1970-72 CAPRI 1600 CC 4 CYLINDER

GENERAL SPECIFICATIONS

Year	Displ. cu. ins.	Displ. cc	Carburetor	HP at RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore in.	Bore mm	Stroke in.	Stroke mm
1970	97.5	1598	1-Bbl.	70.5@5000	.....	8.0-1	3.188	80.98	3.056	77.62
1971	97.5	1598	1-Bbl.	75.0@5000	.....	8.0-1	3.188	80.98	3.056	77.62
1972	97.5	1598	1-Bbl.	.....	.....	7.5-1	3.188	80.98	3.056	77.62

ENGINE IDENTIFICATION

The second series of digits of vehicle identification number, located on a plate riveted to top of right fender apron, indicates engine type.

Capri Engine	Engine Code
1600 cc (1970)	L1
1600 cc (1971-72)	L4

ENGINE REMOVAL

1) Remove hood, disconnect battery cable and ground wire. Drain cooling system, remove radiator and all hoses. Disconnect hot air pipe at air cleaner and exhaust manifold, remove pipe and air cleaner.

2) Disconnect temperature gauge, oil pressure gauge and alternator wires from sending units and alternator. Disconnect throttle linkage, and fuel intake line from fuel pump. Disconnect all ignition wires from distributor, coil, spark plugs and remove distributor cap.

3) Remove starter and clutch housing lower bolts and remove cover. Remove clutch housing to engine bolts. Install suitable lifting brackets to engine and support engine with lifting tackle.

4) Remove oil pan shield if fitted.

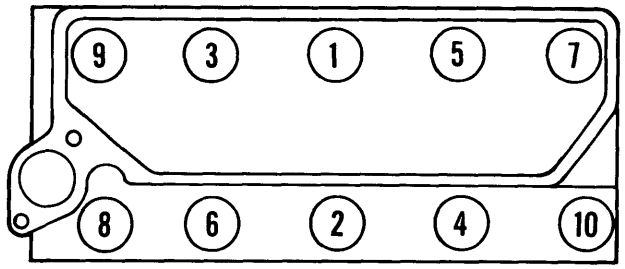
5) Disconnect engine mountings from front crossmember, and suitably support transmission. Pull engine forward off main drive gear and lift engine from vehicle.

INTAKE MANIFOLD REMOVAL

1) After draining cooling system, remove air cleaner and disconnect throttle shaft from carburetor. Disconnect fuel line, decel valve pipe and vacuum line from carburetor.

2) Remove thermostatic spring and water housing.

3) Disconnect water outlet hose and crankcase ventilation hose from intake manifold. Remove attaching nut and bolts and remove manifold.



CYLINDER HEAD TIGHTENING SEQUENCE

CYLINDER HEAD REMOVAL

1) After draining cooling system, disconnect hot air and crankcase ventilation hoses at air cleaner. Remove air cleaner and disconnect fuel line at carburetor and fuel pump.

2) Disconnect hoses at intake manifold and choke housing. Disconnect temperature gauge wire at sender unit.

3) Disconnect exhaust pipe and disconnect throttle linkage and distributor vacuum advance pipe from carburetor.

4) Remove thermostat, rocker arm cover and gasket. Remove rocker arm shaft bolts evenly and remove rocker arm assembly. Remove push rods and keep them in correct order for proper replacement.

5) Remove head bolts and remove head and gasket. *CAUTION — Do not lay head flat on its face as damage to spark plugs or gasket surface can occur.*

VALVES

Engine & Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift
1600 cc							
Int.	1.497"	45°	44°	.050-.070"	.3098-3105"	.0008-.0027"	.2967"
Exh.	1.240"	45°	44°	.065-.085"	.3089-.3096"	.0027-.0036"	.3199"

VALVE ARRANGEMENT

E-I-I-E-E-I-I-E

VALVE GUIDES

Valve guides may be either integral in head or installed in head as individual units. In either case, bores may be reamed to .003" or .015" oversize and valves with .003" or .015" oversize stems installed. *NOTE — Intake valves are aluminized and must not, under any circumstances be faced, ground or lapped in. Replace intake valves that are burned or pitted.*

VALVE SEALS

Insert valve into guide and fit rubber seal to valve stem with open end to head. Seal is retained by a snap ring over valve guide boss.

