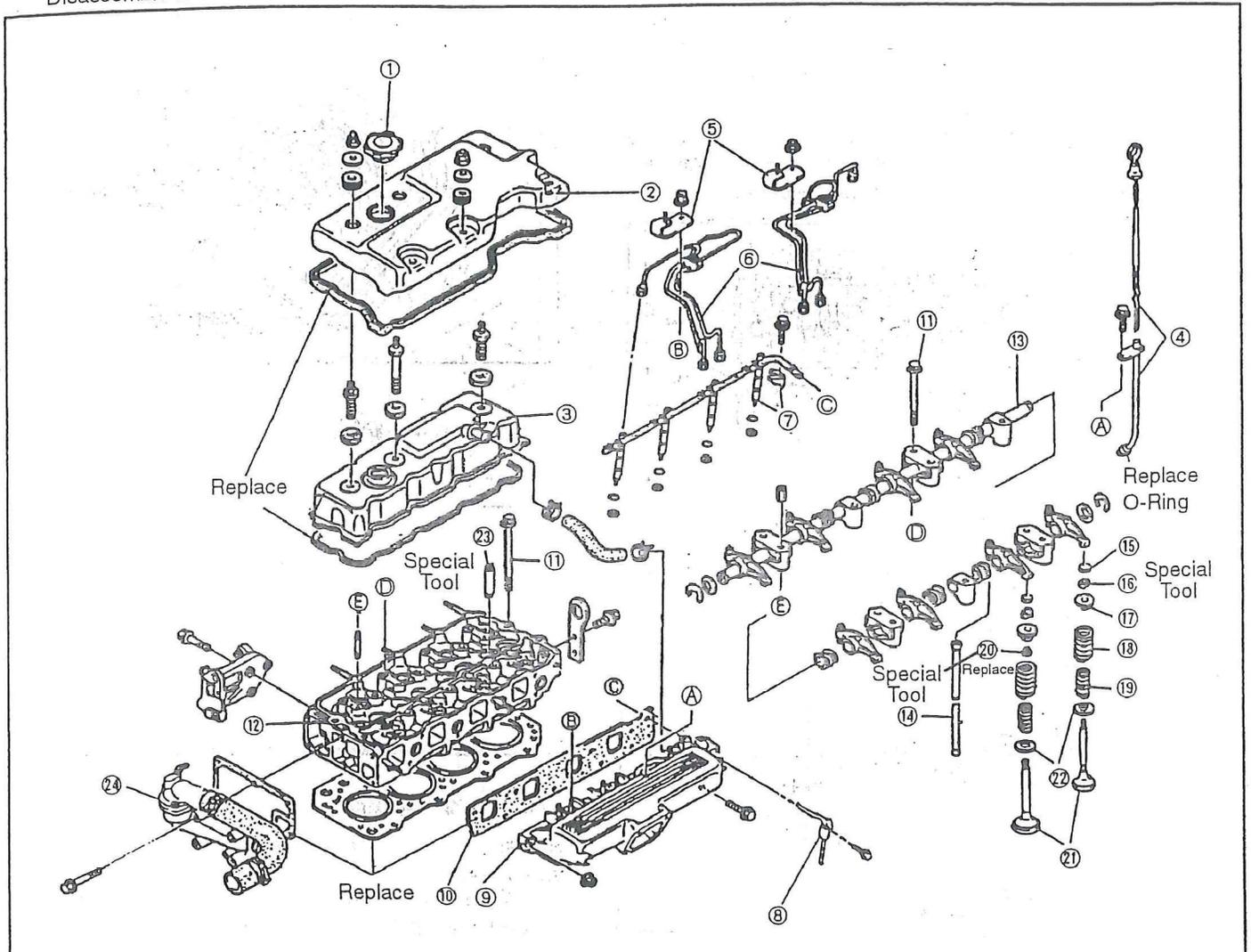


CYLINDER HEAD DISSASSEMBLY

1. Refer to the **NOTES** during disassembly.
Disassemble in the order shown in the illustration.



- | | | |
|---------------------------------------|---|---------------------------------|
| 1. Oil filler cap | 9. Intake manifold | 17. Upper valve spring seat |
| 2. Seal cover | 10. Gasket | 18. Outer valve spring |
| 3. Cylinder head cover | 11. Cylinder head bolts—See NOTE | 19. Inner valve spring |
| 4. Oil level dipstick and guide pipe | 12. Cylinder head | 20. Valve seal |
| 5. Injector line clip | 13. Rocker arm and shaft assembly—See NOTE | 21. Valve |
| 6. Injector line | 14. Push rod | 22. Lower valve spring seat |
| 7. Injection nozzle and nozzle holder | 15. Valve cap | 23. Valve guide—See NOTE |
| 8. Fuel return line | 16. Valve retainer | 24. Water outlet |

