

Engine

Engine Removal/Installation	5-1
Cylinder Head/Valve Train	6-1
Engine Block	7-1
Engine Lubrication	8-1
Intake Manifold/Exhaust System	9-1
Cooling	10-1

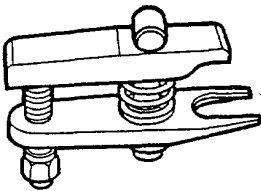


Engine Removal/Installation

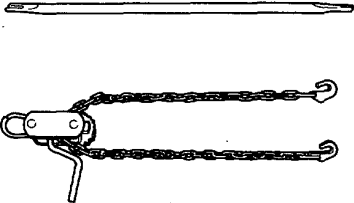


Special Tools

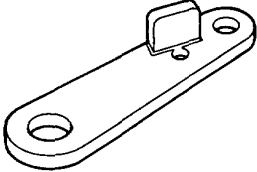
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07MAC—SL00100	Ball Joint Remover, 32 mm	1	5-7
②	07KAK—SJ40101	Engine Tilt Hanger Set	1	5-11
③	07MAK—PY30100	Engine Sub Hanger Stay	1	5-11
④	07MAK—PY30200	Sub Hanger Belt	1	5-11



①



②



③



④

cardiagn.com

Engine Removal/Installation

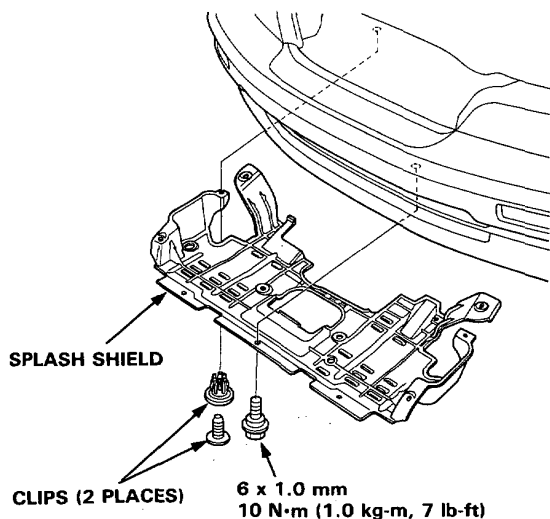


⚠ WARNING

- Make sure jacks and safety stands are placed properly and hoist brackets are attached to the correct positions on the engine (See Section 1).
- Make sure the car will not roll off stands and fall while you are working under it.

CAUTION:

- Use front and rear fender covers to avoid damaging painted surfaces.
- Unspecified items are common for the M/T cars, A/T cars.
- Unplug the wiring connectors carefully while holding the coupler and the connector portion to avoid damage.
- Mark all wiring and hoses to avoid mis-connection. Also, be sure that they do not contact other wiring or hoses or interfere with other parts.

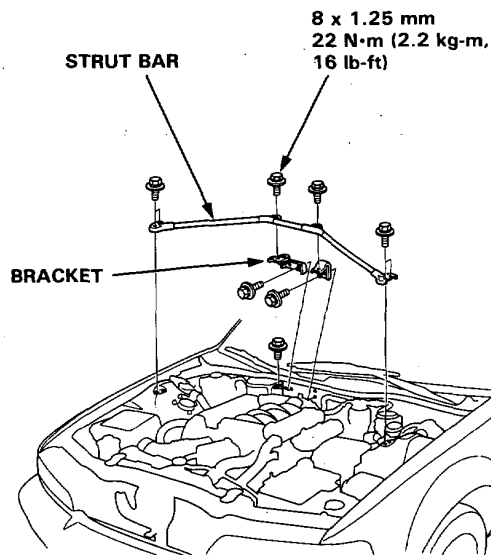


1. Disconnect the battery negative terminal first, then the positive terminal. Remove the battery.

2. Remove the radiator cap.

⚠ WARNING Use care when removing the radiator cap to avoid scalding by hot coolant or steam.

3. Raise the hoist to full height.
4. Remove the engine splash shield.
5. Drain the coolant (See Section 10).
 - Loosen the drain plug from the radiator lower tank.
6. Drain transmission and differential oil/fluid. Use a 3/8" drive socket wrench to remove the drain plugs. Reinstall the drain plugs using new washers.
7. Drain the engine oil. Reinstall the drain plug using a new washer.
8. Lower the hoist.
9. Remove the open stay bolts, then fix the engine hood to vertical position.
10. Remove the strut bar and bracket.

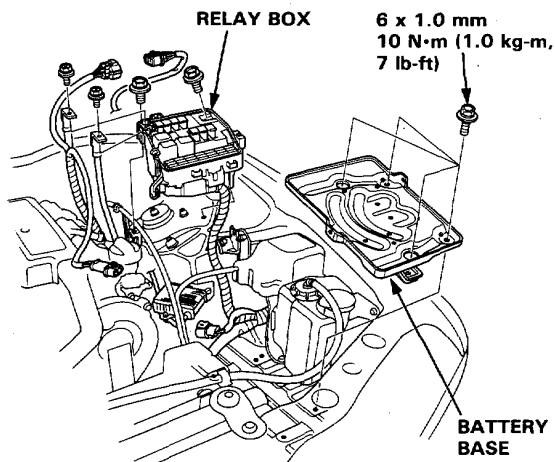


(cont'd)

Engine Removal/Installation

(cont'd)

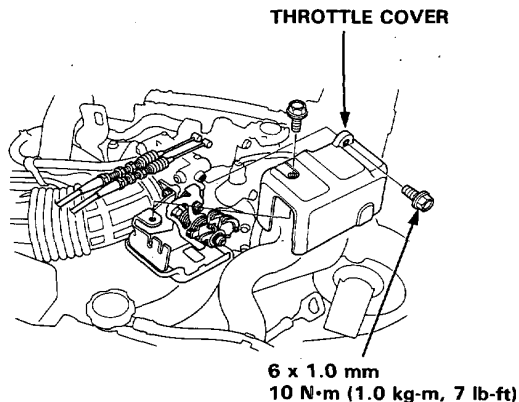
11. Remove the battery base.
12. Disconnect the engine wire harness connectors, then remove the relay box.
 - Remove the ground cable from cylinder block.
 - Remove the battery cable from starter motor B terminal.



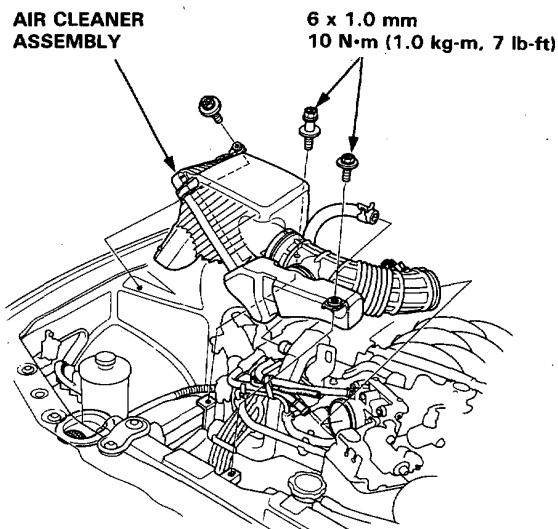
13. Remove the throttle cover.
14. Remove the throttle cable by loosening the locknut, then slip the cable end out of the throttle bracket and accelerator linkage.

NOTE:

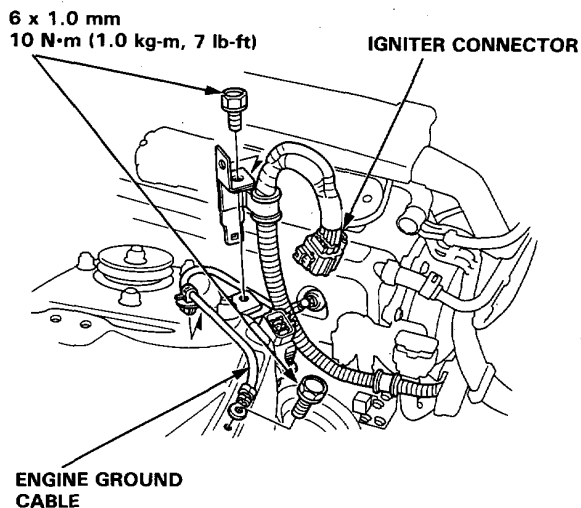
- Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.
- Adjust the throttle cable when installing (See Section 11).



15. Remove air cleaner assembly and air duct.



16. Remove the igniter connector, harness clamp and engine ground cable.

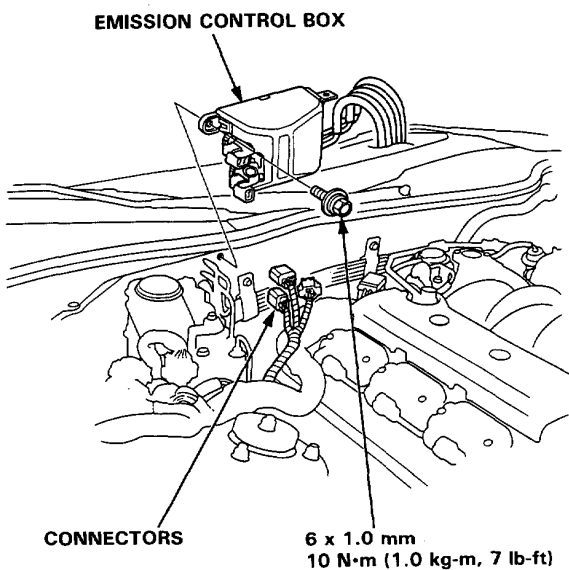




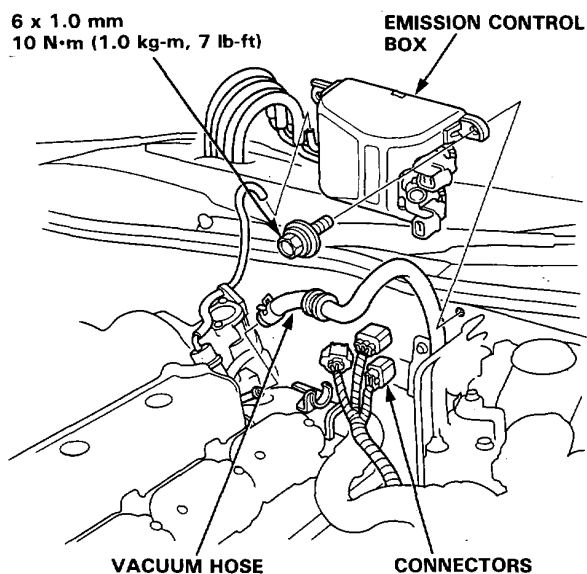
17. Disconnect three connectors, then remove the emission control box.

- Do not disconnect the vacuum hoses.

LHD:

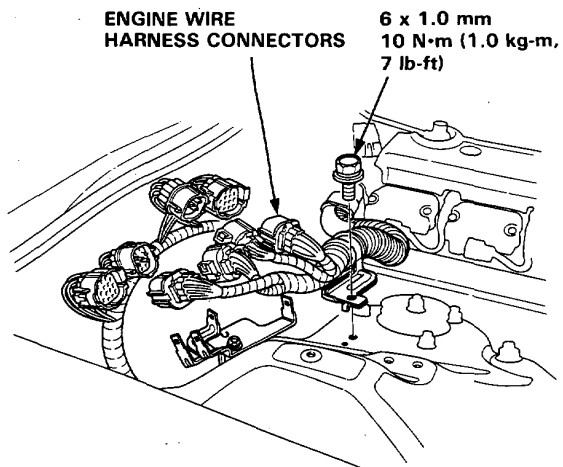


RHD:

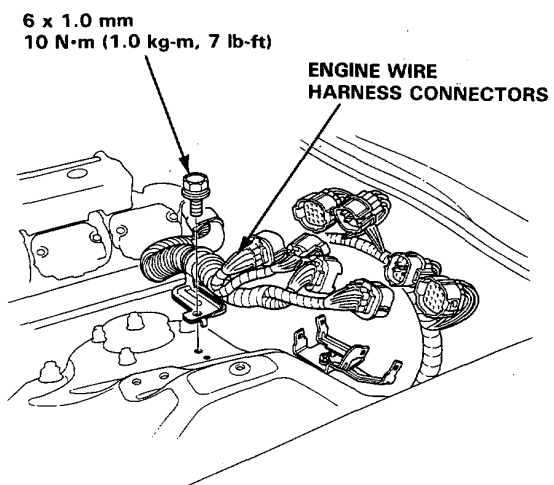


18. Disconnect four engine wire harness connectors and clamp.

LHD:



RHD:



(cont'd)

Engine Removal/Installation

(cont'd)

19. Relieve fuel pressure by slowly loosening the service bolt on the fuel filter about one turn (See Section 11).

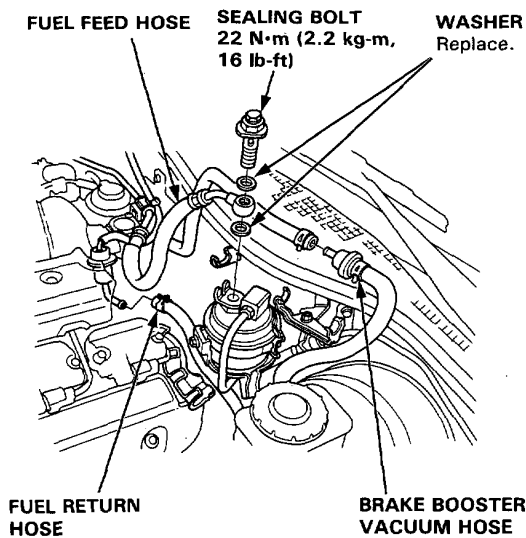
⚠ WARNING Do not smoke while working on the fuel system. Keep open flame away from work area. Drain fuel only into an approved container.

CAUTION:

- Before disconnecting any fuel line, the fuel pressure should be relieved as described above.
- Place a shop towel over the fuel filter to prevent pressurized fuel from spraying over the engine.

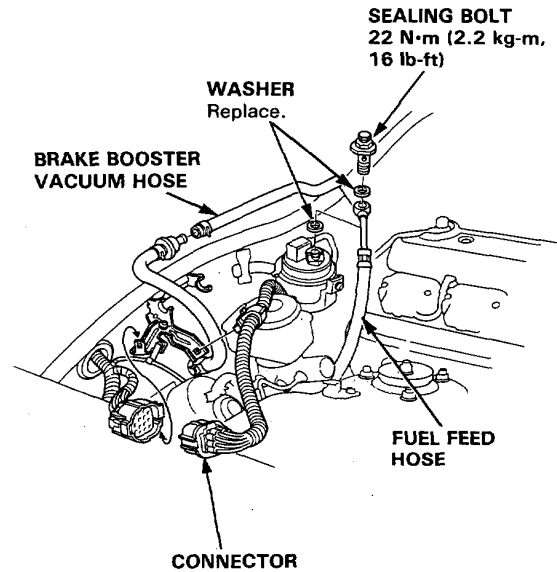
20. Remove the fuel feed hose and the fuel return hose from the pressure control valve.

LHD:



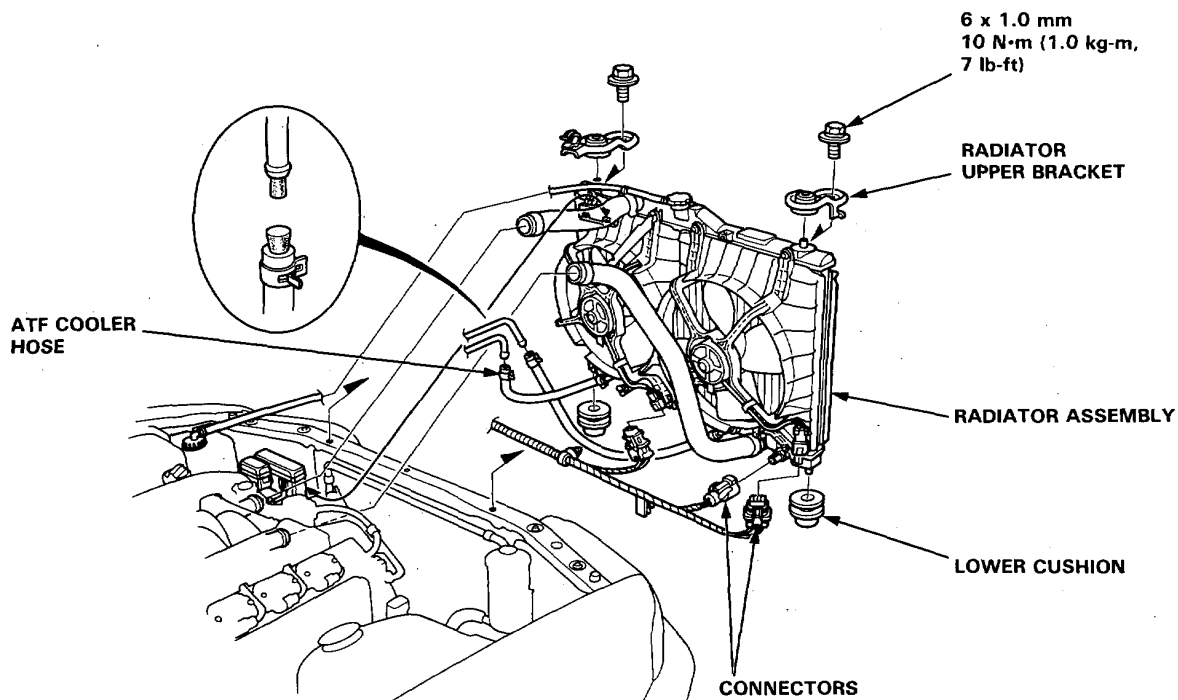
21. Remove the fuel purge hose and the purge cut vacuum hose.

RHD:



22. Disconnect the brake booster vacuum hose.

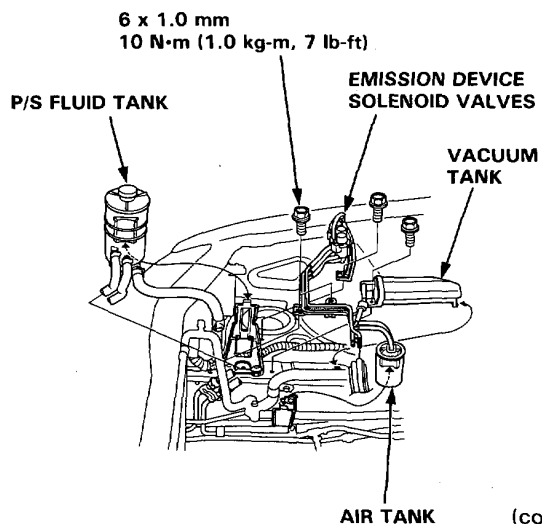
23. Disconnect the A/T transmission sub wire harness connector then remove the harness clamp (page 14-44 and 45).



24. Disconnect the radiator hoses, the ATF cooler hoses, the thermosensor connector and the cooling fan motor connectors, then remove the radiator assembly.

25. Remove vacuum pipe, emission device solenoid valve assembly and air tank.

- Do not disconnect the P/S hoses.

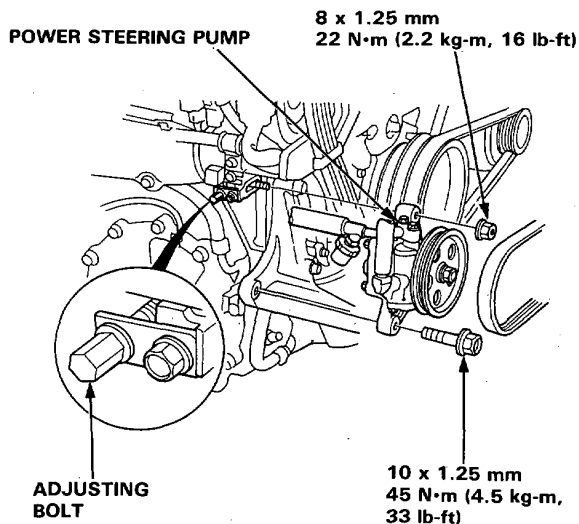


(cont'd)

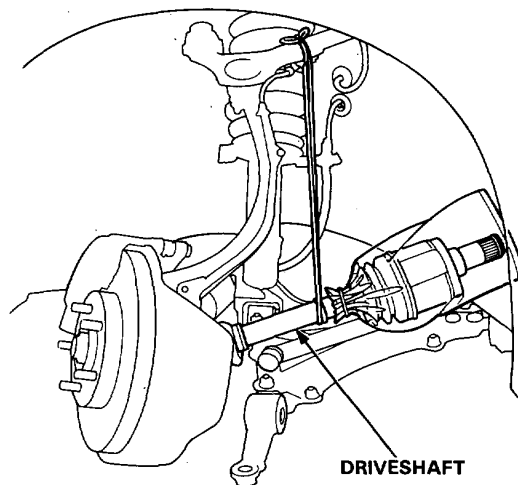
Engine Removal/Installation

(cont'd)

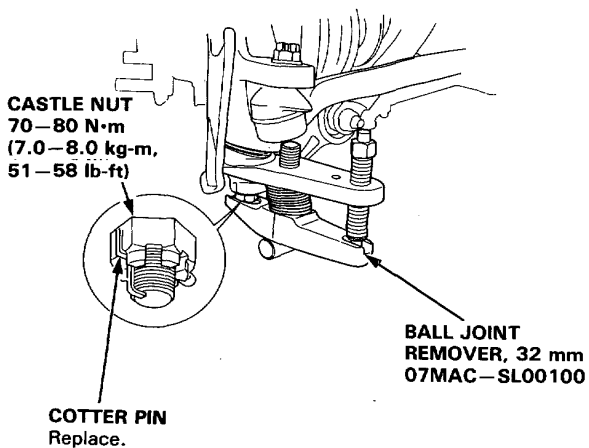
26. Remove the power steering belt and pump.
● Do not disconnect P/S hoses.