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VALVE SPRING ASSEMBLED HEIGHT

Valve spring installed height is measured from valve spring pad to bottom of retainer. Assembled height should be 1.263". If not correct, valve spring shims may be installed to obtain correct height. If correct height not obtained with 1/16" shim, replace valve.

ROCKER ARM ASSEMBLY

Removal & Disassembly – Remove rocker arm shaft attaching bolts evenly, lift off assembly. Remove cotter pin from one end of shaft, slip flat washer, crimped washer and second flat washer off shaft. Rocker arm shaft supports, rocker arms and springs can now be removed from shaft.

Reassembly & Installation – In proper sequence, place shaft supports, rocker arms and springs on shaft. Bolt hole in the rocker arm shaft support must be on same side as tappet screw in rocker arm. Rocker arms are right and left handed, rocker pads being inclined towards support. Place assembly on cylinder head and tighten bolts evenly in sequence, until proper torque (see tightening specifications) has been obtained.

VALVE TAPPET ADJUSTMENT

Adjust valve tappet clearance to following specifications:

Valve	Hot	Cold
Intake	.010"	.008-.010"
Exhaust	.017"	.018-.020"

Adjusting Procedure – Turn crankshaft until valves listed in first column of following table are fully open. Then adjust valves listed in second column of table.

Valves Open	Adjust Valves
1 & 6	3 & 8
2 & 4	5 & 7
3 & 8	1 & 6
5 & 7	2 & 4

VALVE SPRINGS

Engine	Free Length	PRESSURE (LBS.)	
		Valve Closed	Valve Open
1600 cc	1.48"	47.5-52.5 @ 1.263"	117.5-127.5 @ .995"

PISTONS, PINS, RINGS

Engine	PISTONS ①Clearance	PINS		Rings	RINGS	
		Piston Fit	Rod Fit		End Gap	Side Clearance
1600 cc (1970-71)	.0013-.0019"	.0001-.0003"	.0001-.0003"	Comp. Oil	.009-014" .009-.014"	.0016-.0036" .0018-.0038"
1600 cc (1972)	.0016-.0012"	.0001-.0003"	.0001-.0003"	Comp. Oil	.009-.014" .009-.014"	.0016-.0036" .0018-.0038"

① – Measured at 2.31" (1970-71), 2.25" (1972) from piston crown at 90° to pin bore.

OIL PAN REMOVAL

1) Drain oil and remove oil dipstick. Disconnect battery and throttle linkage (at carburetor).

2) Jack up front end of car and place stands under car. Place a jack under transmission.

3) Remove engine front mounting bolts.

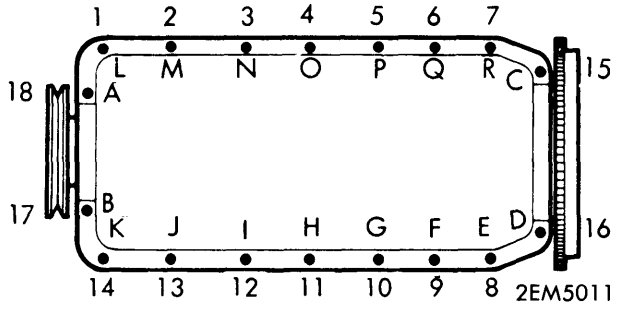
4) Remove oil pan shield if fitted.

5) Remove three bolts and withdraw starter.

6) Remove oil pan bolts and remove oil pan.

7) Remove oil filter element and pick-up tube screen assembly.

8) Reinstall oil pan: Position cork packing strips with chamfered ends into grooves, using a suitable sealer. Place oil pan in position and tighten bolts evenly to 7-9 ft. lbs. following alphabetical, and then numerical sequences (see illustration).



OIL PAN BOLT TIGHTENING SEQUENCE

CONNECTING ROD NUMBERS

Rod number is stamped on lower end of rod and its bearing cap, on camshaft side. When a piston and rod assembly is installed with numbers together it will be in its original position

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in engine assembly. It is advisable, when removing piston and rod assemblies, to be sure each rod is stamped. Stamp any rod without a cylinder number on it.

PISTON PIN INSTALLATION

After correctly installing piston rings on pistons, assemble piston to connecting rod. Be sure that "Front" marking on rod is on same side of assembly as arrow in piston crown. Heat piston in water or oil prior to inserting piston pin. Retain piston pin with snap rings.

FITTING PISTONS

1) Measure cylinder bore 2 11/32" from top face of cylinder block, across the axis of crankshaft.