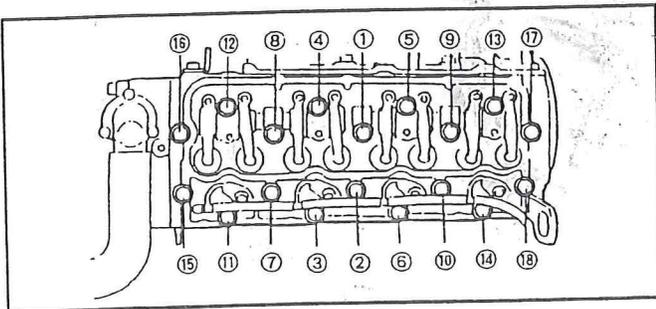
CYLINDER HEAD BOLT REMOVAL

1. Remove the cylinder head bolts gradually in the order shown in the illustration.



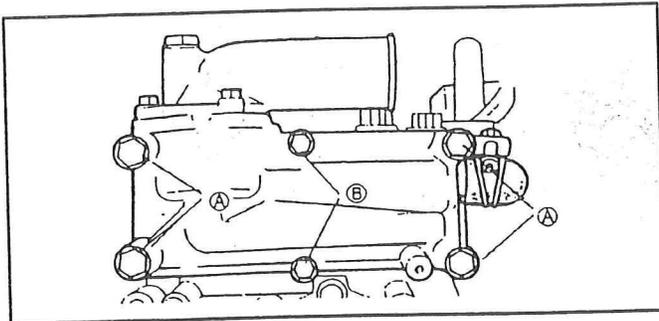
WARNING: The cylinder head is heavy. Be sure that all lifting devices (hoists, cables, chains, slings etc.) are suitable and of adequate capacity to lift the cylinder head. The cylinder head can weigh approximately 33 kg (73 lb).

NOTE: Loosen the cylinder head bolts in two or three steps to prevent the cylinder head from warping. Do not remove the cylinder head unless the engine is at room temperature.

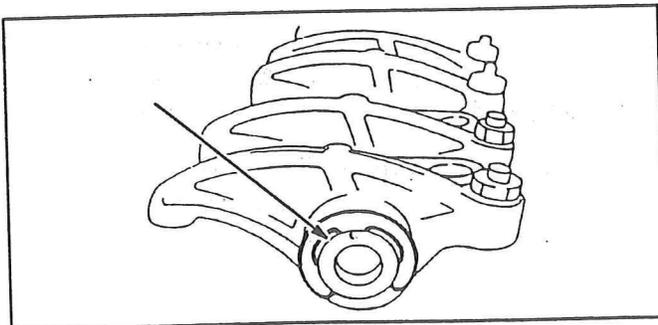


ROCKER ARM AND SHAFT ASSEMBLY REMOVAL

1. Remove the nuts shown in the illustration. First remove the nuts marked (A) and then remove the nuts marked (B). Remove the rocker arm and shaft assembly.



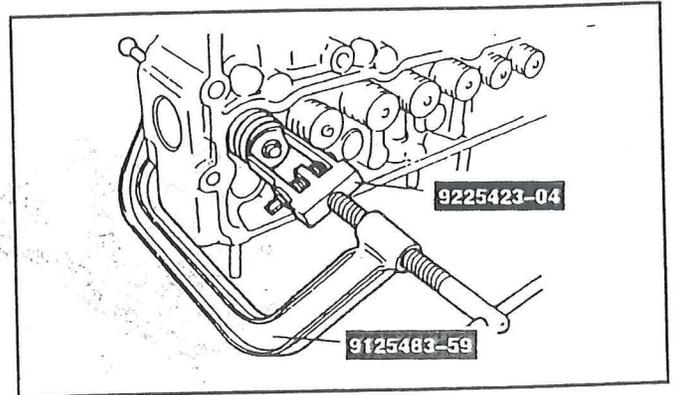
2. Remove the clip shown in the illustration, and disassemble the rocker arm and shaft assembly.



NOTE: Arrange the rocker arms after disassembly so that the original position is clear.

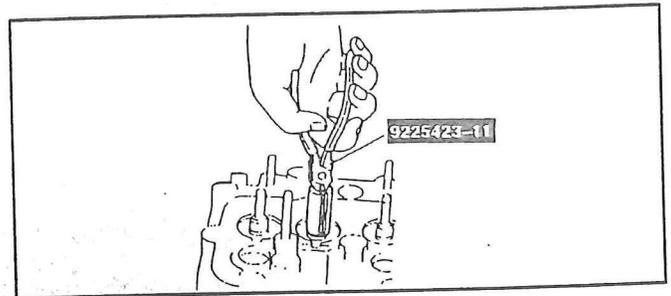
VALVE RETAINER REMOVAL

1. Install the valve spring compressor as shown in the illustration.
2. Compress the valve spring, and remove the valve retainer.