30. Remove the driveshafts. Suspend them with a rope as shown.



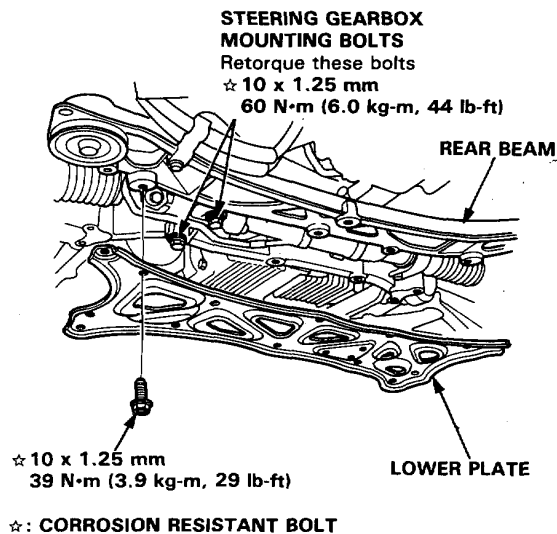
27. Remove the front tires/wheels.
28. Remove the damper forks.
29. Disconnect the suspension lower arm ball joints with the special tool. Refer to Section 18 for the proper procedure.



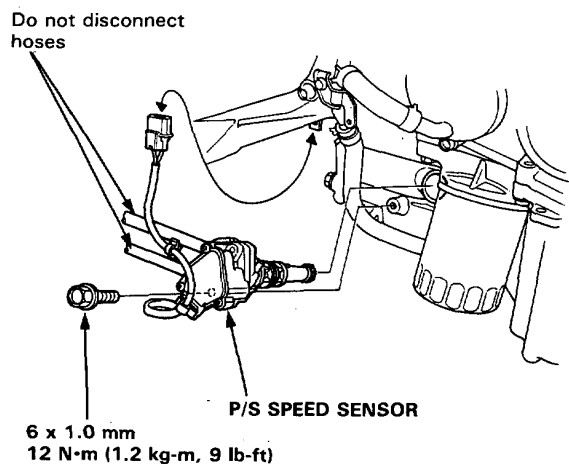
31. Raise the hoist to full height.



32. Remove the lower plate from the rear beam.
- LHD is shown in the illustration. The location of the steering gear box mounting bolts on the RHD are symmetrical.

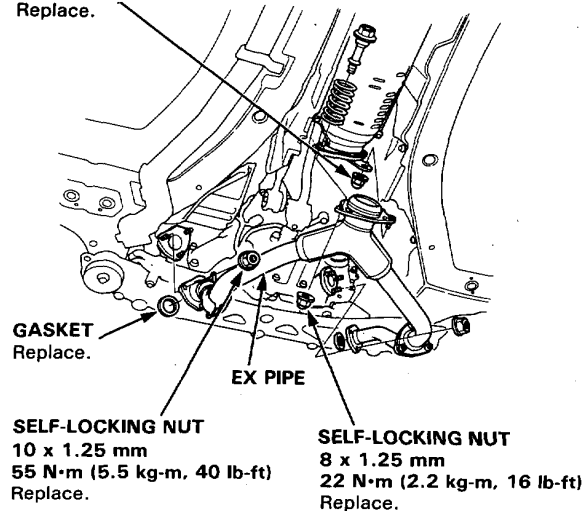


33. Remove the power steering speed sensor.
- Do not disconnect the hoses.

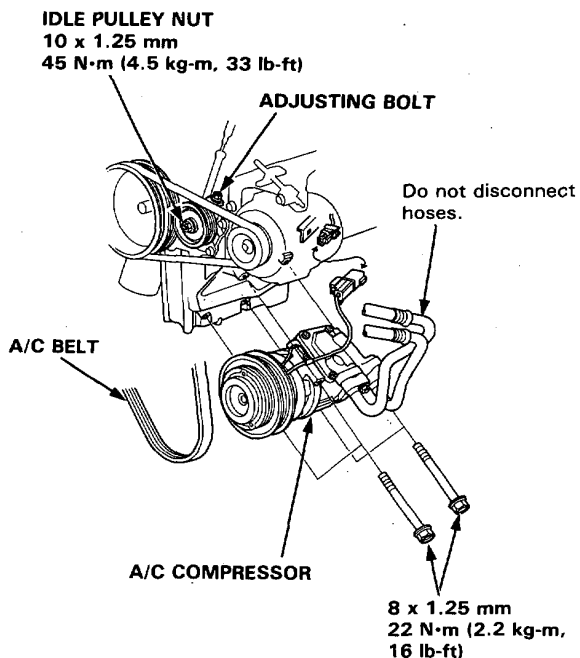


34. Remove the exhaust pipe A and joint pipe assembly.

SELF-LOCKING NUT
8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)
Replace.



35. Remove the air conditioner compressor and belt.
- Do not disconnect hoses.



(cont'd)

Engine Removal/Installation

(cont'd)

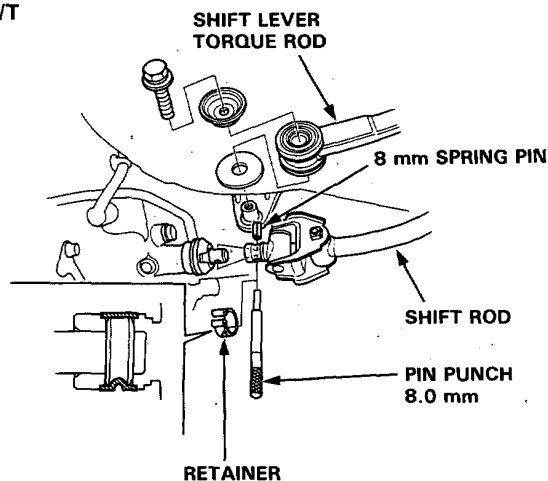
Manual transmission equipped cars:

36. Remove the slave cylinder from transmission housing.

- Do not disconnect the clutch hose.

37. Disconnect the shift rod and shift lever torque rod as shown.

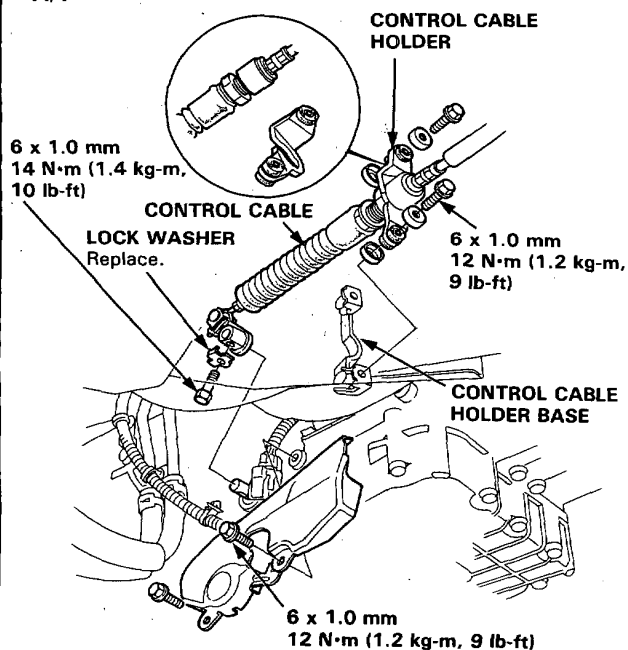
M/T



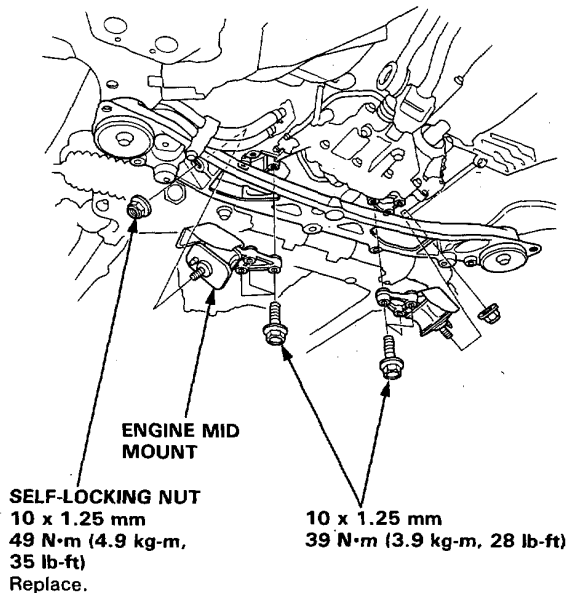
Automatic transmission equipped cars:

38. Disconnect the shift control cable.

A/T

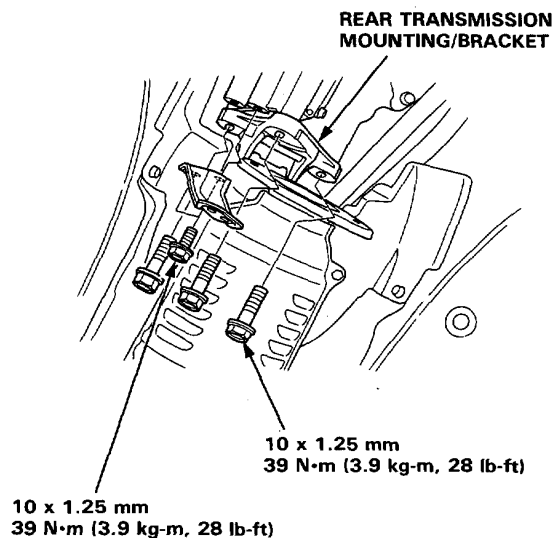


39. Remove the engine mid mounting nuts and bolts.



40. Remove rear transmission mounting/bracket.

A/T:





41. Lower the hoist.
42. Remove the front engine mounting nuts.
43. Remove the EGR passage bolt (except KQ), then install a special tool.
44. Attach a chain hoist to the engine. Raise the hoist to remove all slack from the chain.
45. Check that the engine/transaxle is completely free of vacuum hoses, fuel and coolant hoses, and electric wires.
46. Slowly raise the engine approximately 6". Check once again that all hoses and wires have been disconnected from the engine/transaxle.
47. Raise the engine/transaxle all the way and remove it from the car.

Except KQ:

ENGINE SUB
HANGER STAY
07MAK-PY30100

KQ:

6 x 1.0 mm
BOLT

ENGINE TILT
HANGER SET
07KAK-SJ40101

SUB HANGER
BELT
07MAK-PY30200

M/T MOUNTING BRACKET

A/T MOUNTING
BRACKET

ENGINE RIGHT MID MOUNT

ENGINE LEFT MID MOUNT

ENGINE RIGHT
FRONT MOUNT

ENGINE LEFT
FRONT MOUNT

(cont'd)

Engine Removal/Installation

(cont'd)

48. Install the engine in the reverse order of removal. After the engine is in place:

- Torque the engine mounting bolts in sequence shown below.

CAUTION: Failure to tighten the bolts in the proper sequence can cause excessive noise and vibration, and reduce bushing life: check that the bushings are not twisted or offset.

- Check that the spring clip on the end of each driveshaft clicks into place.

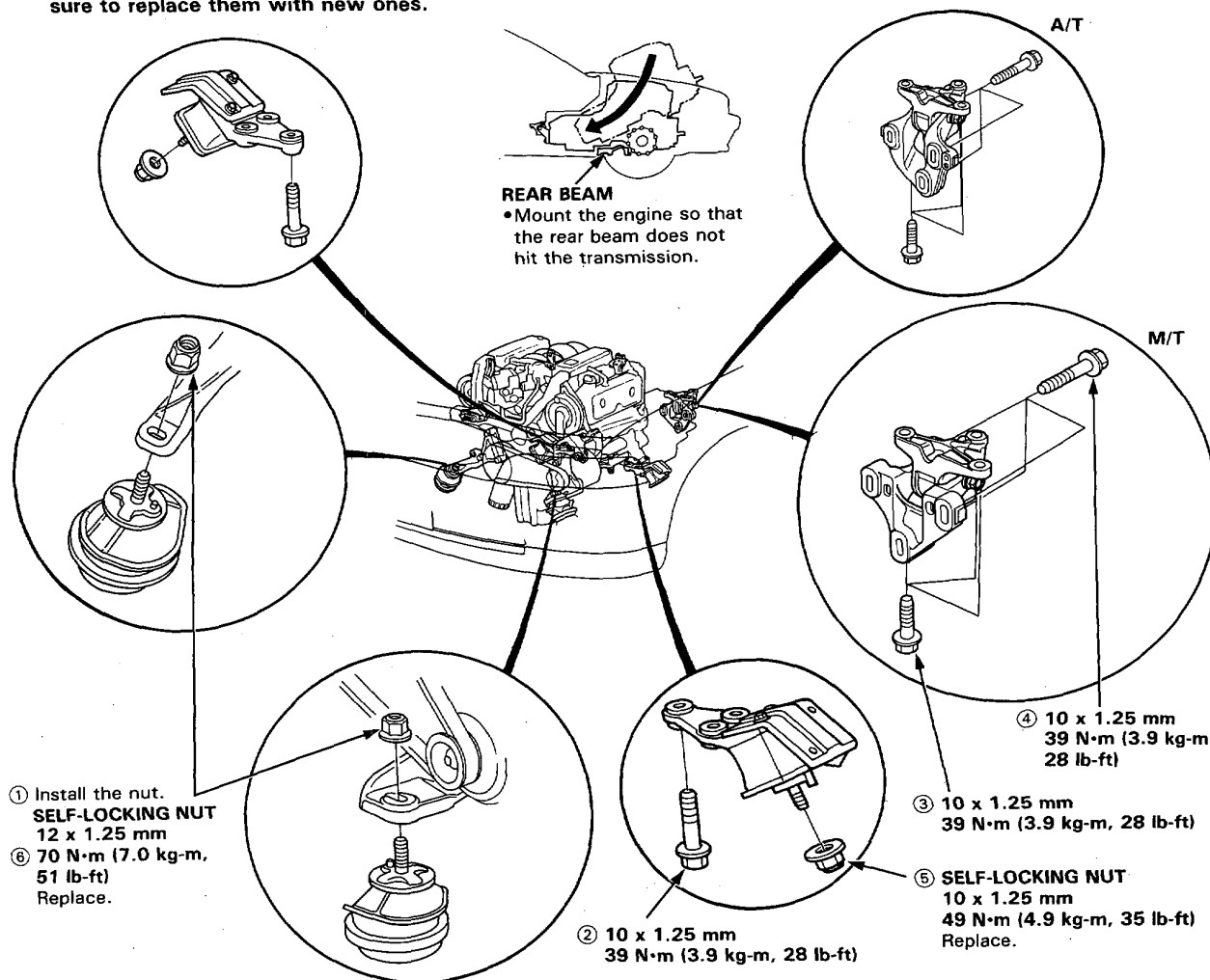
CAUTION: Use new spring clips on installation.

- Bleed air from the cooling system at the bleed bolt with the heater valve open.
- Adjust the throttle cable tension.

- Check the clutch pedal free play.
- Check that the transmission shifts into gear smoothly.
- Adjust the tension of the following drive belts: Alternator belt (See Section 23). Power steering belt (See Section 17). Air conditioner belt (See Section 22).
- Clean battery posts and cable terminals with sandpaper, assemble, then apply grease to prevent corrosion.
- Inspect for fuel leakage.
 - After assembling fuel line parts, turn on the ignition switch (do not operate the starter) so that the fuel pump is operated for approximately two seconds and the fuel is pressurized. Repeat this operation two or three times and check whether any fuel leakage has occurred at any point in the fuel line.

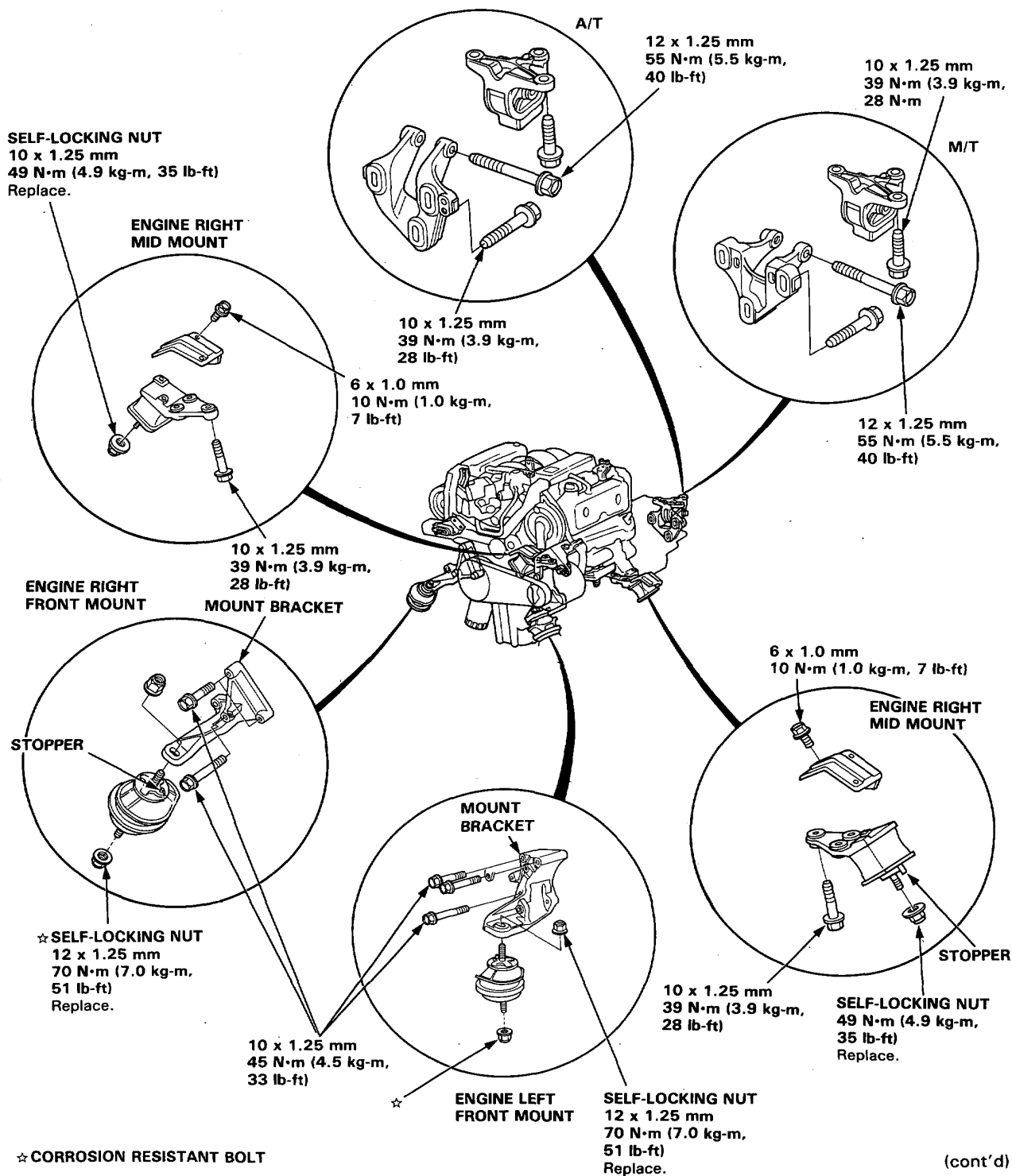
Engine Mounting Torque Sequence:

CAUTION: After loosening the special bolts, be sure to replace them with new ones.