2) Check piston clearance in bore by inserting a 1/2" wide feeler gauge .002" thick attached to a spring scale into cylinder bore the full length of blade. Slide piston, crown first, into cylinder and trap feeler gauge at largest diameter of piston.

3) Hold piston steady (without side thrust) and withdraw feeler blade with a steady pull on piston pull scale, observing pounds pull required to remove feeler blade. If piston clearance is correct, 7 to 11 lbs. pull will be required to withdraw feeler blade.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

	MAIN BEARINGS				CONNECTING ROD BEARINGS		
Engine	Journal Diam.	Clearance	Thrust Bearing	Crankshaft Endplay	Journal Diam.	Clearance	Sideplay
1600 cc①	2.1253-2.1261"	.0005-.0015"	No. 3	.003-.011"	1.9368-1.9376"	.0004-.0015"	.004-.010"

① – Red main bearing inserts 2.1253-2.1257" and blue inserts 2.1257-2.1261".

MAIN BEARING

Crankshaft is supported by five main bearings. Intermediate and rear bearing caps are identical, but their positions must not be interchanged. When disassembling an engine, make sure that bearing caps are numbered (with exception of rear bearing). Rear main cap is not numbered. All caps must be fitted with cast arrows pointing forwards.

Measuring – Use Plastigage to determine crankshaft clearance in bearing. If bearing clearance using standard bearings is excessive, a .002" undersized bearing may be used in combination with a standard bearing. If .002" undersized bearings are used on more than one journal, they must be positioned on cylinder block rather than in bearing cap. If the standard and .002" undersize combination does not bring bearing clearance within specified limits (see specifications), crankshaft will have to be refinished and undersize bearings installed.

REAR MAIN BEARING OIL SEAL

1) Remove transmission, clutch pressure plate and flywheel. Remove oil pan (See Oil Pan Removal). Remove rear oil seal retainer.

2) Install new seal in carrier using a suitable remover/replacer tool (Ford T70P-6165).

3) With a new gasket on carrier, use a suitable gasket compound at ends and fit carrier to block rear face. Use remover/replacer tool to align seal on crankshaft seal surface. With tool in place, tighten carrier bolts evenly and remove tool. Replace oil pan, using new gaskets and gasket compound.

ENGINE FRONT COVER & OIL SEAL

1) Drain cooling system, disconnect radiator hoses at engine and remove radiator. Remove fan belt, fan and water pump pulley.

2) Remove water pump, then use a suitable puller and remove crankshaft pulley. Remove front cover.

3) The oil level dipstick tube is pressed into front cover and its upper end must be 4.90" vertically above bottom face of front cover.

4) Install new oil seal in cover using suitable tool. When replacing front cover, align the cover to cylinder block with an aligning tool. Tighten cover bolts evenly and then remove aligning tool.

CAMSHAFT

Engine	Journal Diam.	Clearance ①	Lobe Lift
1600 cc	1.5597-1.5605"	.0010-.0023"	Int. .2108" Exh. .2176"

① – End play .0025-.0075"

CAMSHAFT & TIMING CHAIN

Camshaft – Engine must be removed from vehicle to replace camshaft bearings or camshaft (See Engine Removal). Replacement of camshaft or bearings requires that front and rear crankshaft oil seals also be replaced. Use suitable bearing remover/replacer tool and adapters to install new bearings. The splits in new bearings should be upwards and outwards at 45° to the vertical. Front and rear bearings are approximately 3/4" wide, front having an additional oil hole for rocker arm shaft oil feed, and center bushing is approximately 5/8" wide.

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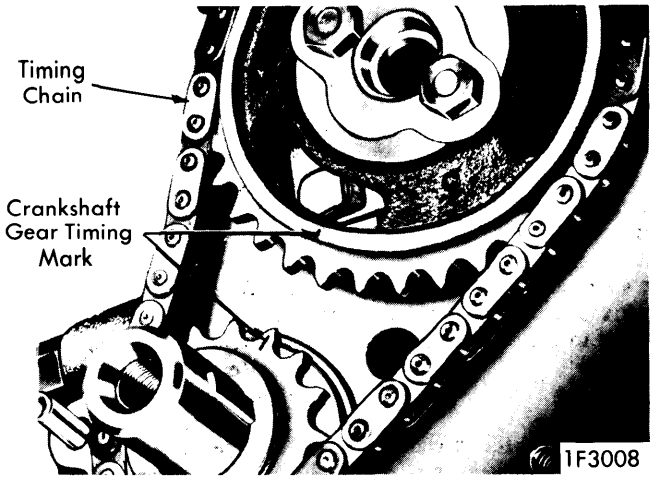