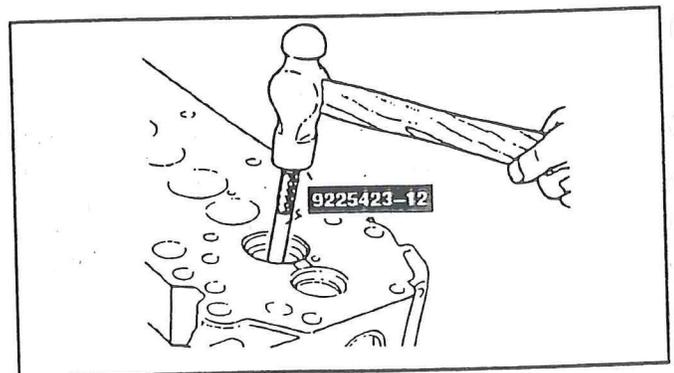
VALVE SEAL REMOVAL

1. Using the valve seal removal tool, remove the valve seal.



VALVE GUIDE REMOVAL

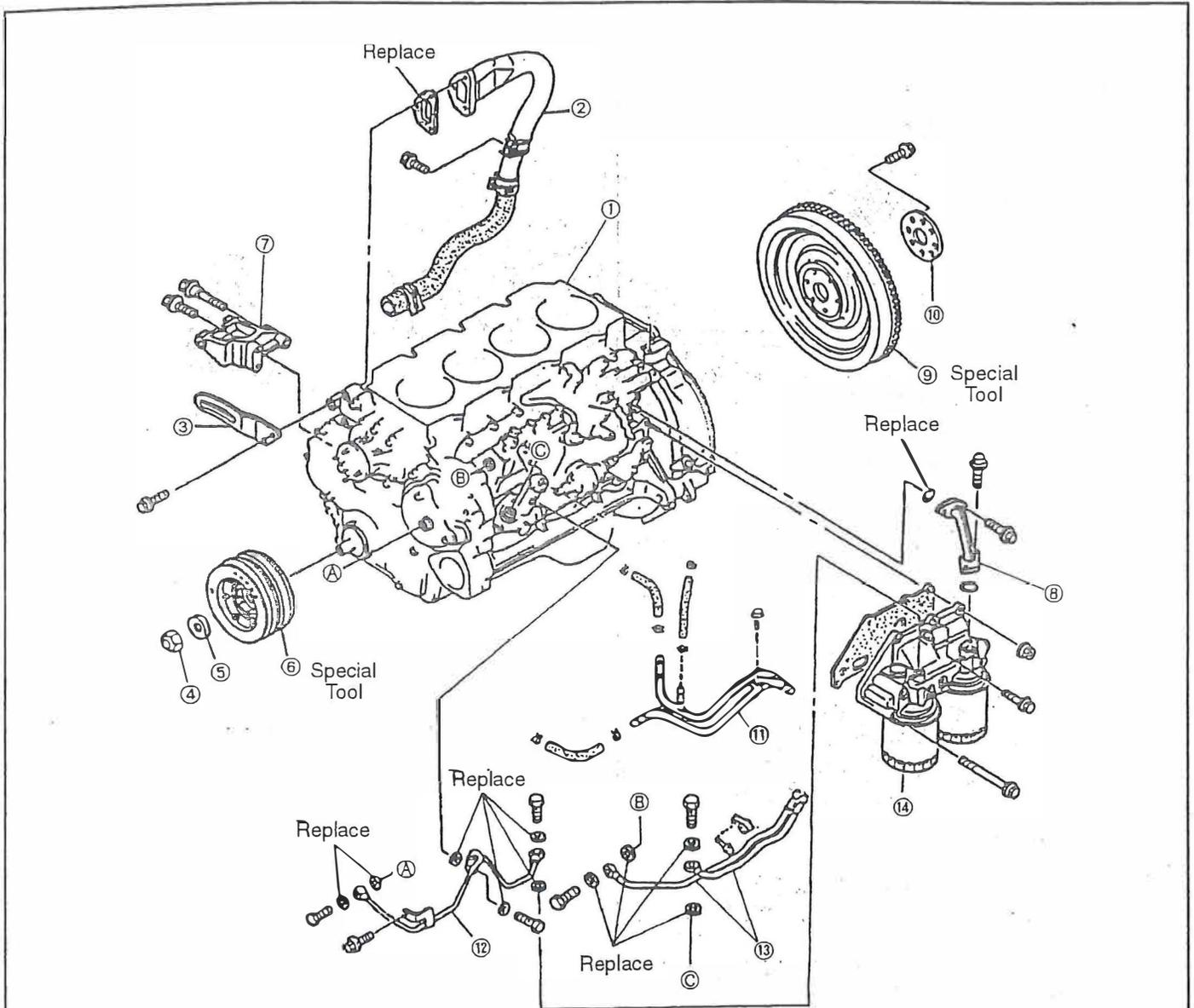
NOTE: Inspect the clearance between the valve guide and valve before removing the valve guide. See: "VALVE AND VALVE GUIDE INSPECTION". Remove the valve guide with the following procedure if necessary.



1. Remove the valve guide as illustrated. Use the valve guide removal tool and a hammer.

CYLINDER BLOCK DISSASSEMBLY-ACCESSORY COMPONENTS

1. Refer to the **NOTES** during disassembly.
Disassemble in the order shown in the illustration.



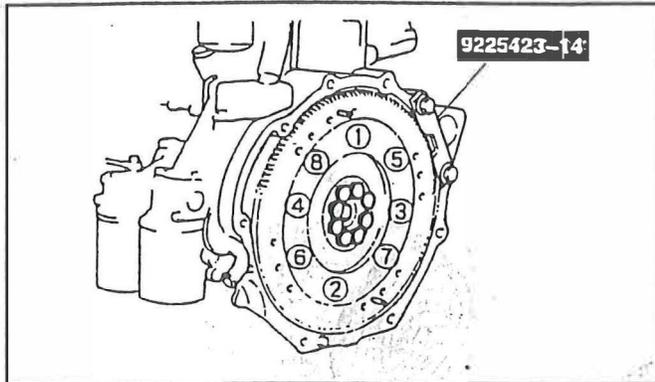
1. Engine block
2. Water pipe
3. Alternator strap
4. Crankshaft pulley lock nut
5. Lock washer