Mount and bracket torque:

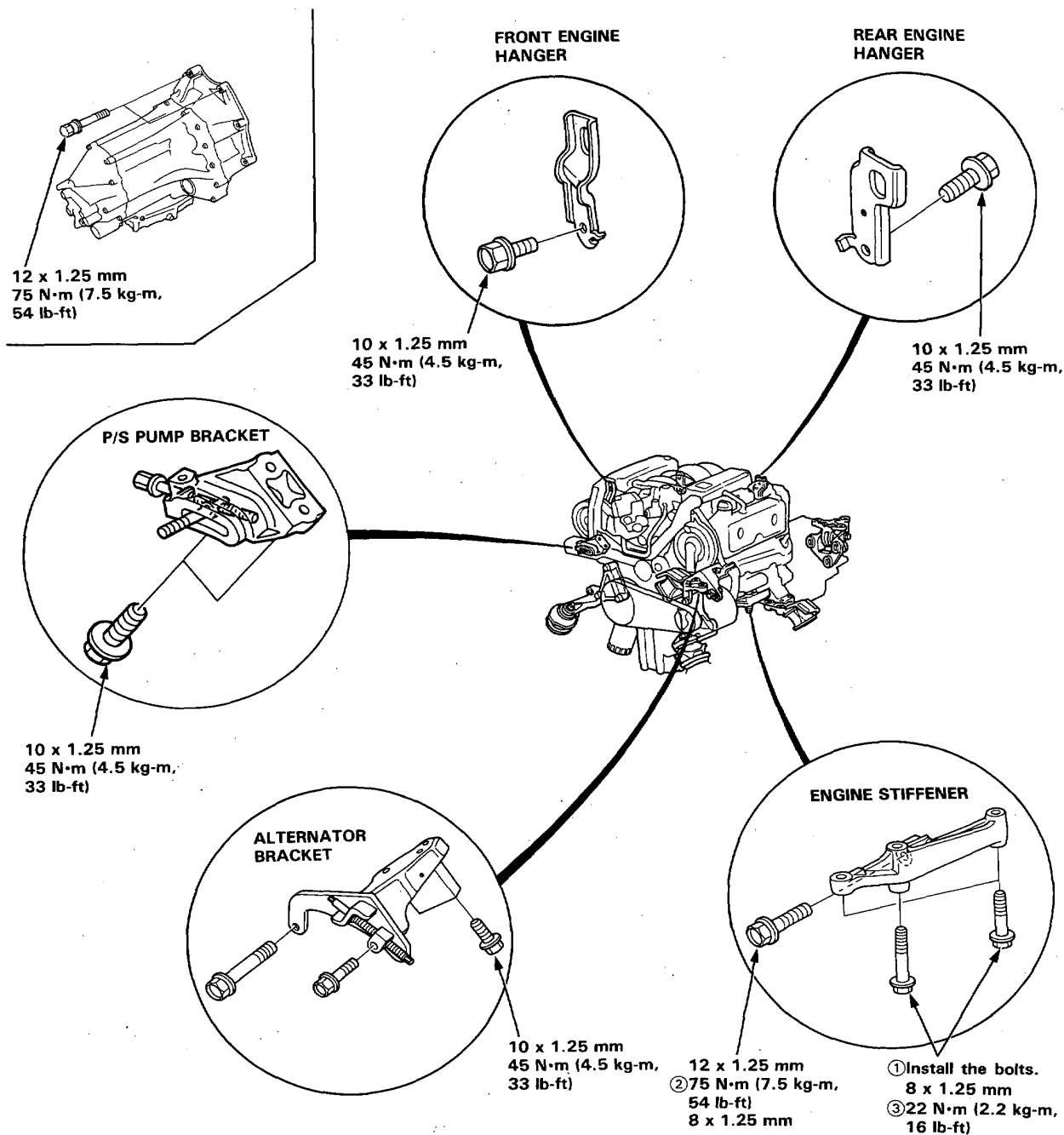


Engine Removal/Installation

(cont'd)

Additional Torque Value Specifications:

NOTE: For manifold replacement, refer to Section 9.



Cylinder Head/Valve Train

Special Tools	6-2
Illustrated Index	6-3
Cylinder Head Removal	6-7
Rocker Arms and Shafts	
Removal	6-13
Overhaul	6-12
Clearance	6-15
Camshaft Inspection	6-13
Valve and Valve Seals	6-16
Valves	6-17
Valve Seats	6-18
Valve Guides	6-19
Cylinder Heads	6-20
Valve Spring and Valve Seals	6-21
Hydraulic Tappets	6-22
Camshafts/Rocker Arms and Camshaft Seals	
Cylinder Head Installation	6-23
Cylinder Head Installation	6-24
Timing Belt	
Illustrated Index	6-26
Inspection	6-27
Tension Adjustment	6-27
Removal	6-28
Installation	6-30
CRANK/CYL Sensor	6-32



Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAD—PJ70200	Valve Guide Seal Installer	1	6-21
②	07HAH—PJ70100	Valve Guide Reamer, 5.5 mm	1	6-20
③	07JAB—0010000	Crank Pulley Holder Set	1	6-26
③-1	07JAA—0010200	Socket Wrench, 19 mm	(1)	6-26
③-2	07JAB—0010200	Handle	(1)	6-26
④	07MAB—PY30100	Pulley Holder Attachment	1	6-26
⑤	07757—0010000	Valve Spring Compressor	1	6-16
⑥	07742—0010100	Valve Guide Remover, 5.5 mm	1	6-19
⑦	07742—8920000	Valve Guide Driver	1	6-19



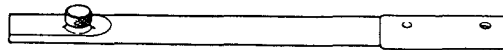
①



②

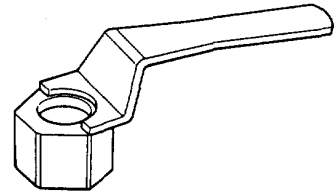


③-1

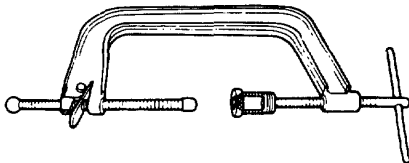


③-2

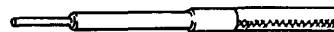
③



④



⑤



⑥ ⑦



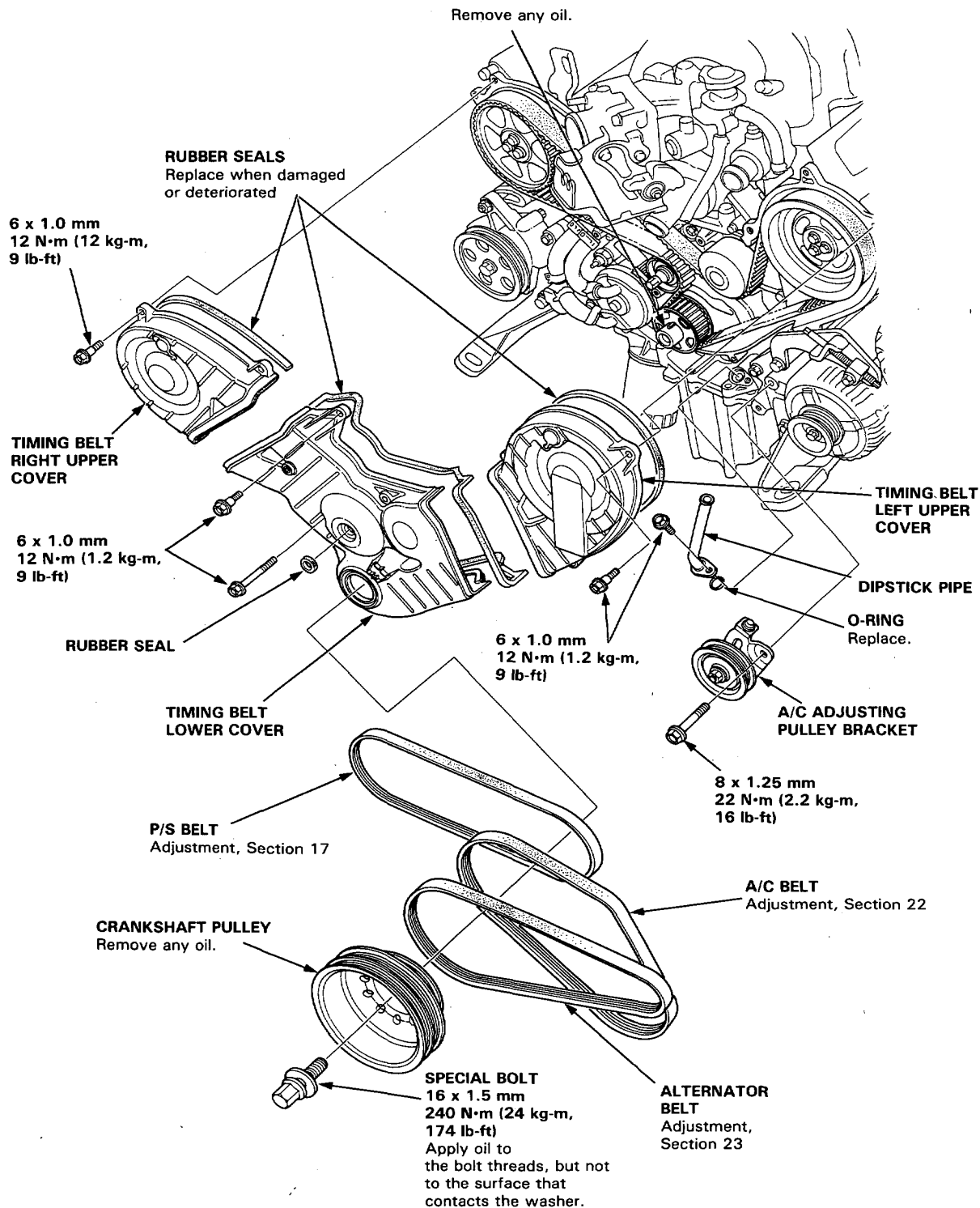
Cylinder Head/Valve Train

Illustrated Index

CAUTION: To avoid damaging the cylinder head, wait until the coolant temperature drops below 38°C (100°F) before removing it.

NOTE:

- Use new O-rings and gaskets when reassembling.
- Replace rubber seals if damaged or deteriorated.

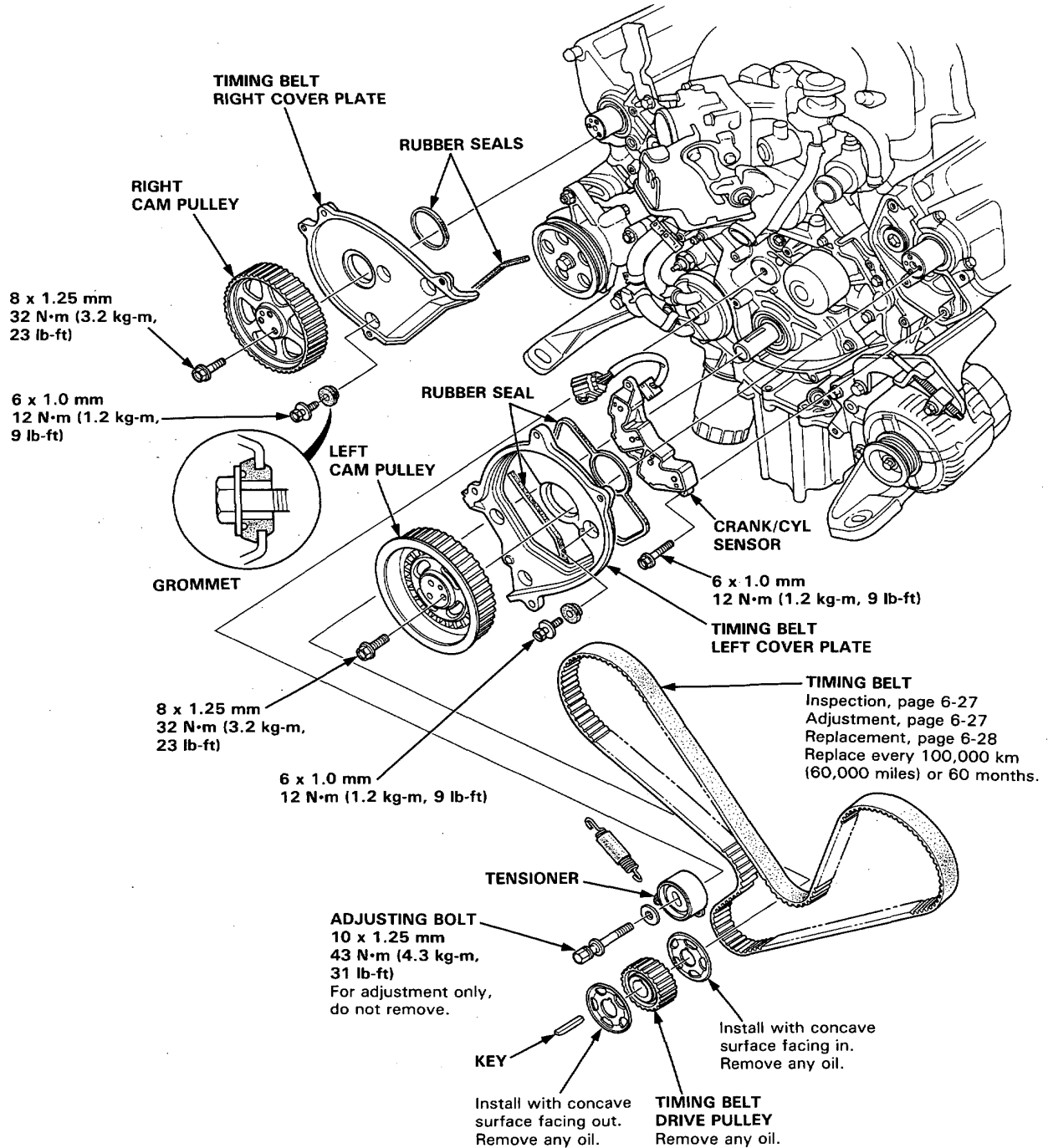


Cylinder Head/Valve Train

Illustrated Index

NOTE:

- Use new O-rings and gaskets when reassembling.
- Replace rubber seals if damaged or deteriorated.



**CAUTION:**

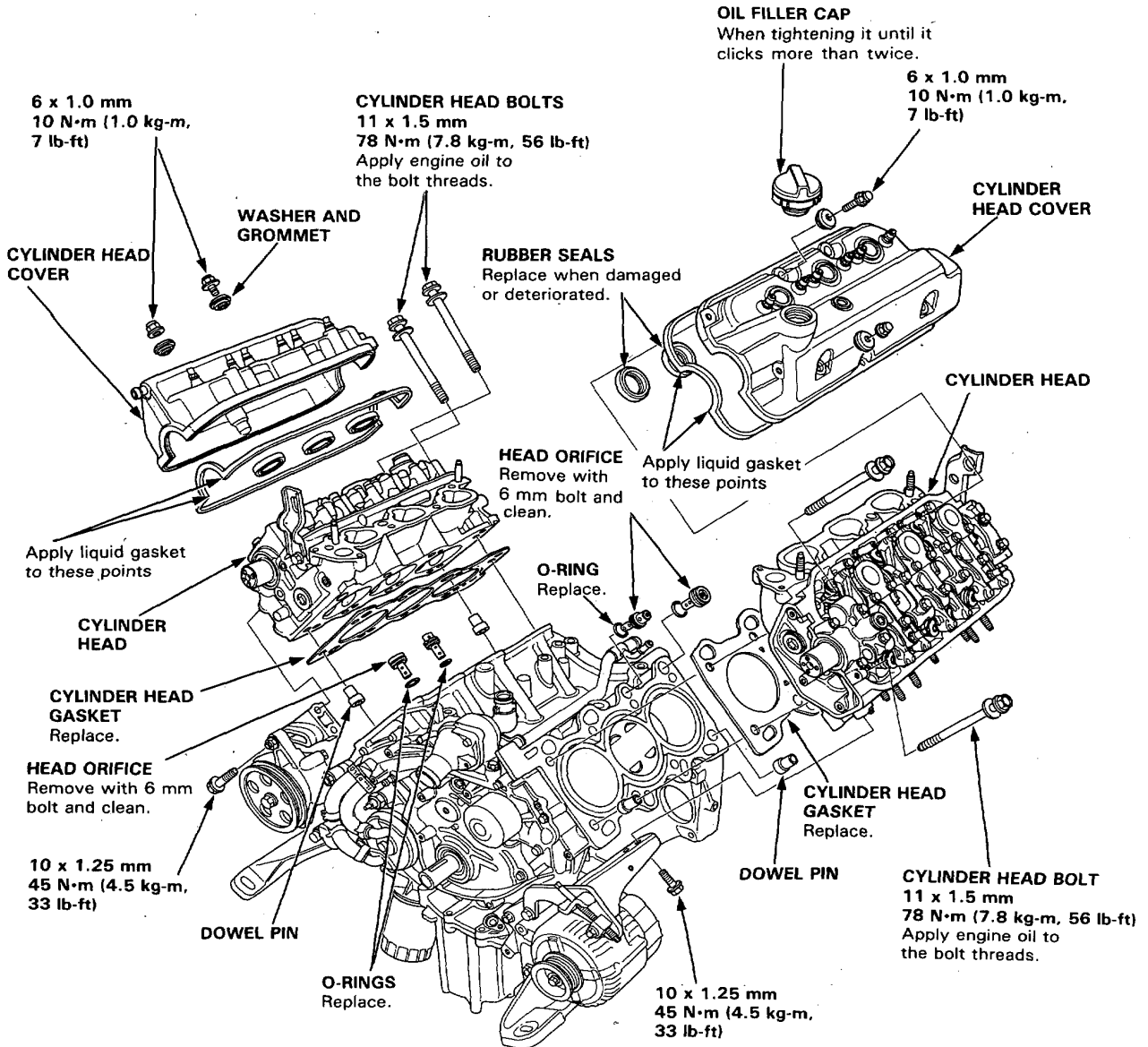
- To avoid damaging the cylinder head, wait until the coolant temperature drops below 38°C (100°F) before removing it.

NOTE:

- Use new O-rings and gaskets when reassembling.
- Use liquid gasket, Part No. 0Y740-99986.



Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.



Cylinder Head/Valve Train

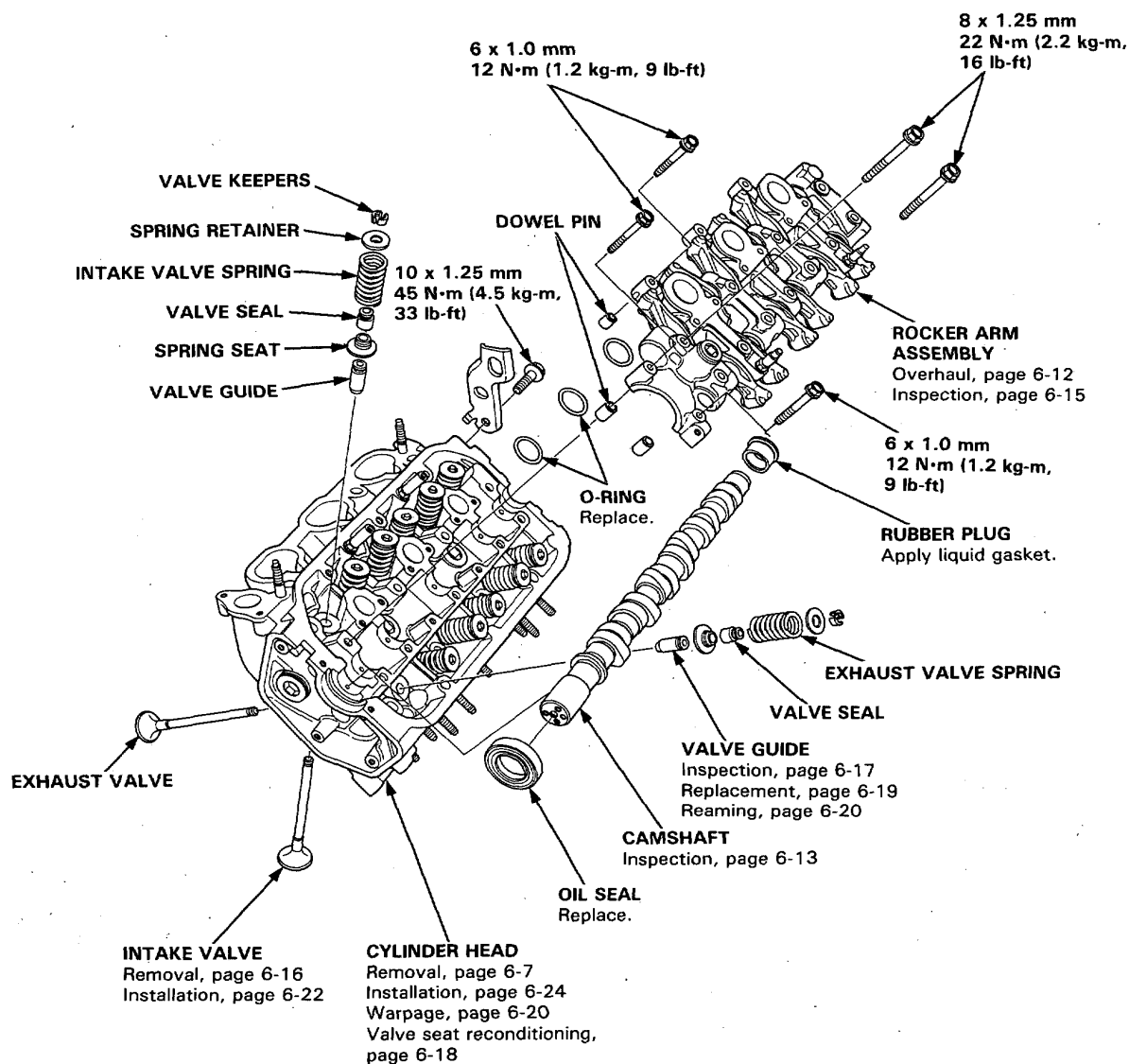
Illustrated Index (cont'd)

NOTE:

- Use new O-rings and gaskets when reassembling.
- Use liquid gasket, Part No. 0Y740-99986



Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.