CORRECT POSITION – VALVE TIMING MARKS

Timing Chain – Single row, with automatic mechanical tensioner. Tensioner has synthetic rubber pad that runs directly on rollers of chain. *NOTE – Do not dress surface of pad to remove grooves worn in by chain links.* Camshaft and crankshaft sprockets have timing marks indented in face of sprocket. When replacing timing chain, be sure timing marks are correctly aligned (see illustration). Install new crankshaft front oil seal in front engine cover before replacing cover.

VALVE TIMING				
	INTAKE		EXHAUST	
Engine	Open (BTDC)	Close (ABDC)	Open (BBDC)	Close (ATDC)
1600 cc	.010" @ 17°	.010" @ 51°	.017" @ 51°	.017" @ 17°

CHECKING CAM LOBE LIFT

Check lift of each camshaft lobe in consecutive order as follows:

1) Remove rocker arm shaft assembly, making sure each push rod is in valve lifter socket. Install a dial indicator so that ball socket adapter of indicator rests on the end of push rod and in same plane as push rod movement.

2) With an auxiliary starter switch connected to starter solenoid and ignition switch "OFF", bump crankshaft until tappet is on base circle of camshaft lobe. This will be push rods lowest point.

3) Zero dial indicator and continue to rotate crankshaft until push rod is in fully raised position (highest indicator reading). Compare total lift from indicator readings with specifications.

4) To check accuracy of indicator readings, continue to rotate crankshaft until indicator reads zero. If lift on any lobe is .005" less than specifications, camshaft and tappet operating on worn lobe must be replaced.

ENGINE OILING

Type System – Full force feed with full-flow oil filter.

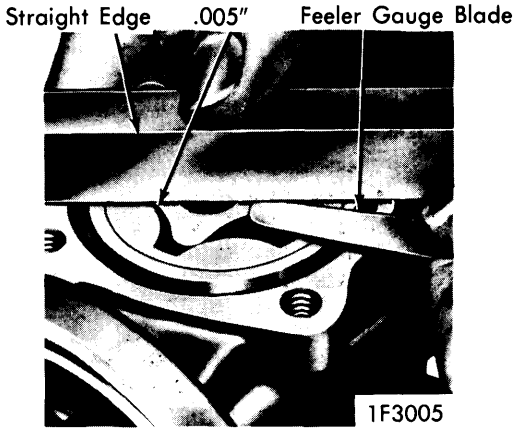
Crankcase Capacity – 3 qts. Add 1/2 qt. with filter change.

Oil Pressure Relief Valve – Non-adjustable.

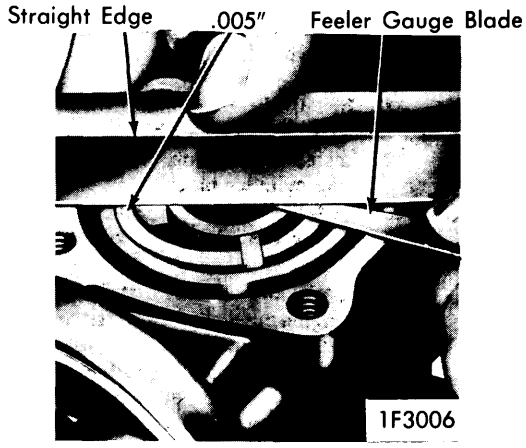
Oil Pressure (Hot) – 35-40 lbs. @ 2000 RPM.

OIL PUMP

Two types of pumps are used in production; a "vane-type", and an "eccentric bi-rotor type". Pumps are directly interchangeable, differing only in their internal design. Pumps may be identified on engine by difference in their end covers. The eccentric bi-rotor has four recesses cast in cover, vane type being flat. Either type may be removed with engine in place by removing three bolts attaching oil pump and filter assembly and with-drawing assembly from engine.