6. Crankshaft pulley assembly
7. Alternator bracket
8. Oil line
9. Flywheel

10. Washer
11. Fuel line
12. Oil line
13. Fuel line
14. Oil filter assembly

FLYWHEEL REMOVAL

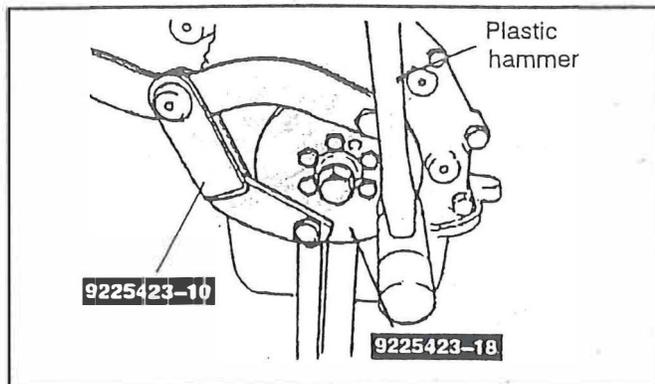
1. Bolt the ring gear brake to the block as shown in the illustration to lock the flywheel in place.



2. Remove the flywheel retaining bolts and washers. Remove the flywheel.

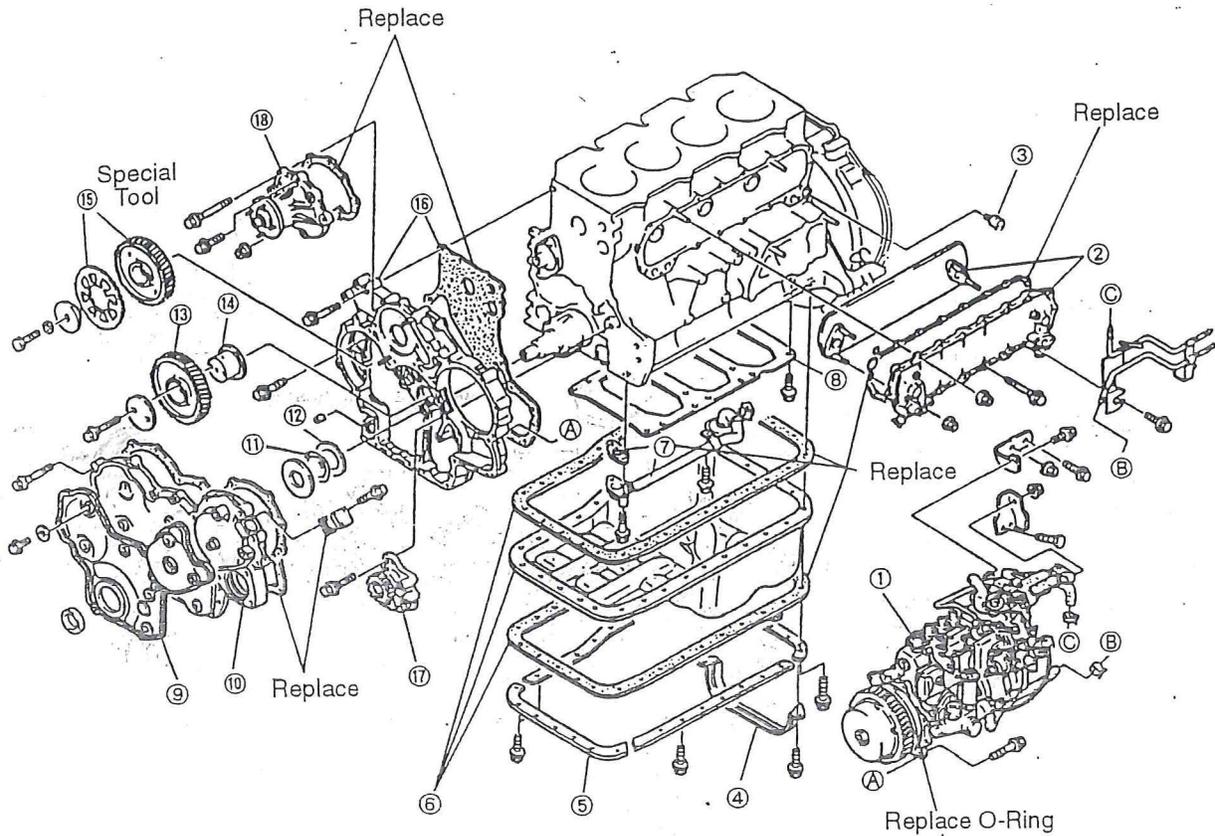
CRANKSHAFT PULLEY REMOVAL

1. Loosen and remove the pulley lock nut.
2. Remove the spacer. Attach the removal tools to the pulley. Tighten the bolts.