Cylinder Heads

Removal

Engine removal is not required for this procedure.

CAUTION: To avoid damaging the cylinder heads, wait until the coolant temperature drops below 38°C (100°F) before loosening the retaining bolts.

NOTE:

- Inspect the timing belt before removing the cylinder heads.
- Turn the crankshaft so that the No. 1 piston is at top-dead-center (page 6-31).
- Mark all emission hoses before disconnecting them.

1. Disconnect the negative terminal from the battery.
2. Remove the battery and battery base.
3. Remove the air cleaner and air intake hose.
4. Drain the cooling system (page 10-5).
5. Disconnect the brake booster vacuum hose (page 5-5).
6. Remove the engine secondary ground cable from the cylinder head and cylinder block.
7. Relieve fuel pressure.

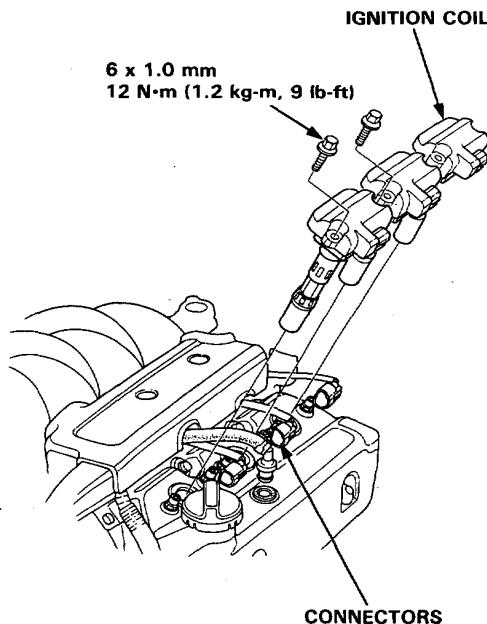
⚠ WARNING Do not smoke while working on fuel system, keep open flame or spark away from work area. Drain fuel only into an approved container.

8. Disconnect the fuel hose and fuel return hose (page 5-6).

9. Disconnect the throttle cable at the throttle body (page 5-4).

NOTE: Take care not to bend the cable when removing it. Always replace a kinked cable with a new one.

10. Disconnect the charcoal canister hose at the throttle valve.
11. Disconnect the terminal and connectors, then remove the main fuse box.
12. Remove the injector resistor and the connector.
13. Disconnect the connectors, then remove the ignition coils.



(cont'd)

Cylinder Heads

Removal (cont'd)

14. Remove the engine wire harness covers.
15. Disconnect the engine sub harness connectors and the clamps from the cylinder head and intake manifold.

Right cylinder head:

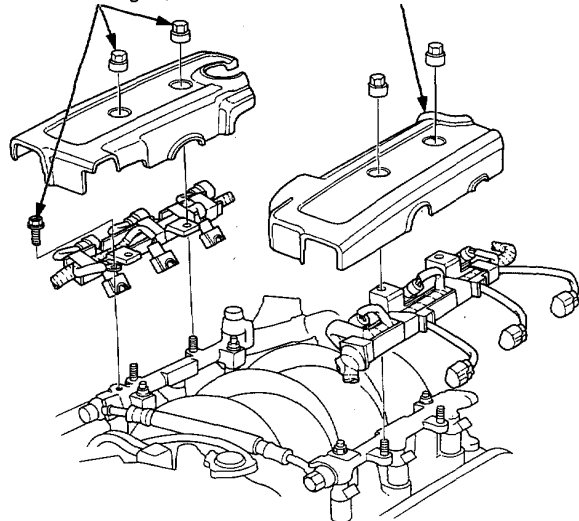
- Three injector connectors (cylinder No. 1, 2, and 3)
- TW sensor connector
- EGR sensor connector (except KQ)

Left cylinder head:

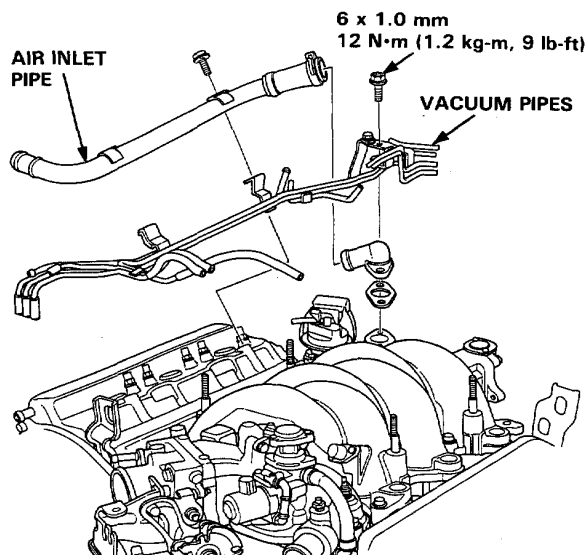
- Three injector connectors (cylinder No. 4, 5, and 6)
- CRANK/CYL sensor connector
- Temperature gauge sender connector
- TA sensor connector

6 x 1.0 mm
12 N·m (1.2 kg-m, 9 lb-ft)

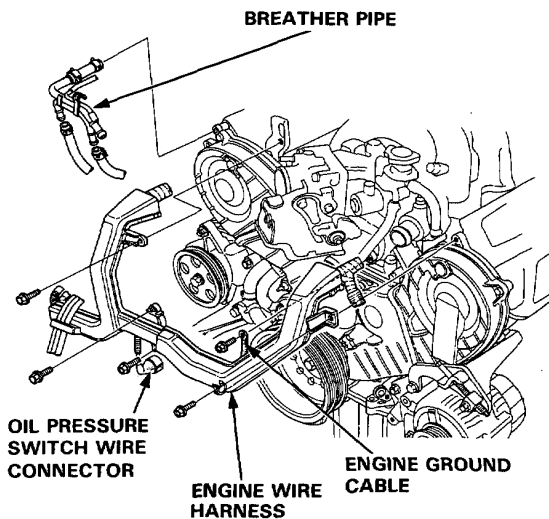
HARNESS COVER



16. Remove the air inlet pipe.
17. Remove the vacuum pipes and hoses.



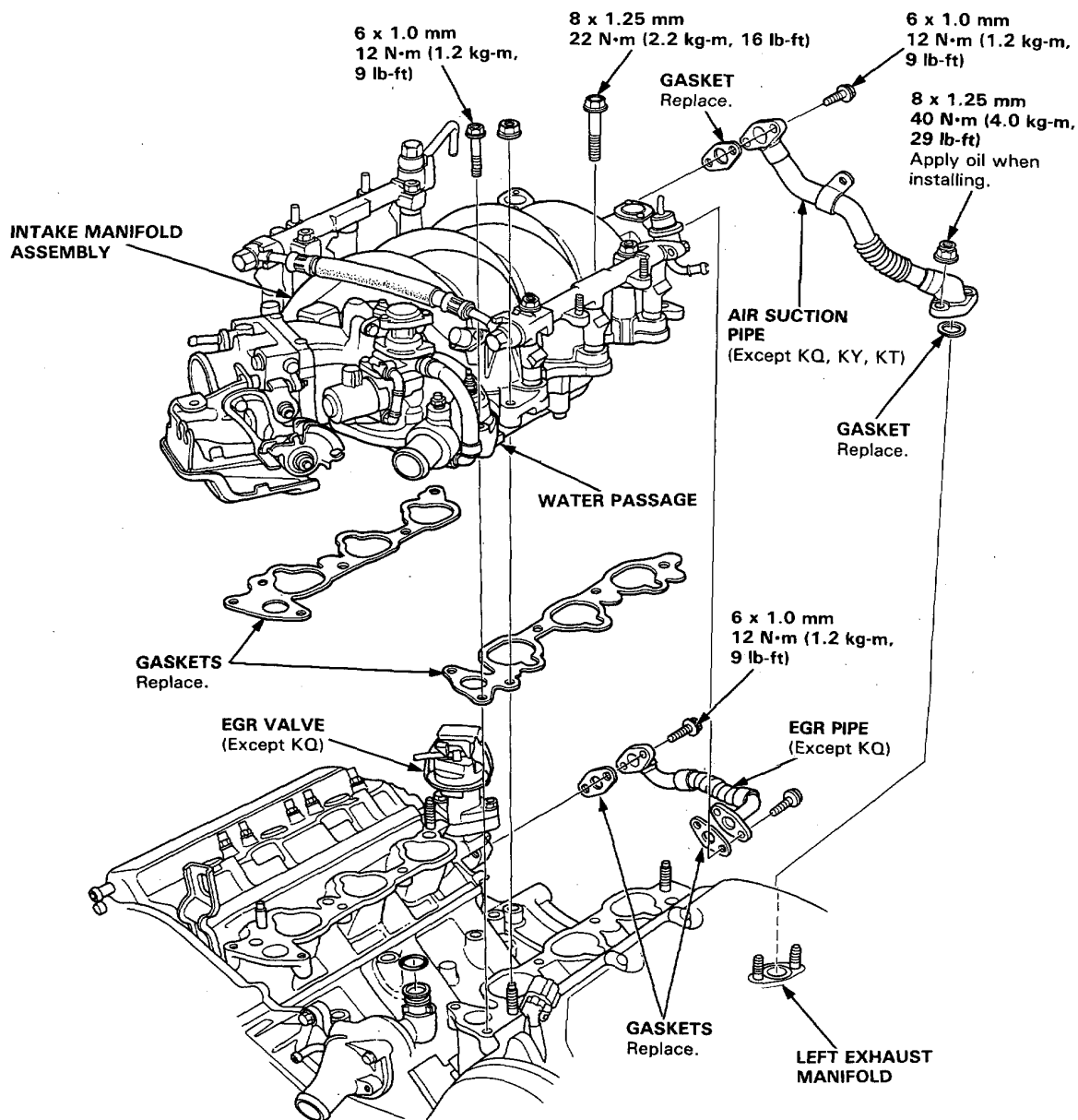
18. Remove the connectors and the clamps, then remove the engine wire harness.
 - Throttle sensor connectors
 - Engine ground terminals
 - Left and right oxygen sensors (except KY, KT)
19. Remove the breather pipe.





20. Remove the fuel return hose.
21. Remove the air suction pipe (except KQ, KY, KT) and the EGR pipe (except KQ).
22. Remove the water passage along with the intake manifold assembly.

NOTE: Fill the cylinder head intake parts with clean shop towels to prevent foreign materials from getting into the cylinders.



(cont'd)

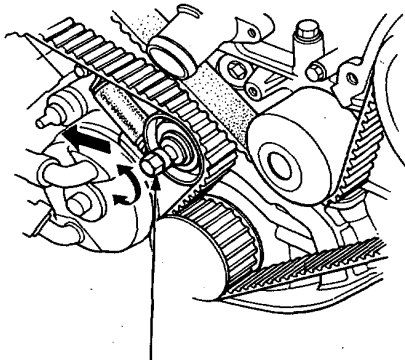
Cylinder Heads

Removal (cont'd)

23. Remove the timing belt upper covers.

24. Loosen the timing belt adjusting bolt 180° and release the belt tension.

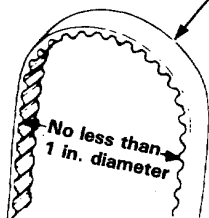
NOTE: Push on belt by the right cam pulley to release tension, then retighten the adjusting bolt.



ADJUSTING BOLT
Do not remove.
Loosen it 180°.

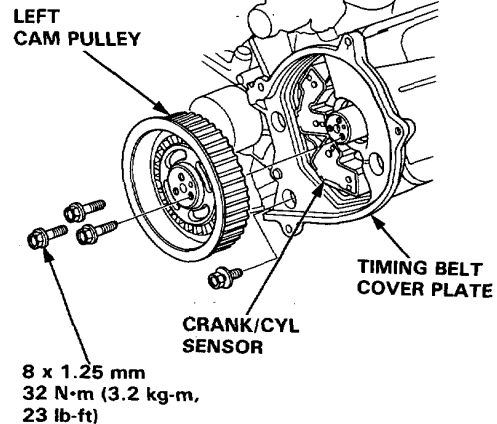
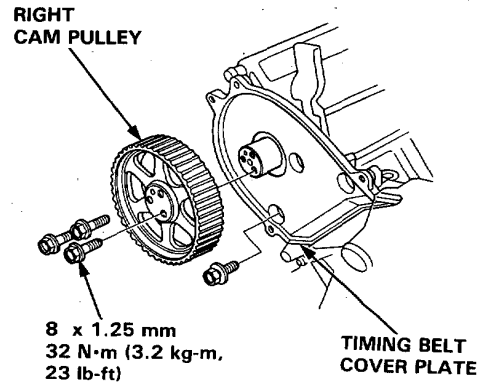
25. Remove the belt from the cam pulleys.

CAUTION: Do not crimp or bend the timing belt more than 90° or less than 25 mm (1 in) in diameter.



No less than
1 in. diameter

26. Remove the cam pulleys.

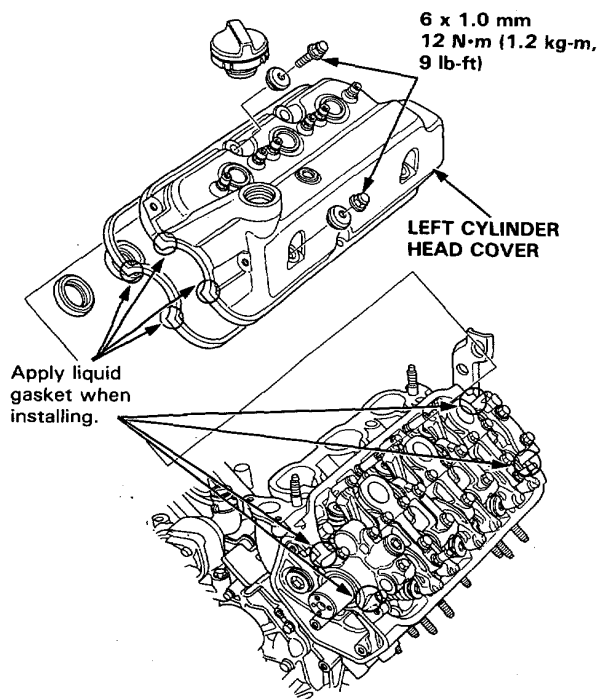
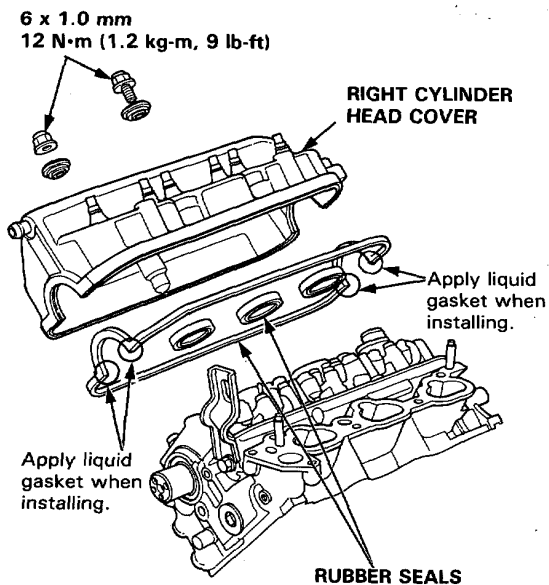


27. Remove the timing belt cover plates.

28. Remove the CRANK/CYL sensor from the left cylinder head.



29. Remove the cylinder head covers.



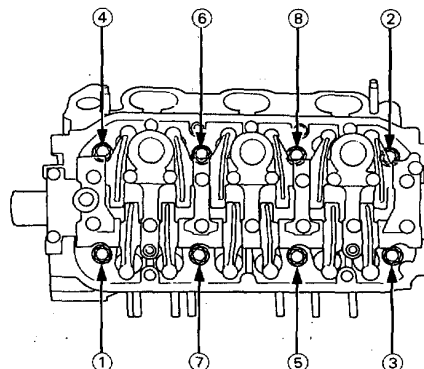
30. Remove three bolts from the alternator bracket, and remove two bolts from the power steering bracket.

31. Remove the self-locking nuts on the exhaust pipes, then disconnect the exhaust pipes from the manifolds.

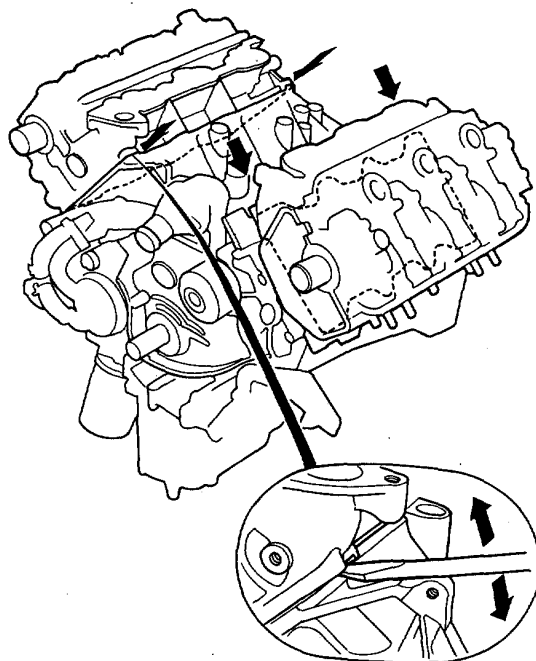
32. Remove the cylinder head bolts, then remove the cylinder heads.

CAUTION: To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat until all bolts are loosened.

CYLINDER HEAD BOLT LOOSENING SEQUENCE



NOTE: Separate the cylinder heads from the block with a flat blade screwdriver as shown.



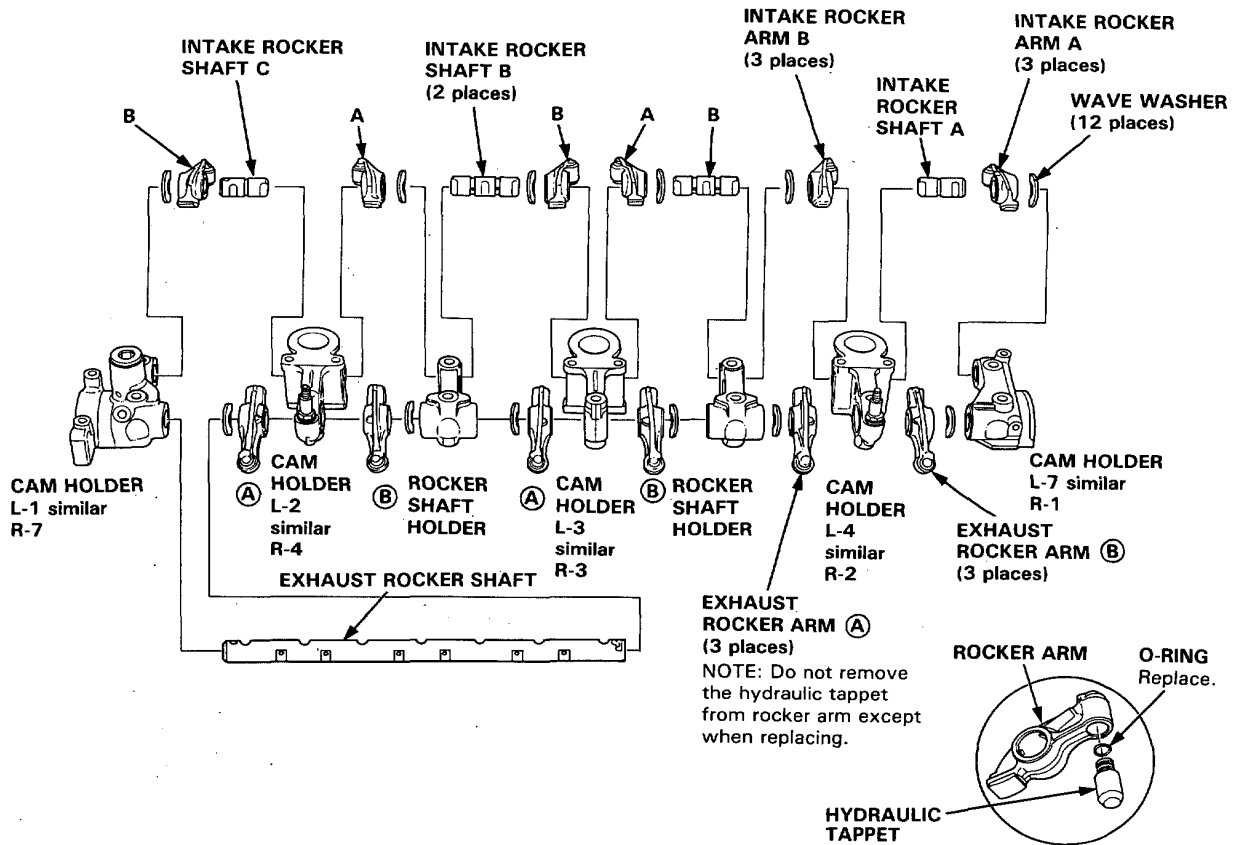
33. Remove the left and right exhaust manifold covers, then remove the left and right exhaust manifolds.