CHECKING ROTOR END FLOAT



CHECKING VANE & ROTOR END FLOAT

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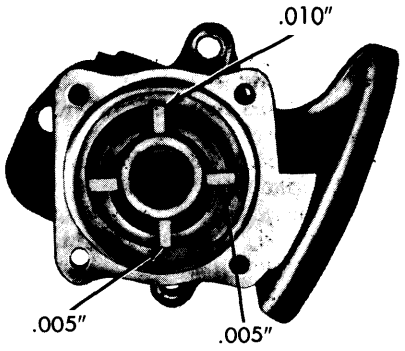
ENGINE OILING (Cont.)



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CHECKING VANE CLEARANCES

Oil Pump Specifications – Rotor Type

Max. Clearance, Inner & Outer Rotors	.006"
Max. Clearance, Outer Rotor-to-Housing	.010"
Max. Clearance, Face of Rotors-to-Face of Housing	.005"
Relief Valve Spring Tension @ 1.04"	7.8-8.5 lbs.
Clearance, Shaft-to-Housing Bearing	.0015-.0030"
Clearance, Relief Valve	.001-.003"
End Clearance, Rotor Assembly	.001-.004"
Clearance, (Radical) Outer Race-to-Housing	1005-.075"

Oil Pump Specifications – Vane Type

Max. Clearance, Face of Rotor & Vanes-to-Housing Face	.005"
Max. Clearance, Side of Rotor-to-Side of Housing	.005"
Max. Clearance, Vane-to-Pump Body	.010"
Max. Clearance, Vane-to-Side of Locating Groove	.005"

ENGINE COOLING

System Capacity – 6 3/4 qts.

Thermostat – Opens 183-190°F.

Pressure Cap – 13 psi.

WATER PUMP

Parts are available for overhaul or repair of water pump. Procedure (with pump removed) is as follows:

Disassembly – 1) Position pump assembly in an arbor press (see illustration) and using suitable holding tool press shaft from hub. Work through access opening in housing, pull bearing retainer clip out of housing.

2) Use arbor press and a deep socket having an OD slightly smaller than OD of bearing and press bearing and impeller from housing. Discard seal and bearing assembly.

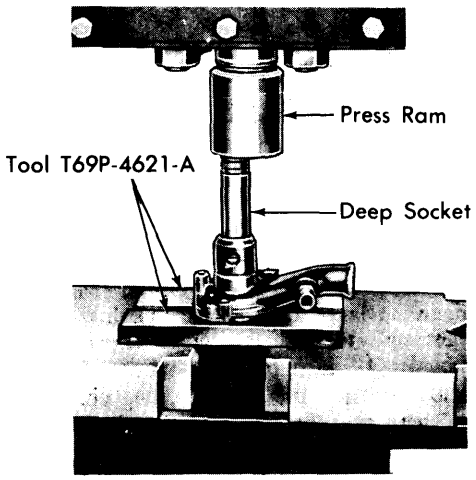
Reassembly – 1) Install slinger on long end of shaft with flange toward bearing.

2) Seat seal in housing with a 1 1/8" socket wrench with carbon end of seal facing toward rear of pump.

3) Press bearing and shaft assembly into place in front of housing, making sure slinger is toward rear of pump. Press bearing inward until groove of bearing is aligned with groove in housing. Install retainer clip through access hole.

4) Press pulley hub onto shaft until front of hub is flush with pulley. Then slip ceramic seal over inner end of bearing shaft with rubber side of seal facing toward end of shaft.

5) Press impeller onto shaft until a clearance of .030" is established between one of the fins and pump housing.



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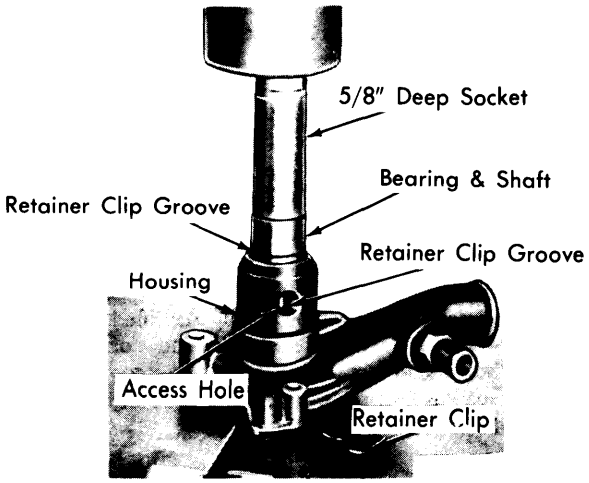
REMOVING WATER PUMP BEARING & SHAFT