3. When the pulley starts to come off, tap it lightly with a plastic hammer to remove it.
 4. Remove the special tools.
1. Refer to the **NOTES** during disassembly. Disassemble in the order shown in the illustration.

CYLINDER BLOCK DISSASSEMBLY-EXTERNAL COMPONENTS



- 1. Fuel injection pump.
- 2. Oil cooler
- 3. Oil pressure switch
- 4. Seal plate
- 5. Stiffener
- 6. Oil pan and gasket

- 7. Oil strainer and gasket
- 8. Stiffener plate
- 9. Timing gear cover insulator
- 10. Timing gear cover
- 11. Friction gear spring
- 12. Friction gear

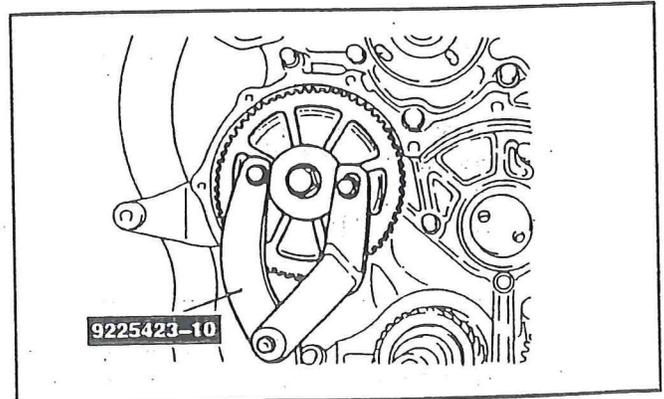
- 13. Idler gear
- 14. Idler gear spindle
- 15. Cam gear and friction gear
- 16. Timing gear case and gasket
- 17. Oil pump
- 18. Water pump



WARNING: The fuel injection pump is heavy. Be sure that all lifting devices (hoists, cables, chains, slings etc.) are suitable and of adequate capacity to lift the fuel injection pump. The fuel injection pump can weigh approximately 17 kg (38 lb).

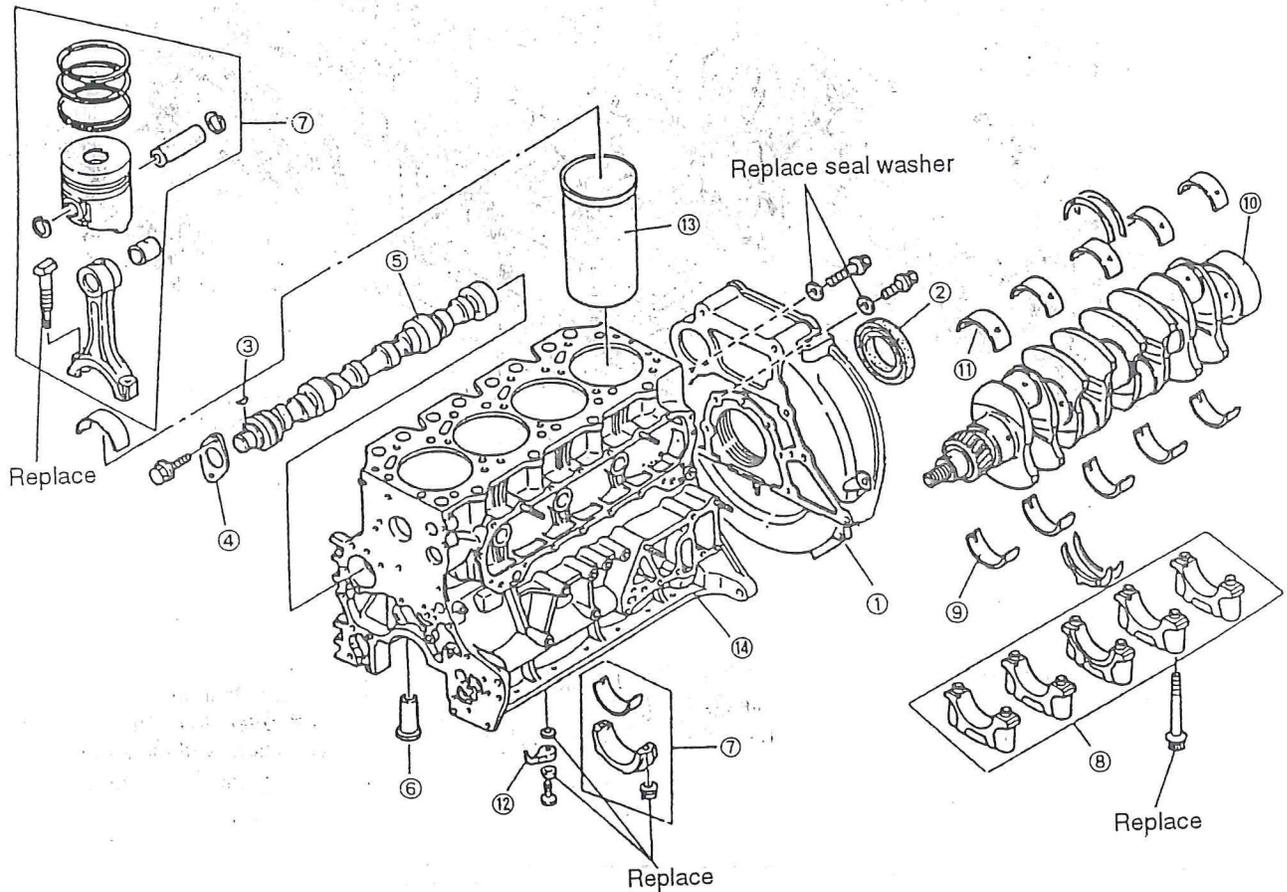
CAM GEAR AND FRICTION GEAR REMOVAL

1. Install the special holder (wrench) on the gear as shown in the illustration to stop the cam gear rotation. Remove the cam gear retaining bolt.
2. Remove the friction gear.
3. Remove the cam gear.