Rocker Arms and Shafts

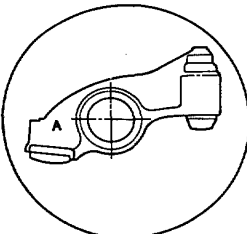
Overhaul

NOTE:

- Refer to page 6-13 for rocker arm assembly removal.
- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (pages 6-15).
- Rocker arms must be installed in the same position if reused.
- When removing or installing rocker arm assembly, do not remove the cam holder bolts. The bolts will keep the holders, springs and rocker arms on the shaft.

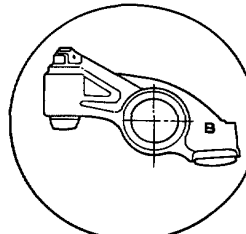


INTAKE ROCKER ARM A



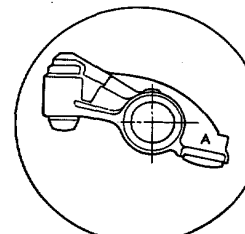
Letter "A" is stamped on rocker arm.

INTAKE ROCKER ARM B



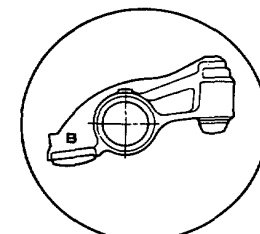
Letter "B" is stamped on rocker arm.

EXHAUST ROCKER ARM A



Letter "A" is stamped on rocker arm.

EXHAUST ROCKER ARM B



Letter "B" is stamped on rocker arm

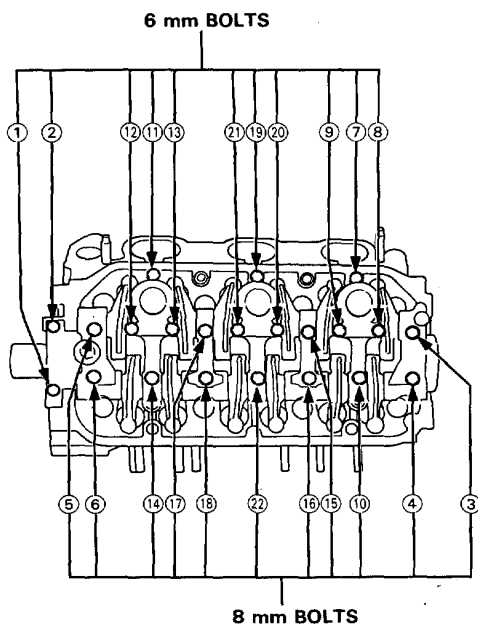


Removal

NOTE:

- Unscrew the cam holder bolts, two turns at a time in a criss-cross pattern, to prevent damaging the valves or rocker arm assembly.
- When removing the rocker arm assembly, do not remove the cam holder bolts. The bolts will keep the cam holders, the springs and the rocker arms on the shafts.

CAM HOLDER BOLT LOOSENING SEQUENCE



Camshaft

Inspection

NOTE:

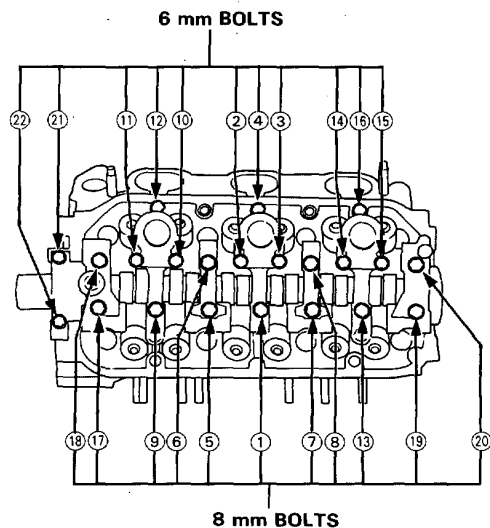
- Do not rotate the camshaft during inspection.
- Remove the rocker arms and rocker shafts.

1. Put the camshaft and the cam holders on the cylinder head, then tighten the bolts to the specified torque.

Specified torque:

8 mm bolts: 22 N·m (2.2 kg-m, 16 lb-ft)

6 mm bolts: 12 N·m (1.2 kg-m, 9 lb-ft)

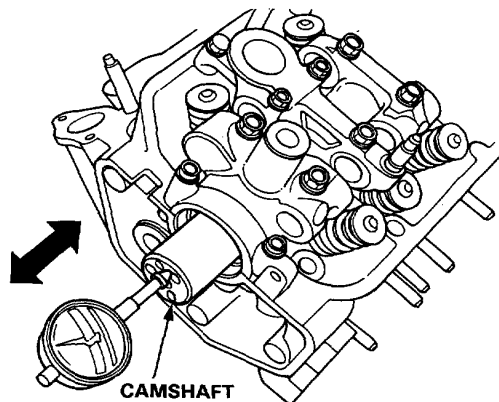


2. Seat the camshaft by pushing it toward rear end of cylinder head.
3. Zero the dial indicator against the rear end. Push the camshaft back and forth, and read the end play.

Camshaft End Play:

Standard (New): 0.05–0.15 mm
(0.002–0.006 in)

Service Limit: 0.15 mm (0.006 in)



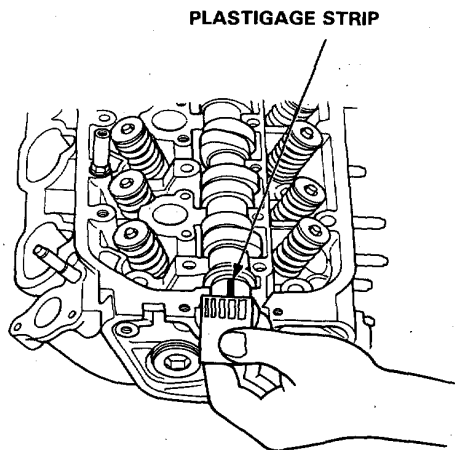
(cont'd)

Camshaft

Inspection (cont'd)

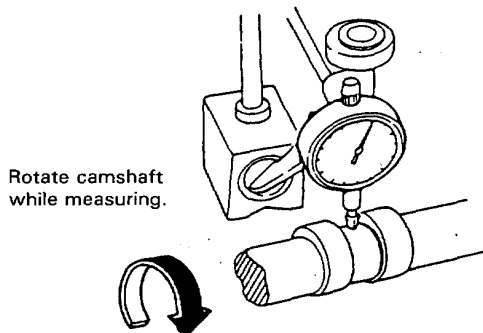
4. Remove the bolts, then remove the cam holders from the cylinder head.
 - Lift camshaft out of cylinder head, wipe clean, then inspect lift ramps. Replace camshaft if lobes are pitted, scored, or excessively worn.
 - Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place.
 - Insert plastigage strip across each journal.
5. Install the cam holders and tighten the bolts to the specified torque as shown in the previous page.
6. Measure widest portion of plastigage on each journal.

Camshaft Bearing Radial Clearance:
Standard (New): 0.050–0.089 mm
(0.002–0.004 in)
Service Limit: 0.10 mm (0.004 in)



7. If camshaft bearing radial clearance is out of tolerance:
 - And camshaft has already been replaced, you must replace the cylinder head.
 - If camshaft has not been replaced, first check total runout with the camshaft supported on V-blocks.

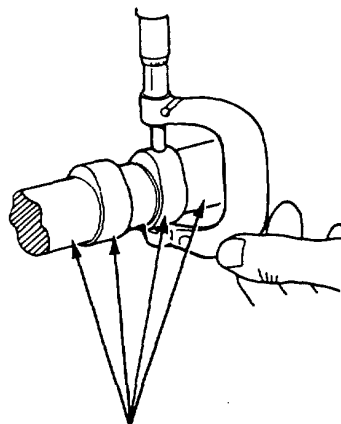
Camshaft Total Runout:
Standard (New): 0.015 mm (0.0006 in)
Service Limit: 0.030 mm (0.0010 in)



- If the total runout of the camshaft is within tolerance, replace the cylinder head.
- If the total runout is out of tolerance, replace the camshaft and recheck. If the bearing clearance is still out of tolerance, replace the cylinder head.

8. Check cam lobe height wear.

Cam lobe height standard (New):
INTAKE 40.005 mm (1.5750 in)
EXHAUST 37.766 mm (1.4868 in)



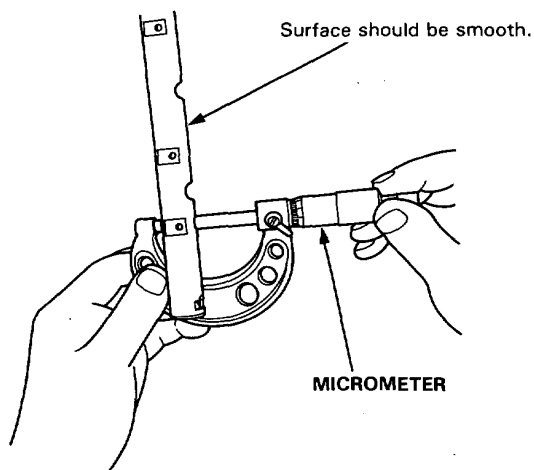


Rocker Arms and Shafts

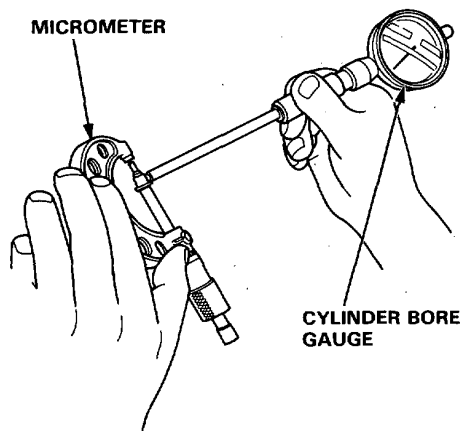
Clearance

Measure both the intake rocker shaft and exhaust rocker shaft.

1. Measure diameter of shaft at first rocker location.

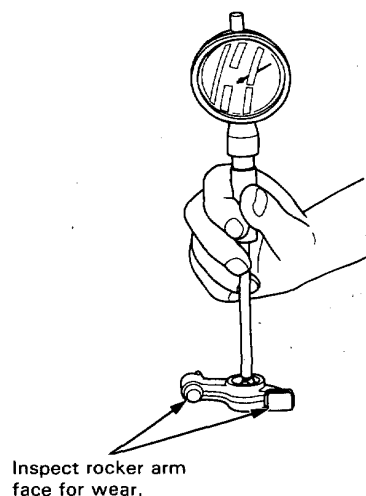


2. Zero gauge to shaft diameter.



3. Measure inside diameter of rocker arm and check for out-of-round condition.

Rocker Arm Radial Clearance:
Service Limit: 0.08 mm (0.003 in.)



4. Repeat for all rockers.
— If over limit, replace rocker shaft and all over-tolerance rocker arms.

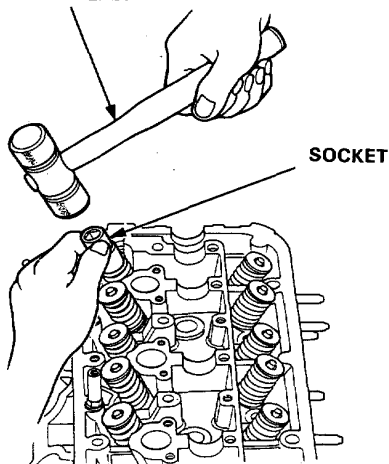
Valves and Valve Seals

Replacement

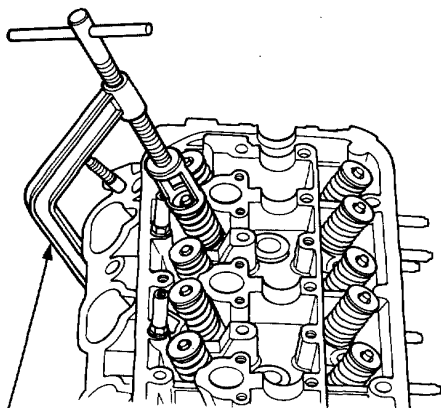
NOTE: Identify valves and valve springs as they are removed so that each item can be reinstalled in its original position.

1. Using an appropriate-sized socket and plastic mallet, lightly tap the valve retainer to loosen the valve keepers before installing the valve spring compressor.

PLASTIC MALLET

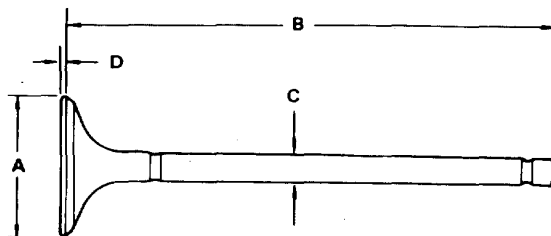


2. Install spring compressor. Compress spring and remove valve keeper.



VALVE SPRING
COMPRESSOR
07757-0010000

3. Remove the valve guide seal.



Intake Valve Dimensions

A Standard (New)	32.9–33.1 mm (1.295–1.303 in)
B Standard (New)	113.58–113.88 mm (4.472–4.483 in)
C Standard (New)	5.48–5.49 mm (0.2157–0.2161 in)
C Service Limit	5.450 mm (0.2146 in)
D Standard (New)	0.85–1.15 mm (0.033–0.045 in)
D Service Limit	0.65 mm (0.026 in)

Exhaust Valve Dimensions

A Standard (New)	27.9–28.1 mm (1.098–1.106 in)
B Standard (New)	116.03–116.33 mm (4.568–4.580 in)
C Standard (New)	5.45–5.46 mm (0.2146–0.2150 in)
C Service Limit	5.42 mm (0.2134 in)
D Standard (New)	1.35–1.65 mm (0.053–0.065 in)
D Service Limit	1.15 mm (0.045 in)



Valves

Valve Movement

Measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).

Intake Valve Stem-to-Guide Clearance:

Standard (New): 0.04–0.10 mm
(0.002–0.004 in)

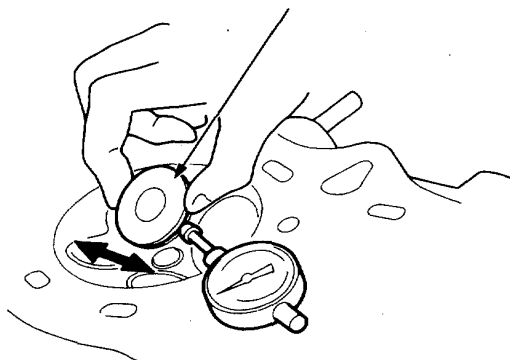
Service Limit: 0.16 mm (0.006 in)

Exhaust Valve Stem-to-Guide Clearance:

Standard (New): 0.10–0.16 mm
(0.004–0.006 in)

Service Limit: 0.22 mm (0.009 in)

Valve extended 10 mm out from seat.



- If measurement exceeds the service limit, recheck using a new valve.
- If measurement is now within the service limit, reassemble using a new valve.
- If measurement still exceeds limit, recheck using alternate method below, then replace valve and guide, if necessary.

NOTE: An alternate method of checking guide to stem clearance is to subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball guide. Take the measurements in three places along the valve stem and three places inside the valve guide. The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit.

Intake Valve Stem-to-Guide Clearance:

Standard (New): 0.02–0.05 mm
(0.001–0.002 in)

Service Limit: 0.08 mm (0.003 in)

Exhaust Valve Stem-to-Guide Clearance:

Standard (New): 0.05–0.08 mm
(0.002–0.003 in)

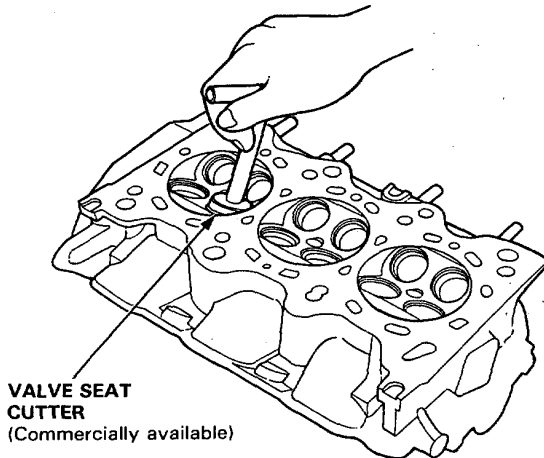
Service Limit: 0.11 mm (0.004 in)

Valve Seats

Reconditioning

1. Renew the valve seats in the cylinder head using a valve seat cutter.

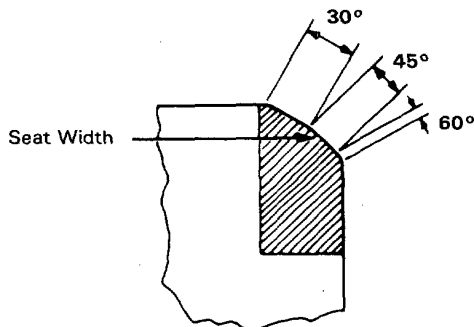
NOTE: If guides are worn (page 6-17), replace them (page 6-19) before cutting the valve seats.



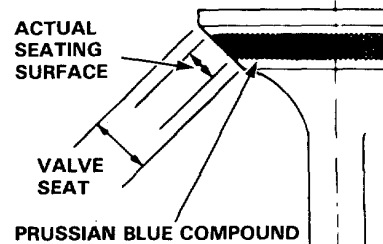
2. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.
3. Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 60° cutter. Check width of seat and adjust accordingly.
4. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

Valve Seat Width:

Standard: IN 1.25–1.55 mm
(0.049–0.061 in)
EX 1.25–1.55 mm
(0.049–0.061 in)
Service Limit: IN 2.0 mm (0.079 in)
EX 2.0 mm (0.079 in)



5. After resurfacing the seat, inspect for even valve seating: Apply Prussian Blue compound to the valve face, and insert valve in original location in the head, then lift and snap it closed against the seat several times.



6. The actual valve seating surface, as shown by the blue compound, should be centered on the seat.
 - If it is too high (closer to the valve stem), you must make a second cut with the 60° cutter to move it down, then one more cut with the 45° cutter to restore seat width.
 - If it is too low (closer to the valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

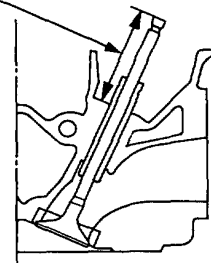
NOTE: The final cut should always be made with the 45° cutter.

7. Insert intake and exhaust valves in the head and measure valve stem installed height.

Valve Stem Installed Height:

Standard (New): IN 46.935–47.375 mm
(1.8478–1.8671 in)
EX 47.885–48.375 mm
(1.8852–1.9045 in)
Service Limit: IN 47.625 mm (1.8750 in)
EX 48.575 mm (1.9124 in)

VALVE STEM INSTALLED HEIGHT



8. If valve stem installed height is over the service limit, replace valve and recheck. If still over the service limit, replace cylinder head; the valve seat in the head is too deep.



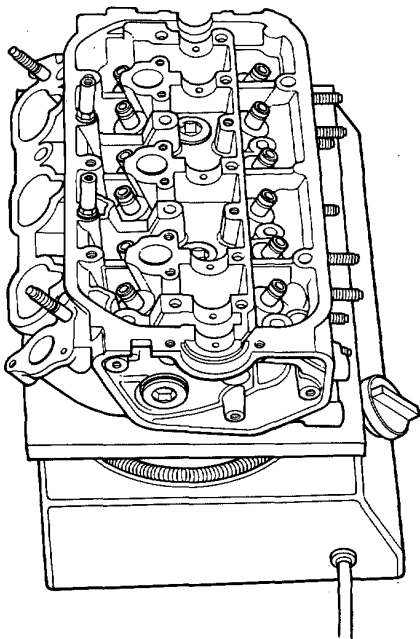
Valve Guides

Replacement

NOTE:

- For best results, heat cylinder head to 150°C (300°F) before removing or installing guides.
- It may be necessary to use an air hammer to remove some valve guides.