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INSTALLING WATER PUMP BEARING & SHAFT

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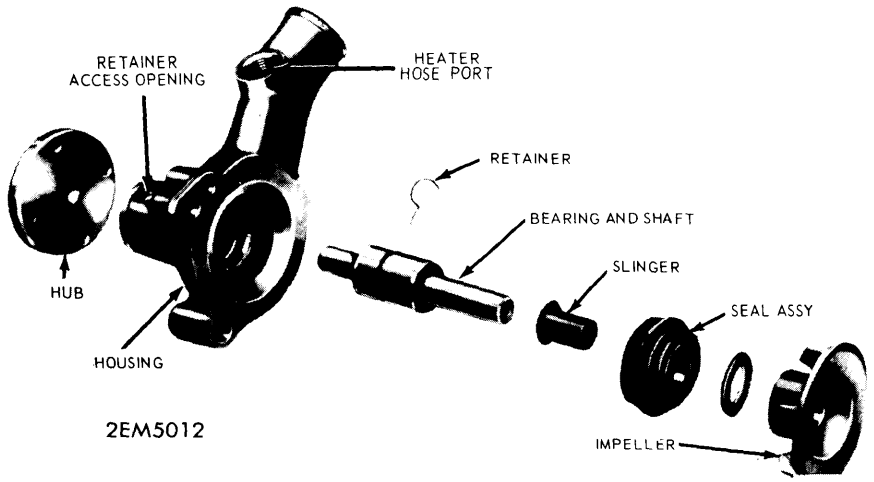
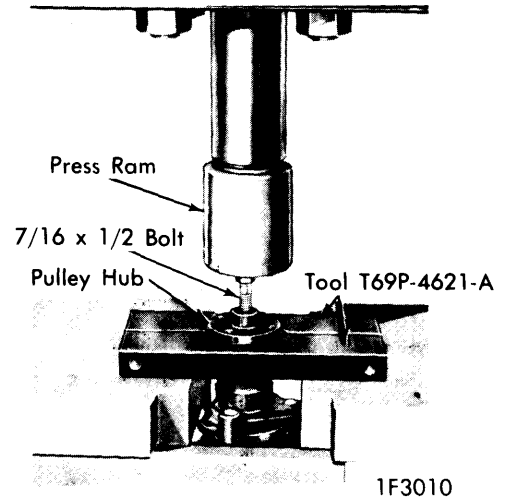
ENGINE COOLING (Cont.)



WATER PUMP DISASSEMBLED



REMOVING WATER PUMP PULLEY HUB

ENGINE NOTES

► *INTAKE VALVE CAUTION — Intake valve faces are aluminized and must NOT, under any circumstances be faced, ground or lapped in. Replace intake valves that are burned or pitted. Do not remove phosphate coating from new valve stems. Stems are coated to prevent scuffing during break-in.*

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Cylinder Head Bolts	①
Main Bearing Caps	65-70
Connecting Rod Bolts	30-35
Crankshaft Pulley Bolt	24-28
Flywheel-to-Crankshaft Bolts	50-55
Rocker Arm Shaft Support	25-30
Camshaft Sprocket-to-Camshaft	12-15
Front Engine Cover	5-7
Exhaust Manifold-to-Cyl. Head Studs	9-12
Exhaust Manifold-to-Cyl. Head Nuts	15-18
Exhaust Manifold-to-Cyl. Head	9-12
Intake Manifold-to-Cyl. Head Bolts	12-15
Intake Manifold-to-Cyl. Head Nuts	12-15
Intake Manifold-to-Cyl. Head Studs	9-12
Oil Pump-to-Cyl. Block	13-15
Oil Pan-to-Cyl. Block Bolts	②
Tappet Adjusting Self Lock Screws	10-25
Water Pump-to-Cyl. Block (1/4")	5-7
Water Pump-to-Cyl. Block (5/16")	12-15
Decel Valve Adaptor-to-Manifold (1970-71)	12-24
(1972)	30-33
Decel Valve Adaptor-to-Decel Valve (1970-71)	12-15
(1972)	27-30

① — Step one, 5 ft. lbs. Step two, 25-30 ft. lbs. Step three, 50-55 ft. lbs. Step four, 65-70 ft. lbs.

② — Step one, finger tighten corner bolts. Step two, tighten all bolts enough to clamp gasket. Step three, tighten all to 7 ft. lbs.