CYLINDER BLOCK DISSASSEMBLY-INTERNAL COMPONENTS

1. Refer to the **NOTES** during disassembly.
Disassemble in the order shown in the illustration.



1. End plate
2. Rear oil seal—See **NOTE**
3. Woodruff key
4. Camshaft thrust plate
5. Camshaft—See **NOTE**

6. Tappet
7. Connecting rod and piston assembly
See **NOTE**
8. Main bearing cap—See **NOTE**
9. Lower main bearing metal

10. Crankshaft
11. Upper main bearing metal
12. Piston cooling jet assembly
13. Cylinder liner—See **NOTE**
14. Cylinder block



WARNING: The end plate is heavy. Be sure that all lifting devices (hoists, cables, chains, slings etc.) are suitable and of adequate capacity to lift the end plate. The end plate can weigh approximately 16 kg (36 lb).

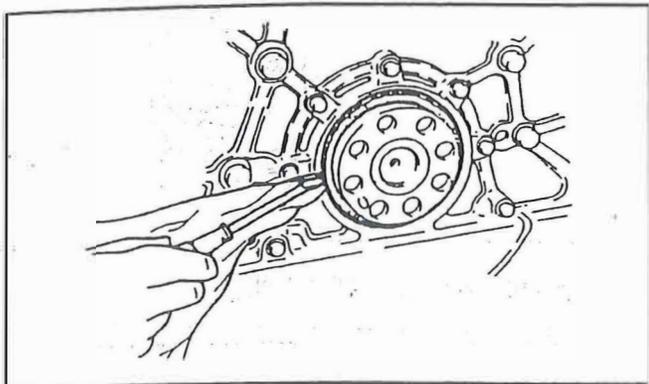
Mazda TM Engine Parts contact:
EngineParts@HeavyEquipmentRestorationParts.com

Phone: 269 673 1638

REAR OIL SEAL REMOVAL

1. Remove the rear oil seal as illustrated.

NOTE: Do not scratch the crankshaft during seal removal.



NOTE: The following rear seals are used:

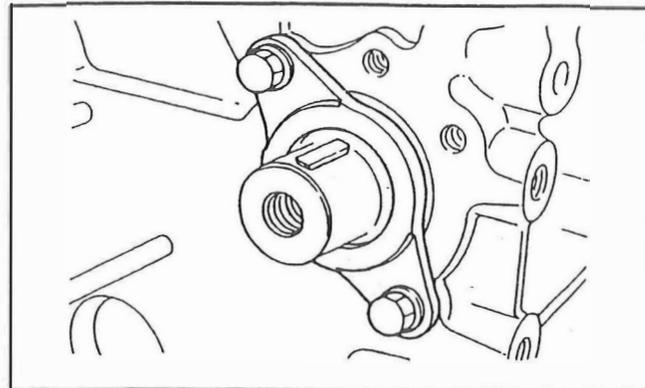
- A/T (Automatic Transmission) vehicle: Single lip seal
- M/T (Manual Transmission) vehicle: Double lip seal

NOTE: All trucks manufactured for the North American market are only available with automatic transmissions.

Speci- fication	Engine rear seal	End plate classifica- tion
A/T	<p>Single lip seal</p> <p>FW side</p>	A
M/T	<p>Double lip seal</p> <p>FW side</p>	M

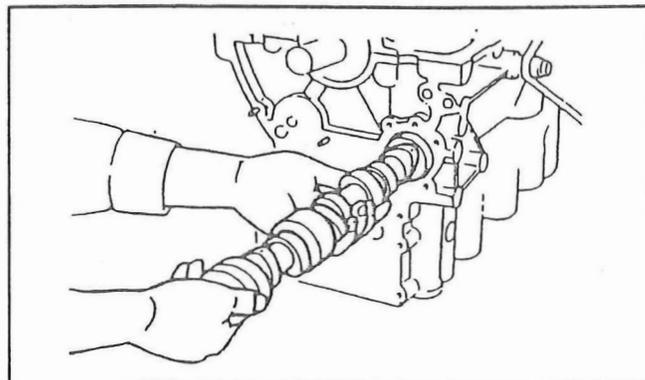
CAMSHAFT REMOVAL

1. Remove the woodruff key.
2. Remove the thrust plate.



3. Gradually pull out the camshaft while turning it by hand

NOTE: Remove the camshaft carefully. Support the camshaft as illustrated to prevent scratches during removal.