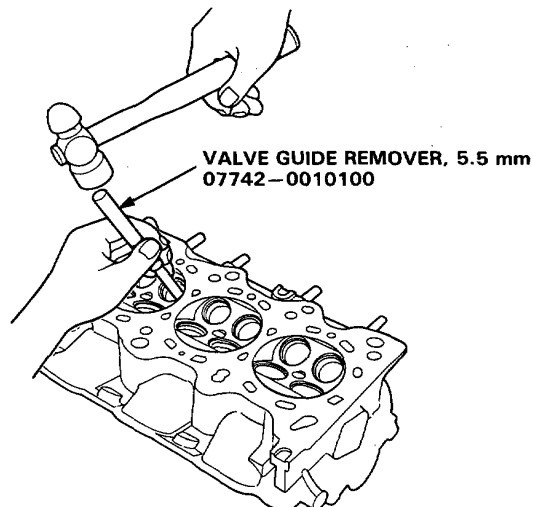
1. Use a hot plate or oven to evenly heat the cylinder head to 150°C (300°F). Monitor the temperature with a cooking thermometer.



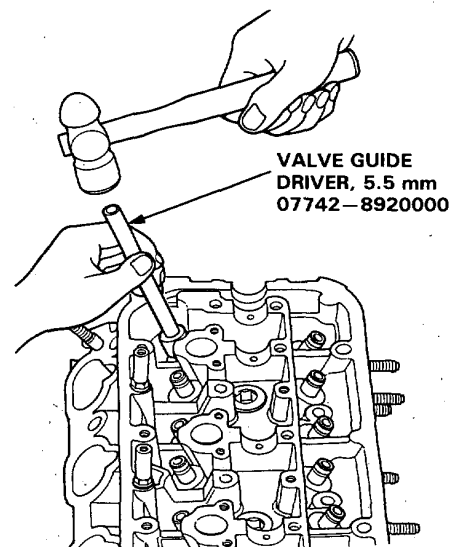
CAUTION:

- Do not use a torch; it may warp the head.
- Do not get the head hotter than 150°C (300°F); excessive heat may loosen the valve seats.
- To avoid burns, use heavy gloves when handling the heated cylinder head.

2. Drive the valve guide out from the bottom of the cylinder head.

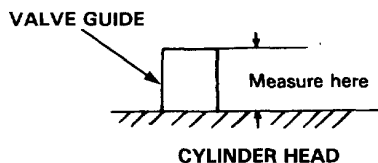


3. Drive in a new valve guide from the camshaft side of the cylinder head.



Valve Guide Installed Height:

Intake: 15.75 – 16.25 mm (0.620 – 0.640 in)
Exhaust: 15.75 – 16.25 mm (0.620 – 0.640 in)



Cylinder Heads

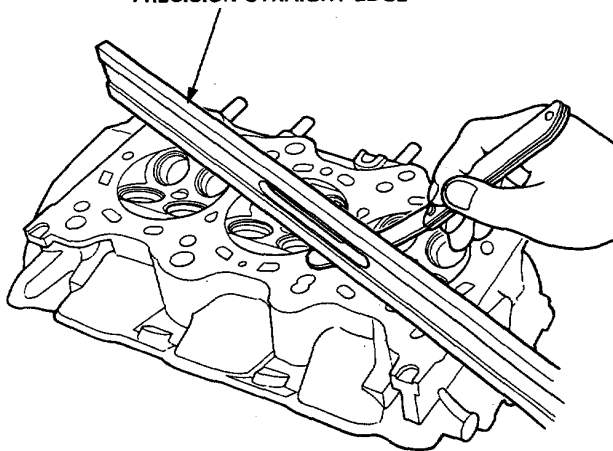
Warpage

NOTE: If camshaft bearing clearances (page 6-14) are not within specification, the head cannot be resurfaced.

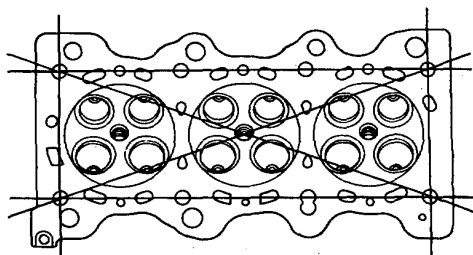
If camshaft bearing radial clearances are within specifications, check the head for warpage.

- If warpage is less than 0.05 mm (0.002 in) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in) and 0.2 mm (0.008 in), resurface cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in) based on a height of 100 mm (3.94 in)

PRECISION STRAIGHT EDGE



Measure along edges, and 3 ways across center.



Cylinder Head Height:

Standard (New): 99.95–100.05 mm
(3.935–3.939 in)

Service Limit: 0.05 mm (0.002 in)

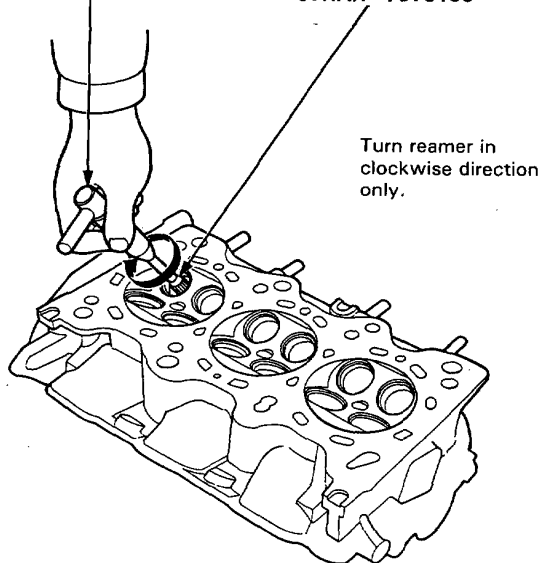
Valve Guides

Valve Guide Reaming

NOTE: For new valve guides only.

1. Coat both reamer and valve guide with cutting oil.
2. Rotate the reamer clockwise the full length of the valve guide bore.
3. Continue to rotate the reamer clockwise while removing it from the bore.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check clearance with a valve (page 6-17).
— Verify that the valve slides in the valve guide without exerting pressure.

REAMER HANDLE
VALVE GUIDE REAMER, 5.5 mm 07HAH—PJ70100

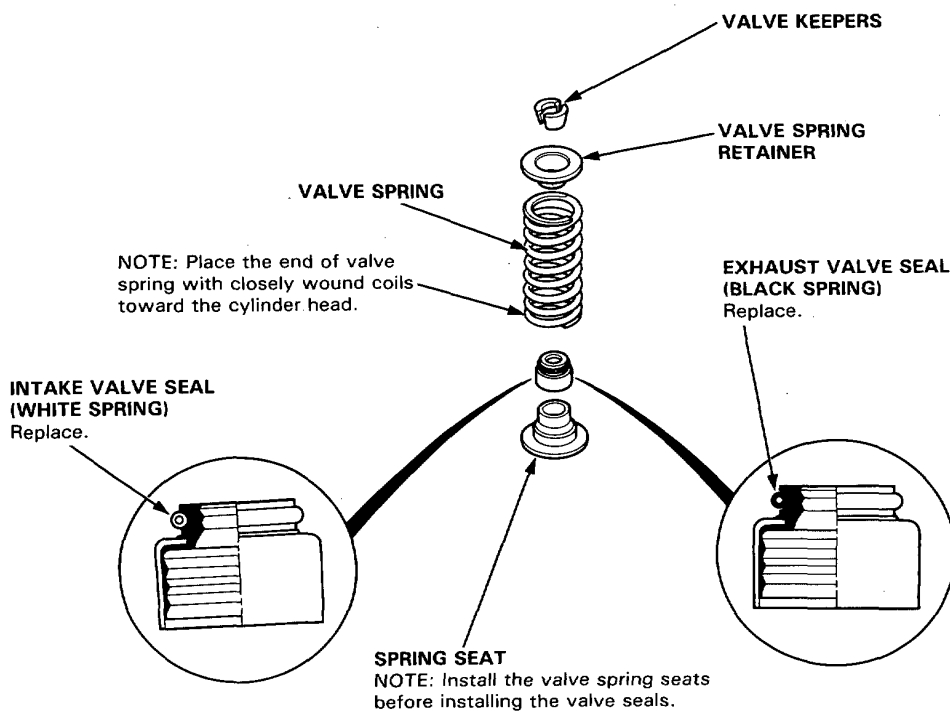




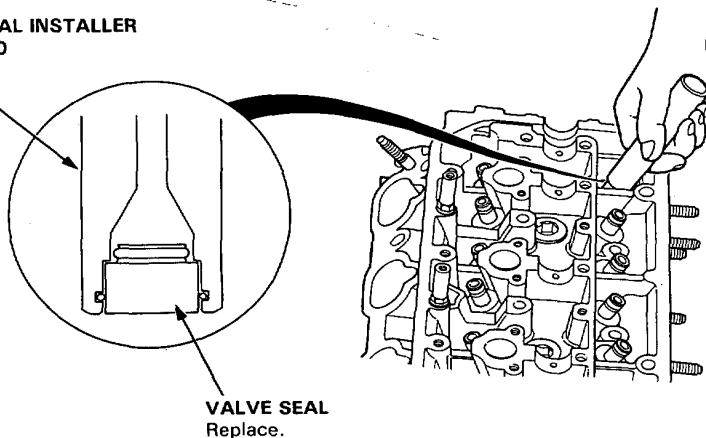
Valve Springs and Valves

Valve Spring and Valve Seal Installation Sequence

NOTE: Exhaust and intake valve seals are NOT interchangeable.



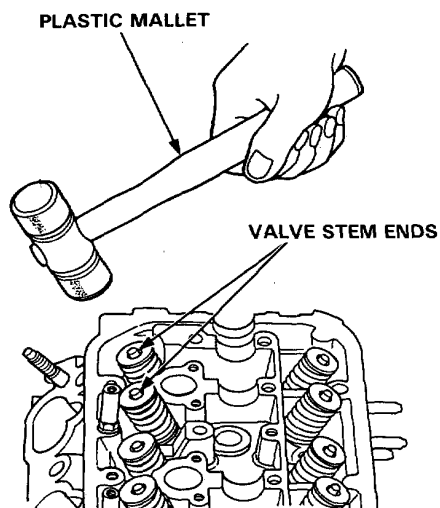
VALVE GUIDE SEAL INSTALLER
07HAD—PJ70200



Valve Springs and Valves

Valve Installation

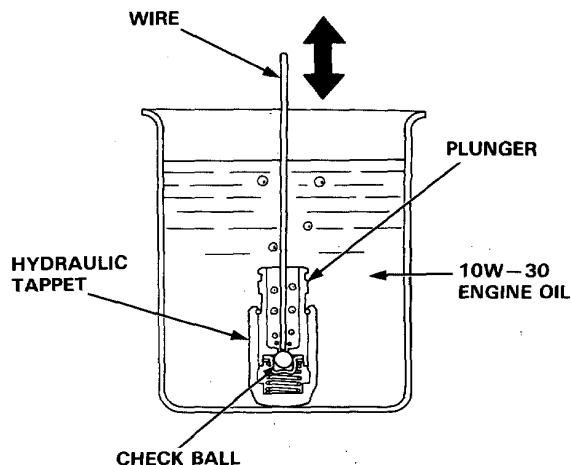
- When installing valves in cylinder head, coat valve stems with oil before inserting into valve guides, and make sure valves move up and down smoothly.
- When valves and springs are in place, lightly tap the end of each valve stem two or three times to ensure proper seating of valve and valve keepers.



Hydraulic Tappets

Bleeding

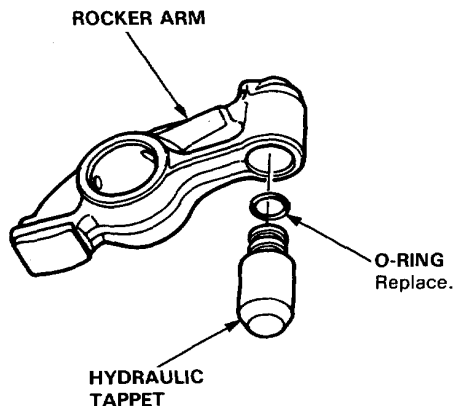
1. Fill a container with 10W–30 engine oil and place the hydraulic tappet in it. Press down on the check ball with a thin wire. Bleed the tappet of air by pumping the plunger slowly until no bubbles come out of the hydraulic tappet.



2. Install the hydraulic tappet to the rocker arm.

NOTE:

- Use new O-ring when reassembling.
- Apply oil to O-ring before installation.





Camshafts/Rocker Arms and Camshaft Seals

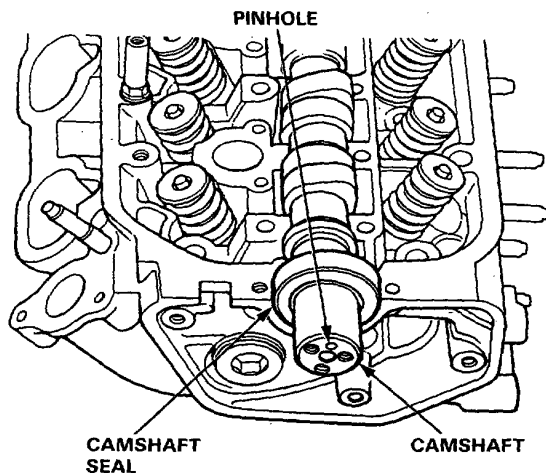
Installation

CAUTION:

- Make sure that all rockers are in alignment with valves when torquing rocker assembly bolts.
- To prevent rocker arm assembly from coming apart, leave the cam holder holding bolts in the holes.
- Handle the rocker arms carefully so that the oil does not come out of hydraulic tappets.

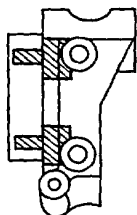
1. After wiping down the cam and journals in cylinder head, lubricate both surfaces and install camshaft.
2. Set the camshaft and camshaft seal as shown below.
3. Install the camshaft seal with the open side (spring) facing in.

 Lubricate cam lobes after reassembly.

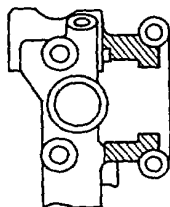


Seal housing surface should be dry.
Apply a light coat of oil to camshaft
and inner lip of seal.

4. Apply liquid gasket to the head mating surfaces of the No. 1 and the No. 7 cam holders.
— Apply liquid gasket to the shaded areas.

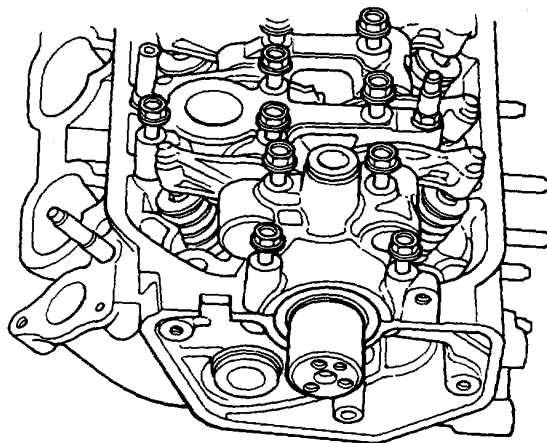


No. 7 (L. HEAD)
Similar
No. 1 (R. HEAD)



No. 1 (L. HEAD)
Similar
No. 7 (R. HEAD)

5. Set the rocker arm assembly in place and loosely install the bolts.
— Make sure that the rocker arms are properly positioned on the valve stems.

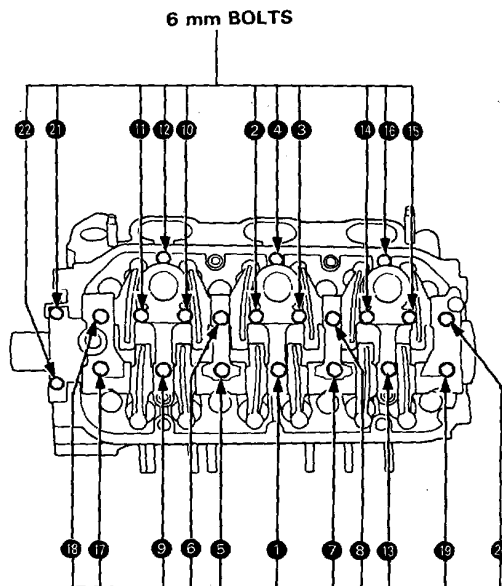


6. Tighten each bolt two turns at a time in the sequence shown below to ensure that the rockers do not bind on the valves.

Specified torque:

8 mm bolts: 22 N·m (2.2 kg·m, 16 lb·ft)

6 mm bolts: 12 N·m (1.2 kg·m, 9 lb·ft)



8 mm BOLTS

Cylinder Heads

Installation

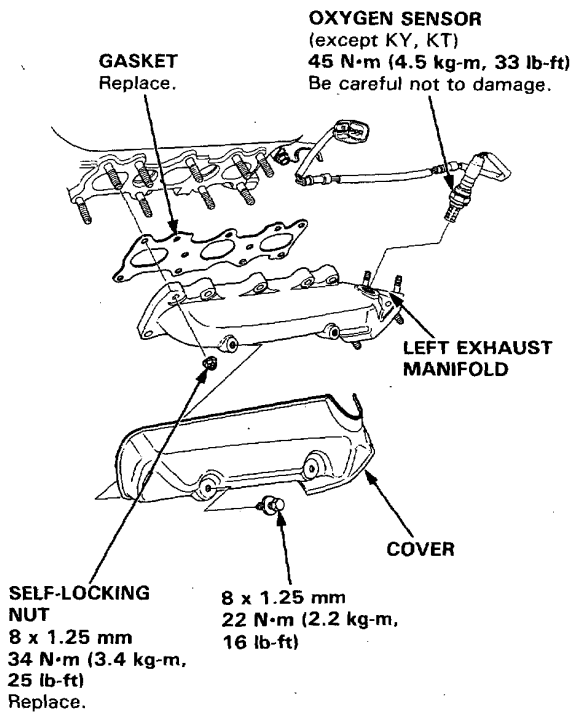
Install the cylinder heads in the reverse order of removal:

- Always use new head gaskets.
- Cylinder heads and engine block surface must be clean.
- Turn the crankshaft so that No. 1 piston is at TDC (page 6-30).

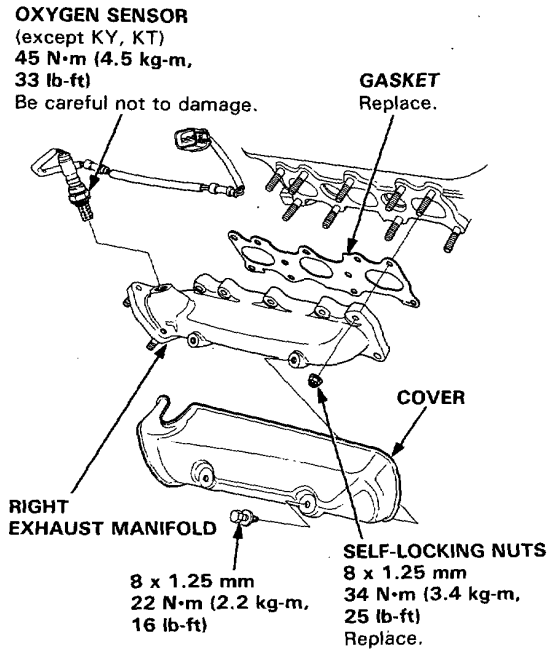
1. Install the left and right exhaust manifolds to each cylinder head, then tighten the self-locking nuts in a criss-cross pattern in two or three steps, beginning with the inner nut.
 - Apply oil to the self-locking nut threads.
 - Always use new exhaust manifold gaskets.

2. Install the exhaust manifold covers.

LEFT EXHAUST MANIFOLD:

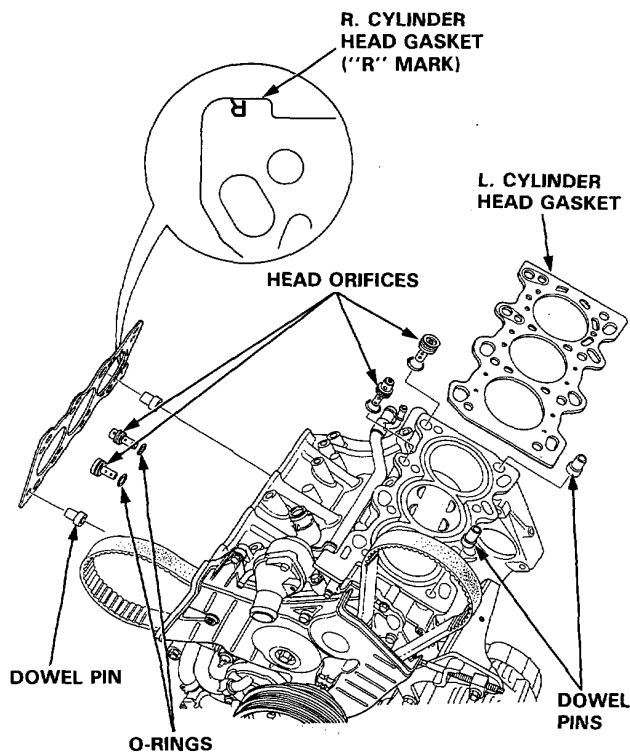


RIGHT EXHAUST MANIFOLD:





3. Install the cylinder heads on the engine block. The cylinder head dowel pins and the head oil control orifice must be aligned.
- Always use new cylinder head gaskets.



