalance.

►*1966 199" & 232" ENGINE NOISE CORRECTION:* Noise is similar to a connecting rod knock, and usually occurs when opening throttle quickly while engine is between 600 and 900 RPM, with alternator and accessory drive belts tightened to specifications. Knock may also be heard at 50 MPH under light acceleration. For test purposes, noise will be eliminated by shorting out No. 1 spark plug. Correct by installing suitable undersize bearings in front main bearing to reduce clearance to .001-.002". Effective with Engine Code No. **805 (J & L) 17**, all 199" and 232" engines have a .001" undersize lower main bearing in the front main bearing location. The upper bearing remains standard size.

►*1966 199" & 232" ENG. INTAKE MANIFOLD GASKET CAUTION:* *Never install a composition type intake manifold to cylinder head gasket on an engine which originally was assembled with a metal gasket because the exhaust manifold will not shift with the intake manifold to effect a leak proof seal at the exhaust ports. Upon installation of a replacement manifold to cylinder head gasket, it is extremely important that the exhaust to intake manifold stud nuts be left finger tight until the manifold to cylinder head bolts and stud nuts are tightened to specified torque of 20-25 ft. lbs.*

►*1967 ENGINE CRANKSHAFT BEARING IDENTIFICATION NOTE:* Connecting rod and main bearing inserts may be identified by a color code on one edge of insert. Yellow is standard size. Black is .001" undersize. Green is .002" undersize. Red is .010" undersize. Bearing inserts without color code will have size stamped on steel back.

►*1964-68 – 199-232" 6 CYL. SLUDGE ACCUMULATION, BLOCKING OIL FLOW TO VALVE ROCKER ARM ASSEMBLY CORRECTION:* The following modification will reduce sludge formation at the point where the cylinder head cap screw intersects the transfer line. Remove third from rear cylinder head cap screw and second from rear rocker arm shaft-to-pedal cap screw. Insert a stiff wire into oil transfer line and cylinder head cap screw hole to loosen accumulated sludge, then clean out with compressed air. Modify cylinder head cap screw as shown in illustration, being sure to make a radius at ends of undercut. Reinstall rocker arm shaft-to-pedestal cap screw and cylinder head cap screw. Tighten to 20-23 ft. lbs. torque and 80-85 ft. lbs. torque respectively.



CYLINDER HEAD CAP SCREW MODIFICATION

1965-73 199", 232", 258" OHV 6 CYL. ENGINES (Cont.)

ENGINE OILING

Crankcase Capacity – 4 quarts; 5 quarts with filter change.

Oil Filter Replacement – Replace every 4000 to 6000 miles. When installing, tighten only by hand.

Oil Pressure – 13 lbs. minimum at 600 RPM, 60 lbs. maximum on 1965 through early 1967 engines. 75 lbs. maximum on late 1967 and 1968-73 engines.

PRESSURE REGULATOR VALVE

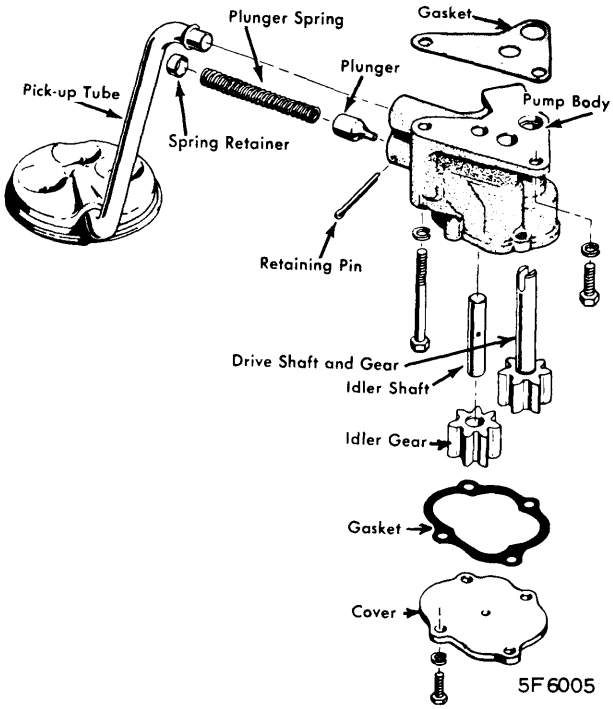
Located in pump body. Not adjustable.

ENGINE OILING SYSTEM

Gear type pump mounted internally on right side of crankcase. Oil is drawn from oil pan through a fixed strainer and delivered to main oil gallery on right side of engine crankcase. Pressure regulator valve is located in pump body.

OIL PUMP

Oil pump is driven by distributor drive shaft. Removal of pump will not affect ignition timing, as distributor gear remains meshed with camshaft gear. With pump cover and gasket removed, gears should project .000-.004" above pump body for proper clearance. A clearance of .0005-.0025" should exist between the gears and the wall of the gear cavity opposite point of gear mesh. *CAUTION - Do not disturb location of pickup tube in pump body unless absolutely necessary.* If tube is removed, it is advisable to replace with a new tube assembly. Use a film of sealer around the new tube and drive tube into body while keeping bracket aligned. *NOTE - Pump cover should be installed with pump out of engine so that pump can be checked for free rotation of gears.*



OIL PUMP ASSEMBLY

TIGHTENING SPECIFICATIONS

Application	ALL ENGINES	Ft. Lbs.
Cylinder Head	(1965-72)	80-85
	(1973)	105
Intake Manifold		20-25
Exhaust Manifold		20-25
Oil Pan -	1/4"	7-8
	5/16"	10-12
Main Bearing Caps		75-85
Connecting Rod Caps		27-30
Flywheel		100-110
Vibration Damper	(1965-68)	70-80
	(1969-73)	50-60
Camshaft Sprocket		50-55
Rocker Arm Assembly Screws		20-23
Rocker Arm Cover		*45-55 inch lbs.*
Engine Front Cover		4-6
Thermostat Housing		10-15
Water Pump		10-15
Oil Pump Cover		8-12
Oil Pump Screws -	(Long)	15-18
	(Short)	8-12
Trans.-to-Converter Housing		17-22
Clutch Housing-to-Block	(1965-68 Top)	28-33
	(1965-68 Bottom)	40-45
	(1969-73 Top)	25-28
	(1969-73 Bottom)	40-45
Drive Plate-to-Converter		30-35
Drive Plate-to-Crankshaft		100-110
Engine Rear Support-to-Case	(1964-68)	30-35
	(1969-73)	35-45