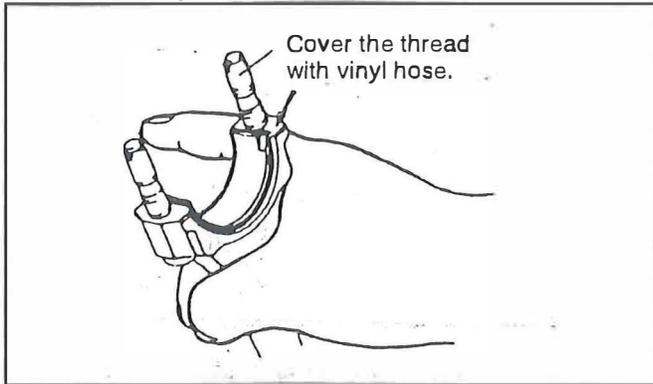
CONNECTING ROD AND PISTON ASSEMBLY REMOVAL

1. Check the following points before removing the connecting rods and pistons.

- a. Inspection of connecting rod large end's end play:
Standard value: 0.200-0.400 mm / (.0079-.0157 in)
Limit value: 0.50 mm / (.0197 in)
- b. Inspection of connecting rod bearing's oil clearance:
Standard value: 0.040-0.062 mm / (.0016-.0024 in)
Limit value: 0.10 mm / (.0039 in)

See: "PISTON AND CONNECTING ROD INSTALLATION".

NOTE: Cover the threads of the connecting rod bolts with vinyl hose so that the inner wall of the cylinder liner and crankshaft do not get scratched. Arrange the removed connecting rods and pistons so the original position is clear.

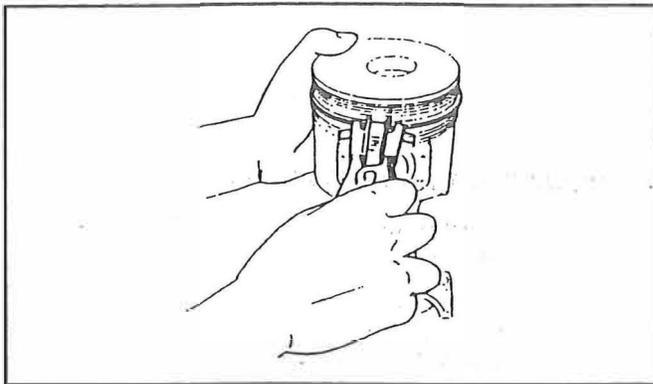


2. Remove the connecting rod cap and bearing.
3. Tap the connecting rod bolts lightly with a hammer handle. Remove the connecting rod and piston from the cylinder block.

PISTON RING REMOVAL

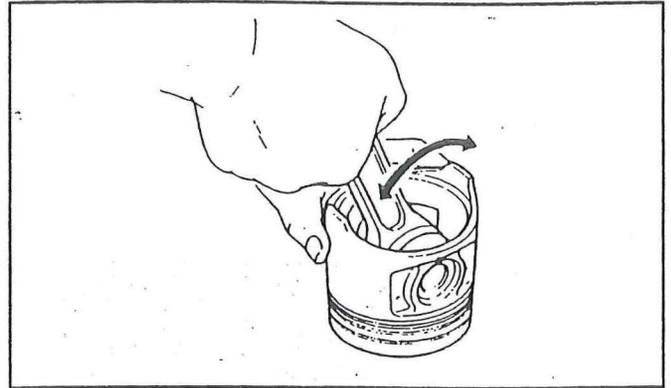
1. Use a piston ring tool (commercial product) to remove the piston rings.

NOTE: If a piston ring is expanded too far, the ring may break. Wear eye protection and use caution when handling the rings.

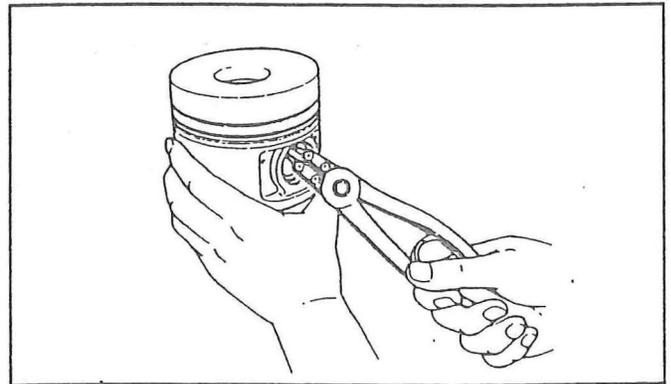


SNAP RING AND PISTON PIN REMOVAL

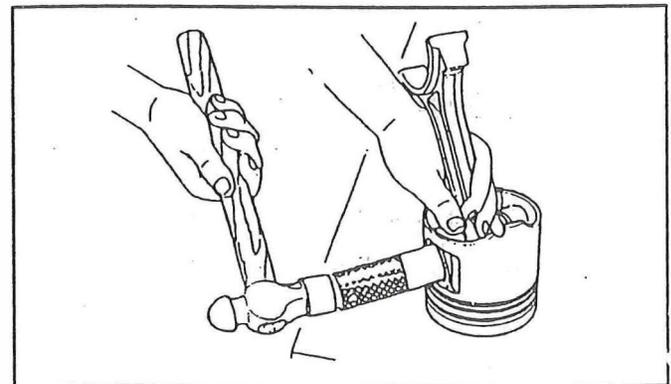
1. Inspect the following before removing the piston pin:
 - a. With the piston stationary, verify that the connecting rod moves freely and smoothly throughout its range.