4. Tighten the cylinder head bolts sequentially in two or three steps.
- Apply clean engine oil to the bolt threads and washer contact surfaces.

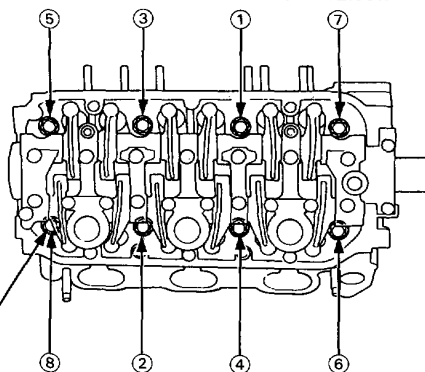
Specified Torque

11 x 1.5 mm

78 N·m (7.8 kg-m, 56 lb-ft)

NOTE: We recommend using a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and not to over-tighten.

CYLINDER HEAD BOLTS TORQUE SEQUENCE



CYLINDER HEAD BOLTS

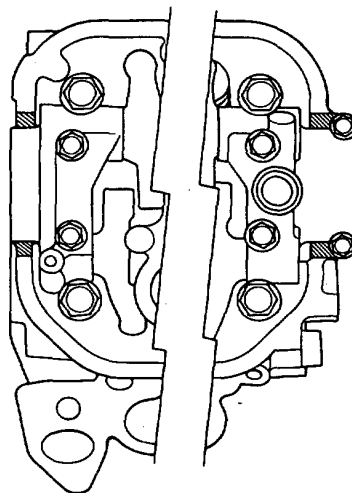
11 x 1.5 mm

78 N·m (7.8 kg-m, 56 lb-ft)

Apply clean engine oil to the bolt threads and washer contact surfaces.

5. Apply liquid gasket to the head mating surface of the No. 1 and No. 7 cam holder, then install the cylinder head cover.

— Apply liquid gasket to the shaded areas.

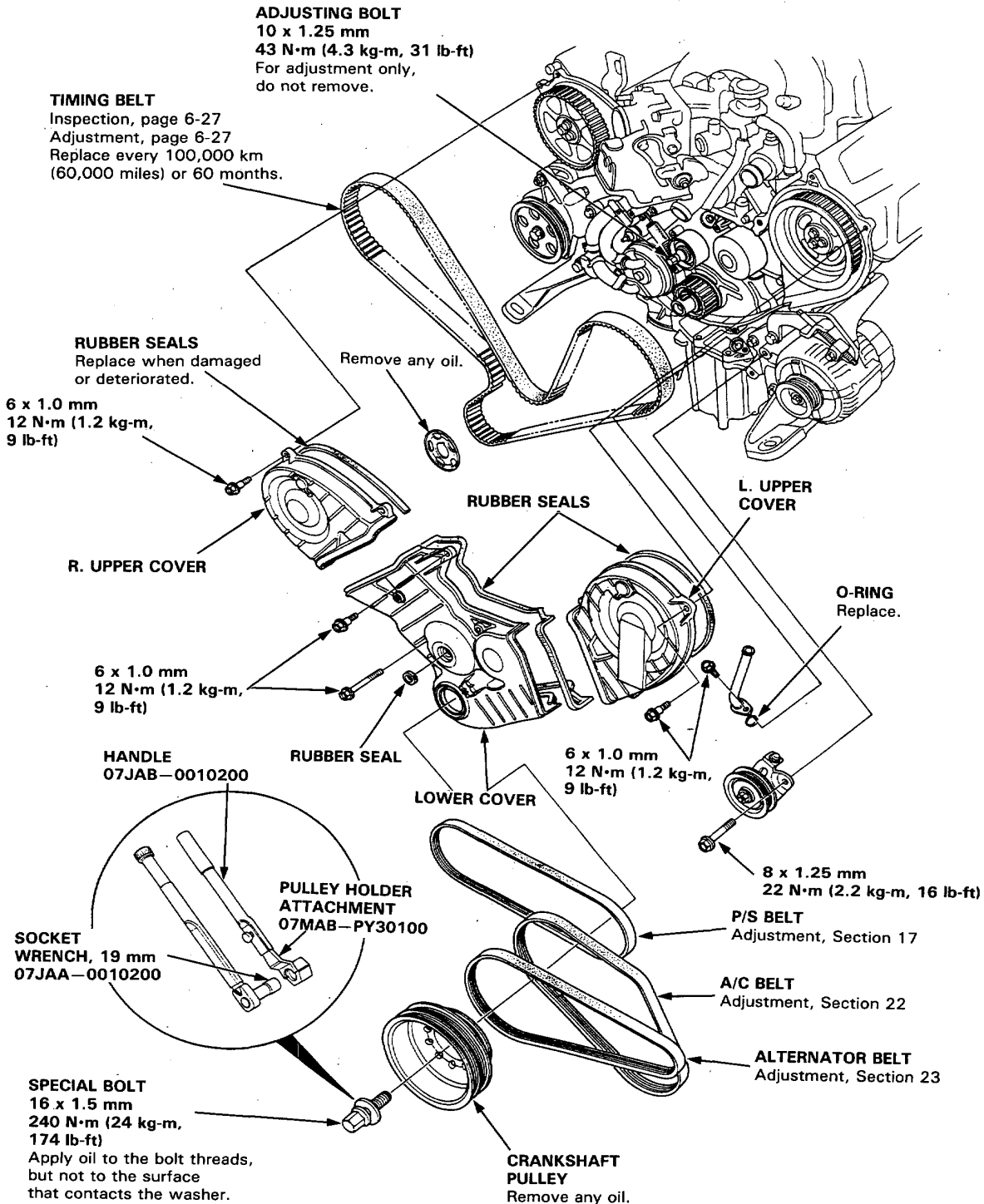


Timing Belt

Illustrated Index

NOTE:

- Turn the crankshaft so that the No. 1 piston is at TDC (page 6-30)
- Replace rubber seals if damaged or deteriorated.





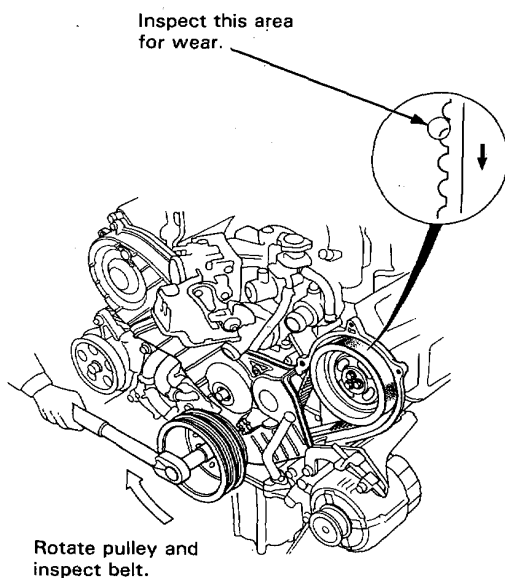
Timing Belt

Inspection

1. Remove the left upper cover.
2. Inspect the timing belt for cracks and oil soaking.

NOTE:

- Replace the belt if oil soaked.
- Remove any oil or solvent that gets on the belt.



Tension Adjustment

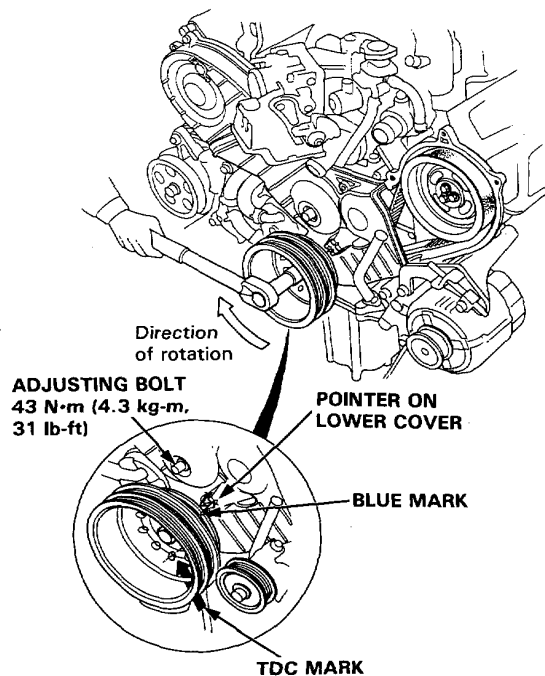
CAUTION:

- Always adjust timing belt tension with the engine cold.
- Do not rotate the crankshaft when adjusting bolt is loose.

NOTE:

- Tensioner is spring-loaded to apply proper tension to the belt automatically after making the following adjustment.
- Inspect the timing belt before adjusting the belt tension.
- Always rotate the crankshaft clockwise when viewed from the pulley side. Rotating it counterclockwise may result in improper adjustment of the belt tension.

1. Remove the left upper cover.
2. Set the No. 1 piston at TDC (page 6-30).
3. Rotate the crankshaft clockwise 9-teeth on camshaft pulley (The blue mark on crankshaft pulleys should line up with the pointer on lower cover).
4. Loosen the timing belt adjusting bolt 180°.
5. Tighten the adjusting bolt torque to 43 N·m (4.3 kg·m, 31 lb·ft).



Timing Belt

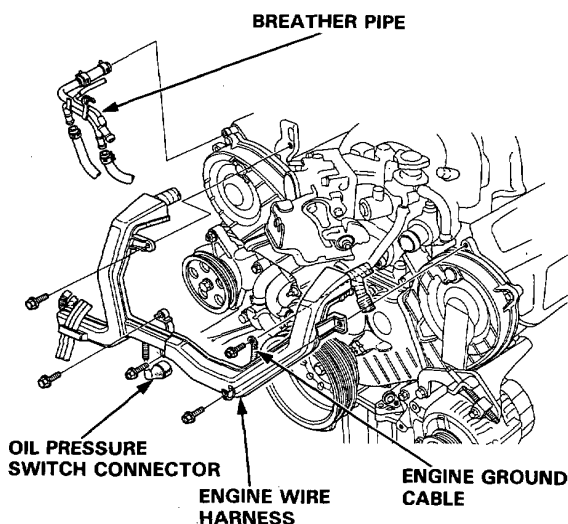
Removal

CAUTION: Inspect the water pump when replacing the timing belt (page 10-9).

NOTE:

- Turn the crankshaft so that the No. 1 piston is at top-dead-center (page 6-30 and 31).
- Before removing the timing belt, mark direction of rotation if it is to be reused.

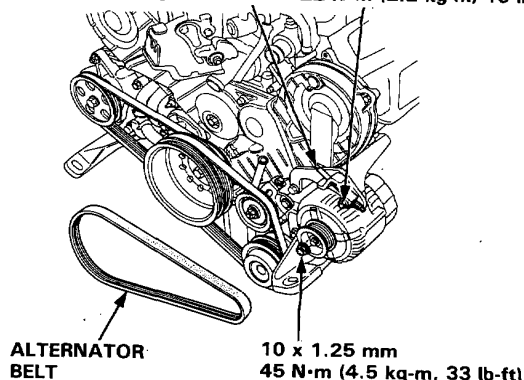
1. Disconnect the negative terminal from the battery.
2. Remove the engine wire harness covers (page 6-8).
3. Remove the engine wire harness.
4. Remove the breather pipe.
5. Remove the vacuum pipe A bracket.



6. Remove the alternator belt.

ADJUSTING BOLT

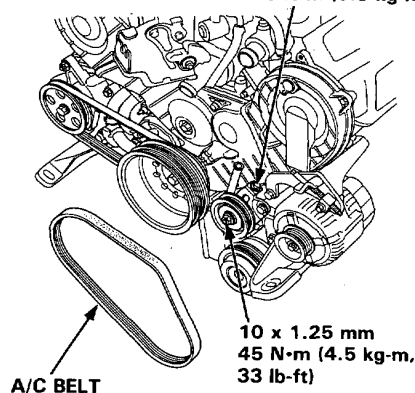
8 x 1.25 mm
8 N·m (0.8 kg-m, 6 lb-ft) 22 N·m (2.2 kg-m, 16 lb-ft)



7. Remove the A/C belt.

ADJUSTING BOLT

8 N·m (0.8 kg-m, 6 lb-ft)

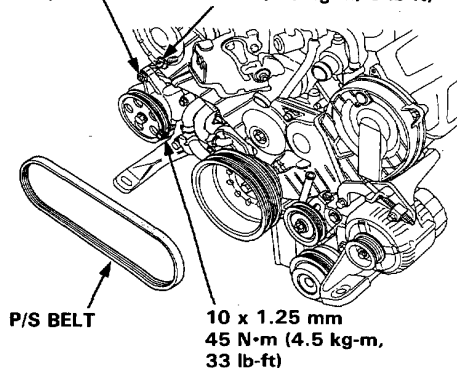


8. Remove the P/S belt.

8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)

ADJUSTING BOLT

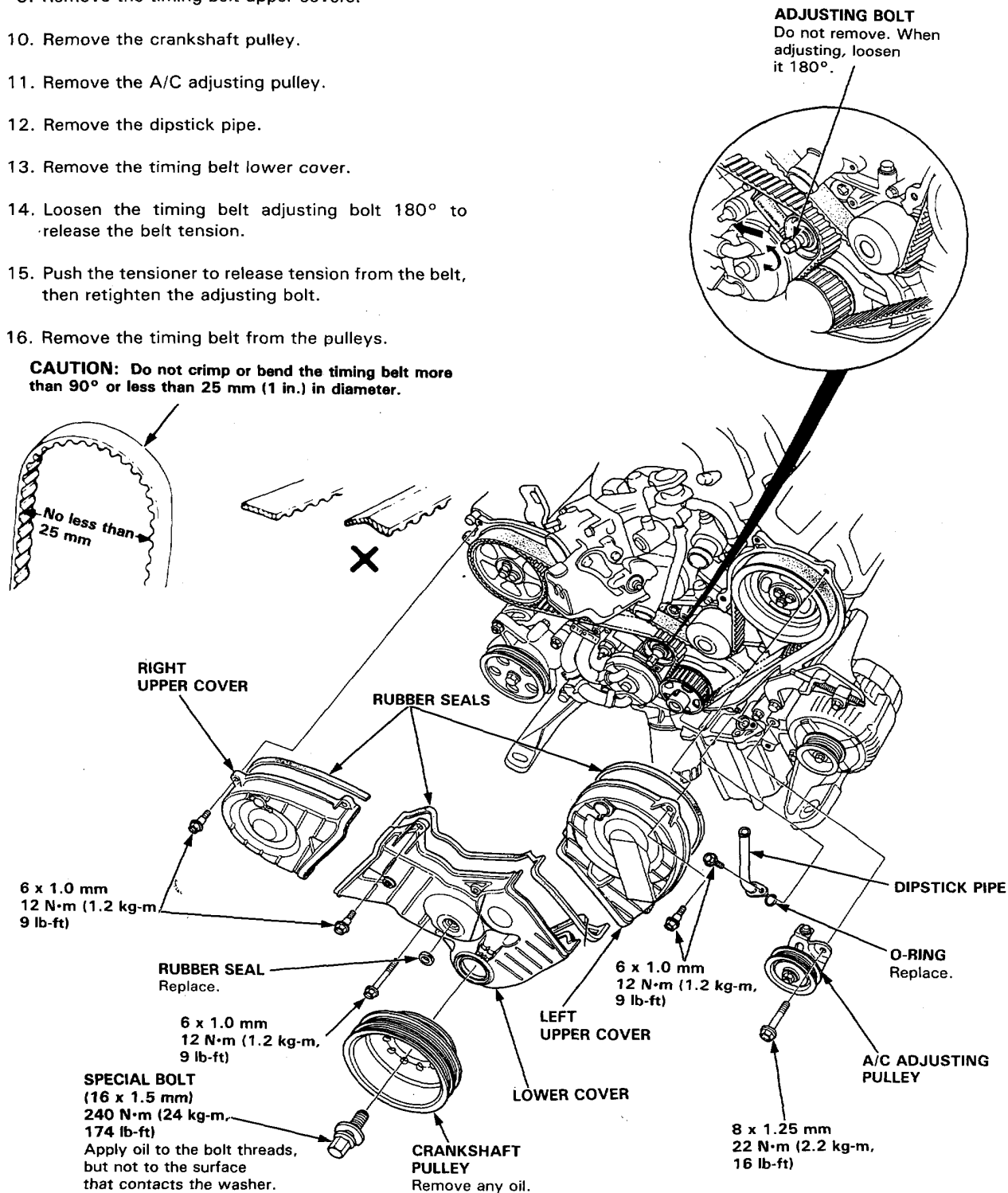
8 N·m (0.8 kg-m, 6 lb-ft)





9. Remove the timing belt upper covers.
10. Remove the crankshaft pulley.
11. Remove the A/C adjusting pulley.
12. Remove the dipstick pipe.
13. Remove the timing belt lower cover.
14. Loosen the timing belt adjusting bolt 180° to release the belt tension.
15. Push the tensioner to release tension from the belt, then retighten the adjusting bolt.
16. Remove the timing belt from the pulleys.

CAUTION: Do not crimp or bend the timing belt more than 90° or less than 25 mm (1 in.) in diameter.



Timing Belt

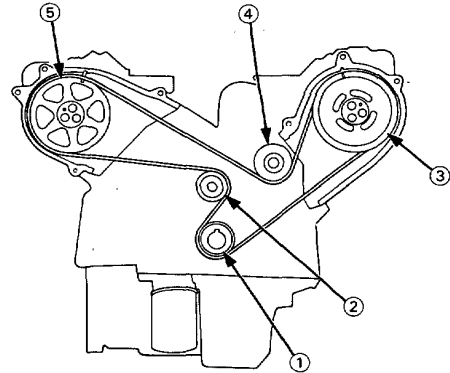
Installation

1. Install the timing belt in the reverse order of removal;
Only key points are described here.
2. Remove all spark plugs.
3. Position the crankshaft and the cam pulleys as shown before installing the timing belt.

- (A) Set the crankshaft so that the No. 1 piston is at top-dead-center (TDC).

NOTE: Align the Δ mark on the teeth side of the timing belt drive pulley to the pointer on the oil pump.

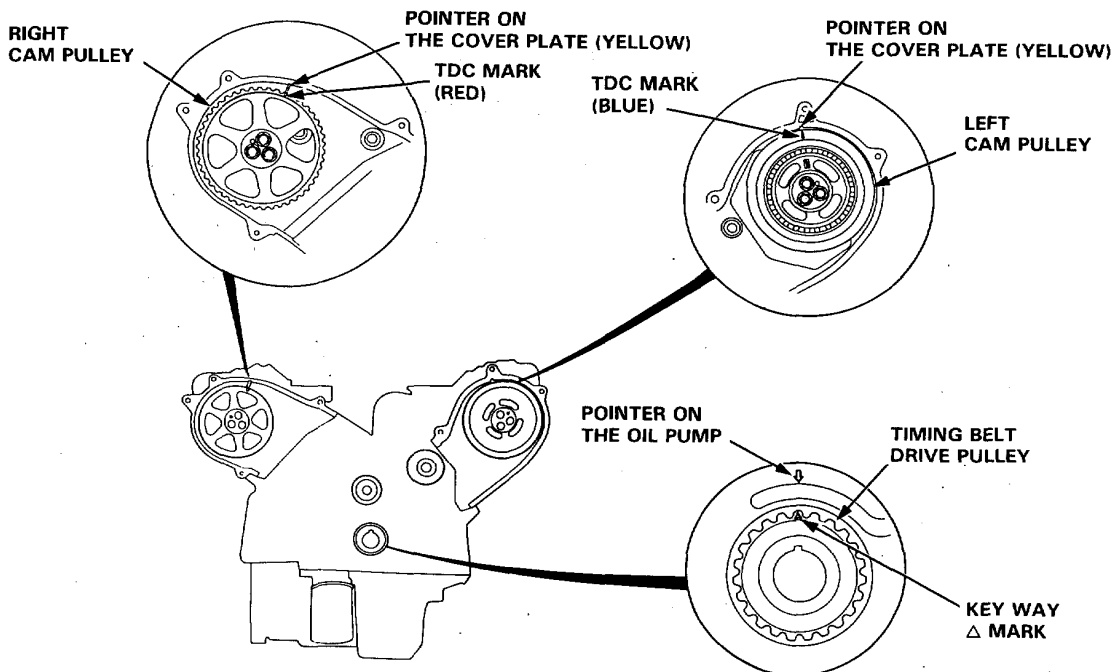
- (B) Align the TDC mark on the left cam pulley to the pointer on the left cover plate.
- (C) Align the TDC mark on the right cam pulley to the pointer on the right cover plate.