2. Remove the snap ring with snap ring pliers.



3. Place the piston in water, and warm the water with a heater until the piston reaches 50-70°C / (120-160°F).
4. Remove the piston pins. Push out the piston pins using a drift pin or driver. The drift pin or driver should have an O.D. (outside diameter) slightly smaller than the O.D. of the piston pin to prevent damage to the piston pin or piston during removal.



5. Arrange the removed pistons, piston pins, piston rings and connecting rods for each cylinder.

MAIN BEARING CAP REMOVAL

1. Inspect the following before removing the main bearing cap:

- a. Inspection of crankshaft end play:
 Standard value: 0.14-0.39 mm / (.0055-.0154 in)
 Limit value: 0.40 mm / (.0157 in)

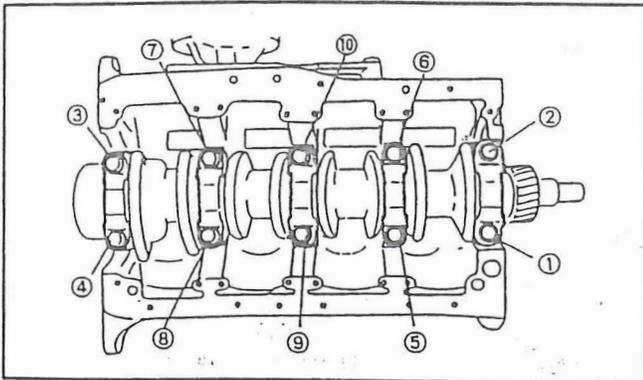
See: "CRANKSHAFT AND BEARING INSTALLATION".

2. Loosen and remove the main bearing cap retaining bolts in the order shown in the illustration.

3. Remove the bearing cap and lower main bearing metal as an assembly.

4. Inspect the main journal oil clearance:
 Standard value:
 Number 1,2,4,5 0.058-0.092 mm / (.0023-.0036 in)
 Number 3 0.084-0.118 mm / (.0033-.0046 in)
 Limit value:
 Number 1,2,4,5 0.12 mm / (.0047 in)
 Number 3 0.15 mm / (.0059 in)

See: "CRANKSHAFT AND BEARING INSTALLATION".

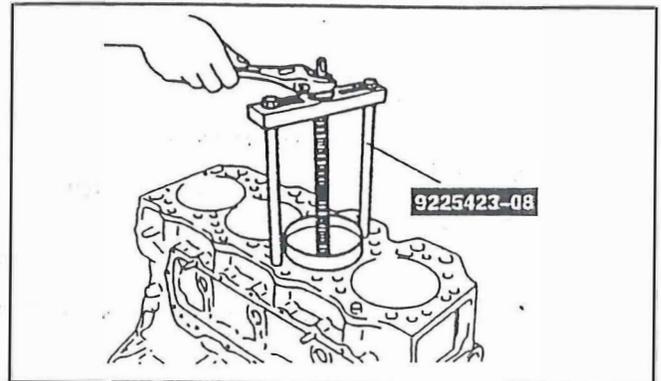


WARNING: The crankshaft is heavy. Be sure that all lifting devices (hoists, cables, chains, slings etc.) are suitable and of adequate capacity to lift the crankshaft. The crankshaft can weigh approximately 38 kg (84 lb).

CYLINDER LINER REMOVAL

1. Place a front / rear positioning mark on the cylinder block and on each cylinder liner. Pull out the cylinder liners by hand.

Use the cylinder liner puller as shown if the cylinder liner cannot be pulled out by hand.



NOTE: Do not drive out the liner. The liner edge can be damaged. Arrange the removed cylinder liners for each cylinder.

ENGINE INSPECTION AND REPAIR

NOTE: Replace all worn or damaged seals and gaskets. Remove all traces of dirt, oil, grease, carbon, etc. thoroughly clean all parts.

NOTE: Use caution to prevent scratching aluminum parts such as the pistons.

NOTE: Carry out the inspection and repair in the specified order.

SPECIAL TOOLS AND SUPPLIES REQUIRED

SPECIAL TOOLS AND SUPPLIES REQUIRED	PROCEDURE	SPECIAL TOOLS AND SUPPLIES REQUIRED	PROCEDURE
Red check	Inspection of cylinder head cracks	Straightedge	Distortion inspection
Thickness Gauge	Distortion inspection, clearance measurement	Calipers	Dimensional inspection of valves
Micrometer	Various dimensional measurements	Caliper gauge	Various inner diameter measurements
Table	Vibration inspection	Square	Inspection of valve spring right angle
V block	Vibration inspection	Dial gauge	End plate measurement
Plasti-gauge	Oil clearance measurement	Cylinder gauge	Measurement of cylinder inner diameter
Connecting rod aligner	Inspection of connecting rod curve	Valve seat cutter	Correction of valve seat
Prussian Blue	Inspection of valve seat contact		