4. Install the timing belt tightly in the sequence shown.

①Timing belt drive pulley (crankshaft) → ②Adjusting pulley → ③Left cam pulley → ④ Water pump pulley → ⑤Right cam pulley.

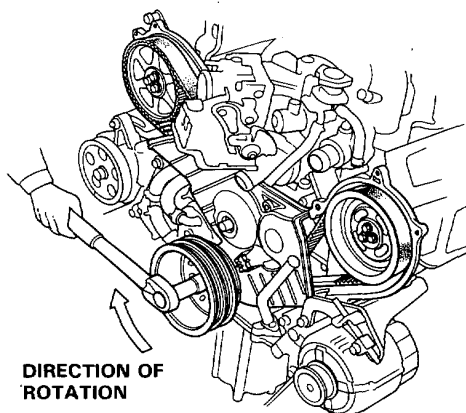
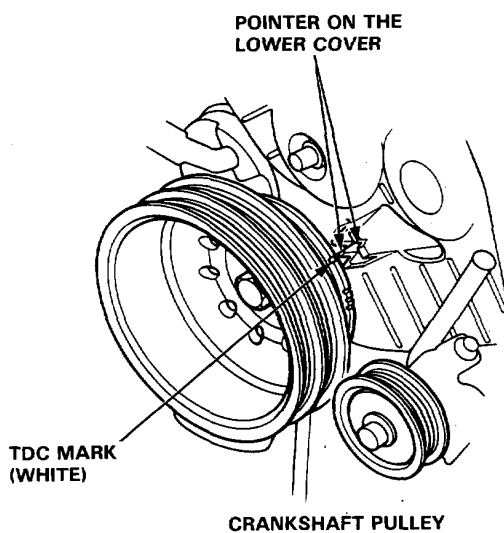
- For easy installation, advance the right cam pulley by about a half tooth from the TDC position.



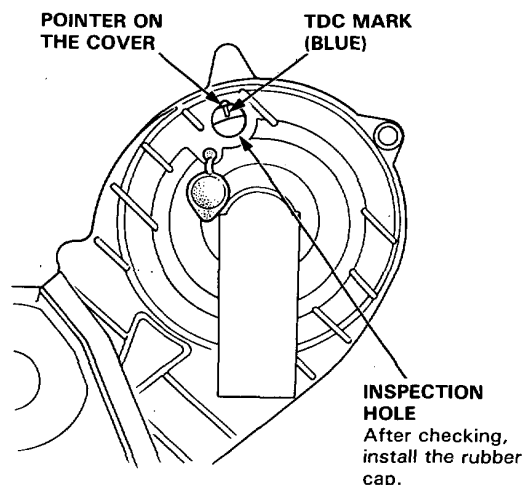


5. Loosen the adjust bolt, and retighten it after tensioning the belt.
6. Rotate the crankshaft about 5 or 6 turns clockwise so that the belt may fit in position on the pulleys.
7. Carry out timing belt tension adjustment (page 6-27).
8. Check the crankshaft pulley and the cam pulleys at TDC.

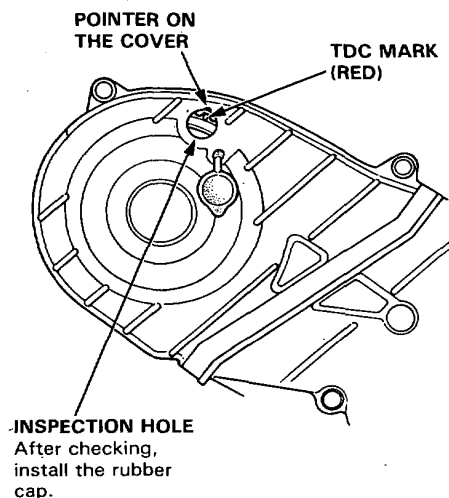
CRANKSHAFT PULLEY:



LEFT CAM PULLEY:



RIGHT CAM PULLEY:



9. If the cam pulleys are not positioned at TDC, remove the timing belt and adjust the positioning following the procedure on page 6-30, then reinstall the timing belt.

NOTE: Refer to page 6-28 for timing belt removal.

10. After installation, adjust the tension of each belt.
 - See section 23 for alternator belt tension adjustment.
 - See section 17 for power steering belt tension adjustment.
 - See section 22 for air conditioner belt tension adjustment.

CRANK/CYL Sensor

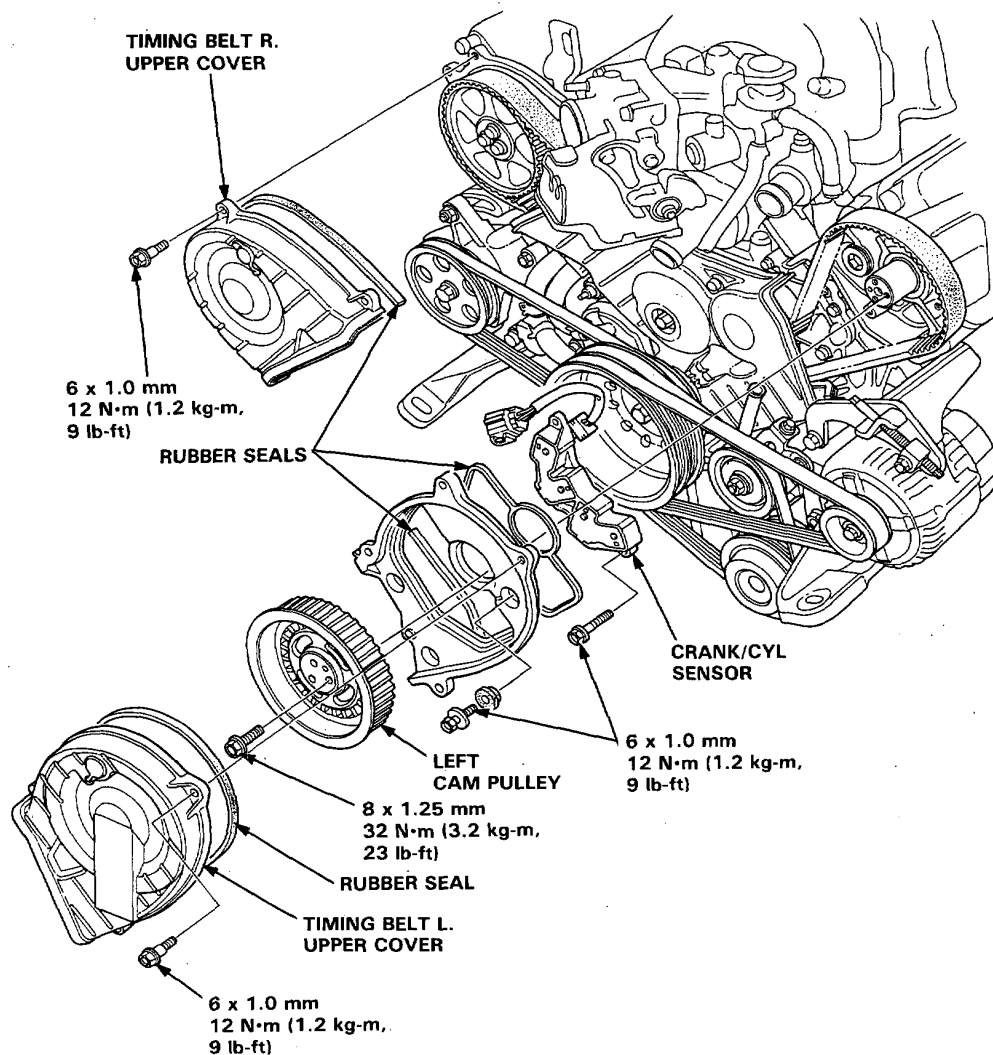
Replacement

NOTE: Turn the crankshaft so that the No. 1 piston is at top-dead-center (page 6-30).

1. Remove the upper covers.
2. Remove the timing belt from the right and left cam pulley (page 6-10).
3. Remove the left cam pulley.
4. Remove the left timing belt cover plate.
5. Remove the CRANK/CYL sensor from the left cylinder head.

6. Install the CRANK/CYL sensor in the reverse order of removal;

- Refer to page 6-30 and 31 when installing the timing belt.



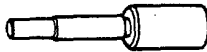
Engine Block

Special Tools	7-2
Illustrated Index	7-3
Flywheel and Drive Plate	7-6
Rod and Main Bearings	7-6
Pistons and Crankshaft Removal	7-9
Crankshaft	7-11
Pistons	7-12
Cylinder Block	7-13
Piston Pins	7-14
Piston Rings	7-17
Oil Seal	7-20
Crankshaft Installation	7-20



Special Tools

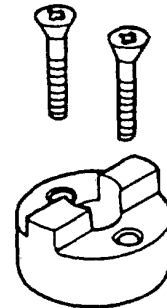
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAF-PH60300	Piston Pin Base Insert	1	7-14, 7-15
②	07GAF-PH70100	Pilot Collar	1	7-14, 7-15
③	07HAF-PL20102 or 07HAF-PL20101	Piston Base Head	1	7-14, 7-15
④	07749-0010000	Driver	1	7-20
⑤	07924-PD20003 or 07924-PD20002	Ring Gear Holder	1	7-6
⑥	07948-SB00101	Driver Attachment	1	7-20
⑦	07973-PE00310	Piston Pin Driver Shaft	1	7-14, 7-15
⑧	07973-PE00320	Piston Pin Driver Head	1	7-14, 7-15
⑨	07973-6570500	Piston Base	1	7-14, 7-15
⑩	07973-6570600	Piston Base Spring	1	7-14, 7-15



①



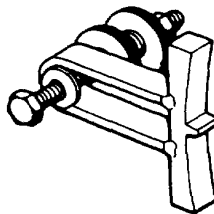
②



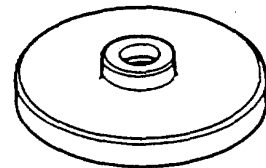
③



④



⑤



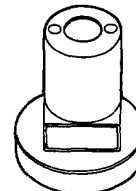
⑥



⑦



⑧



⑨



⑩

cardiagn.com

Engine Block

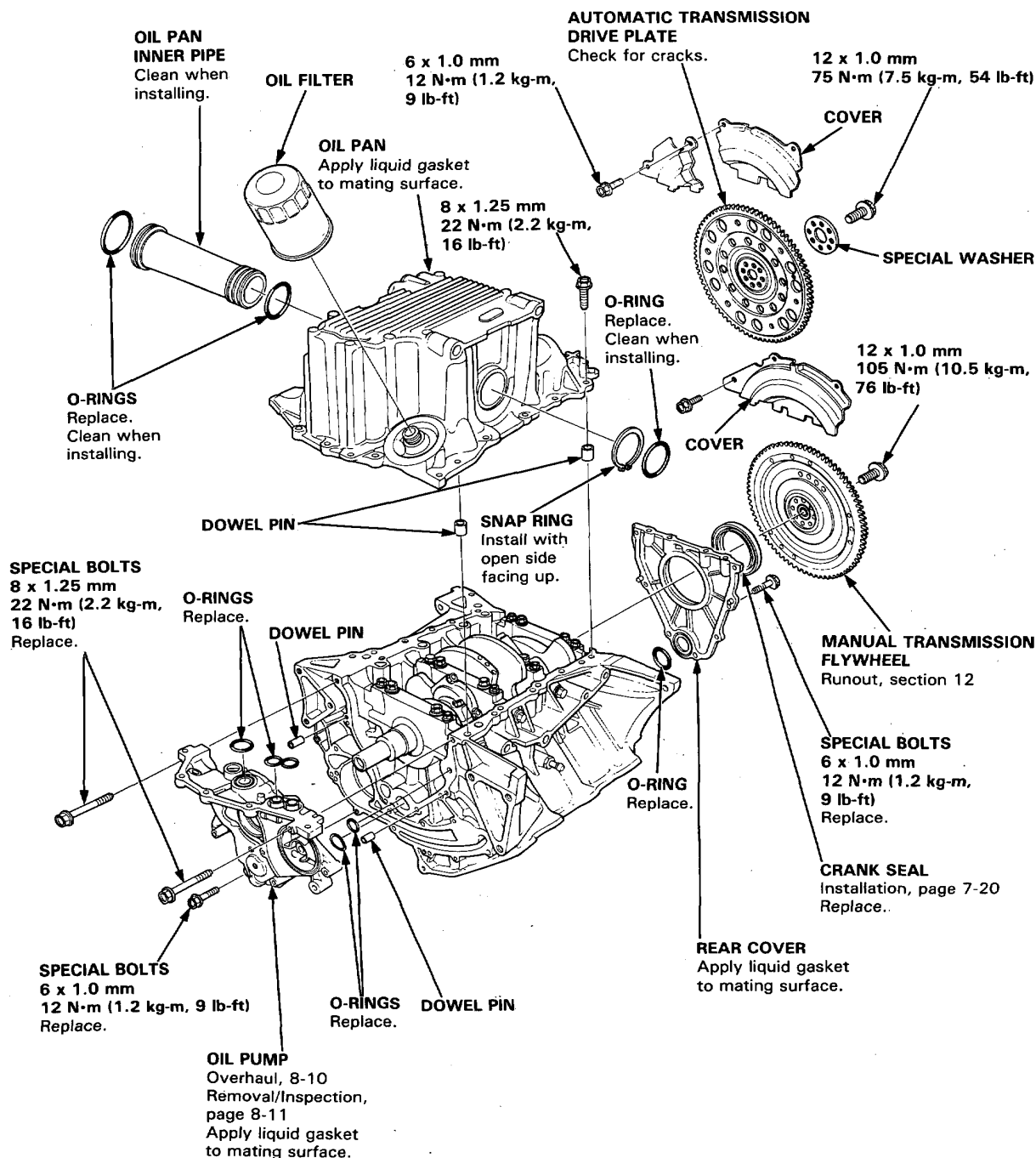
Illustrated Index



Lubricate all internal parts with engine oil during reassembly.

NOTE:

- Apply liquid gasket to the mating surfaces of the rear cover and oil pump case before installing them.
- Use liquid gasket, part No. OY740—99986.



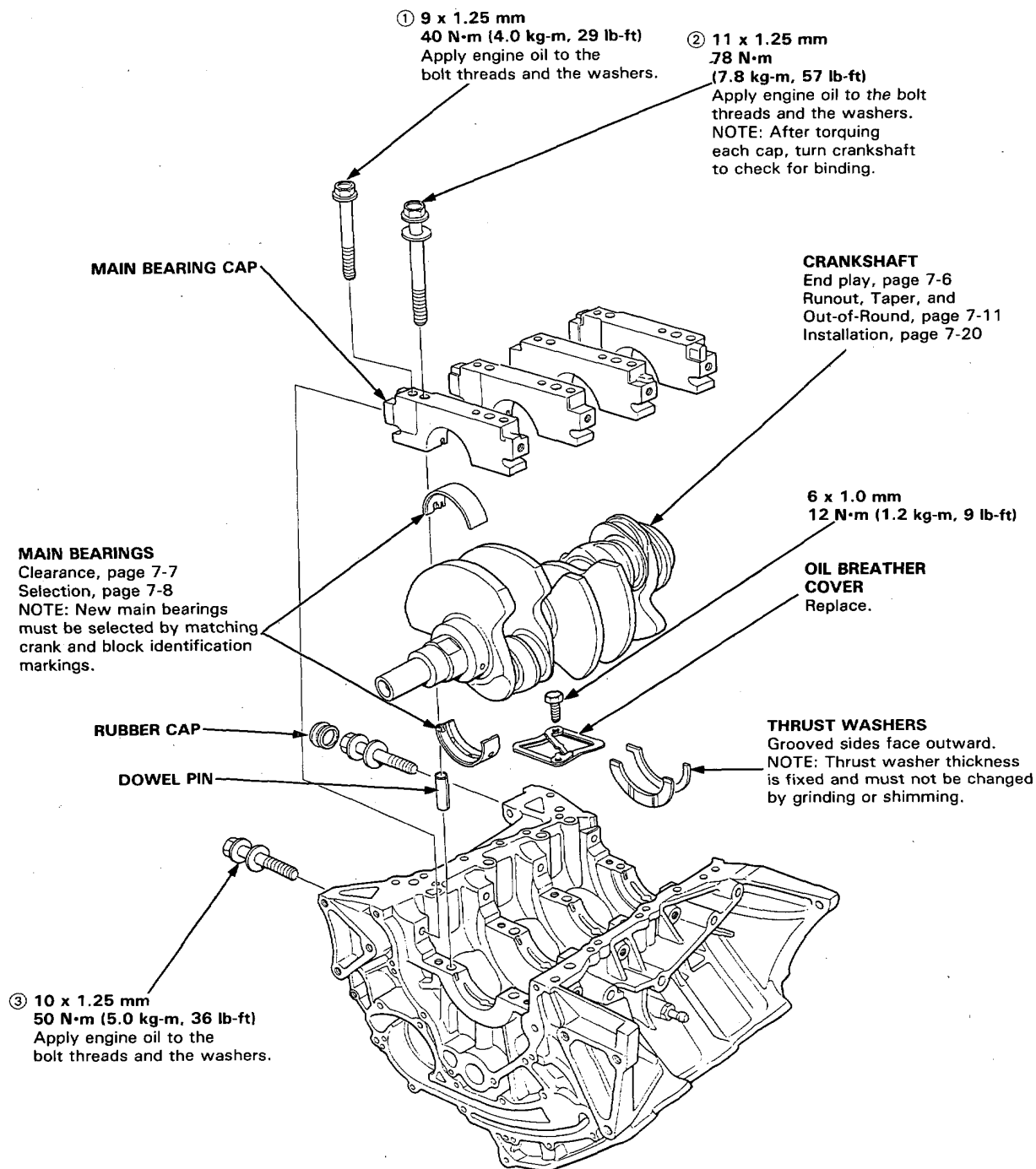
(cont'd)

Engine Block

Illustrated Index (cont'd)

NOTE:

- Lubricate all internal parts with engine oil during reassembly.
- Use liquid gasket, Part No. OY740—99986.

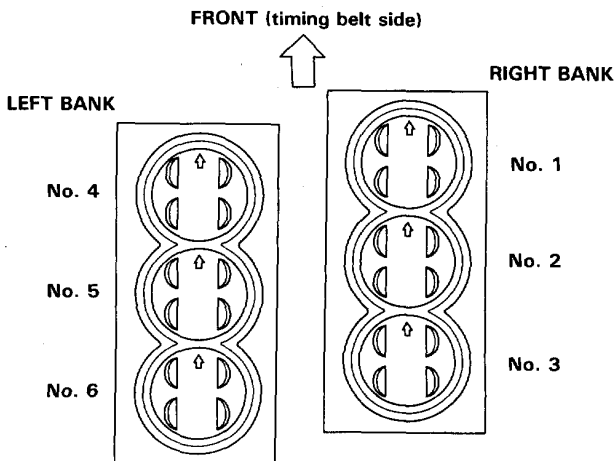




NOTE: New rod bearings must be selected by matching connecting rod assembly and crankshaft identification markings (page 7-8).



Lubricate all internal parts with engine oil during reassembly.



PISTON

Inspection, page 7-12

NOTE:

- Before removing piston, inspect the top of the cylinder bore for carbon build-up or ridge. Remove ridge if necessary, page 7-9.
- To maintain proper piston clearance, match the letter on the piston top (No letter denotes A.) with the letter for each cylinder stamped on the block.

PISTON PIN

Removal, page 7-14

Installation, page 7-15

Inspection, page 7-16

ENGINE BLOCK

Cylinder bore inspection, page 7-13

Warpage inspection, page 7-13

Cylinder bore honing, page 7-14

CONNECTING ROD BEARING CAP

Installation, page 7-20

NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.

PISTON RINGS

Replacement, page 7-17

Measurement, pages 7-17 and 18

Alignment, page 7-18

CONNECTING ROD

End play, page 7-7

Selection, page 7-15

Inspect top of each cylinder bore for carbon build-up or ridge before removing piston.
Remove ridge if necessary, page 7-9



CYLINDER BORE SIZES

NOTE: To maintain proper piston clearance, match these letters with the letters on the pistons. The letters on the block read from front to rear, No. 1 through No. 3 cylinders on the first line and No. 4 through No. 6 cylinders on the second line.

CONNECTING ROD BEARINGS

Clearance, page 7-7

Selection, page 7-8

CONNECTING ROD CAP NUT

9 x 0.75 mm

45 N·m (4.5 kg·m,
33 lb·ft)

After torquing each bearing cap, rotate crankshaft to check for binding.

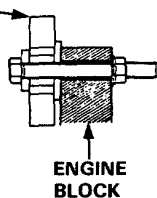
Flywheel and Drive Plate

Replacement

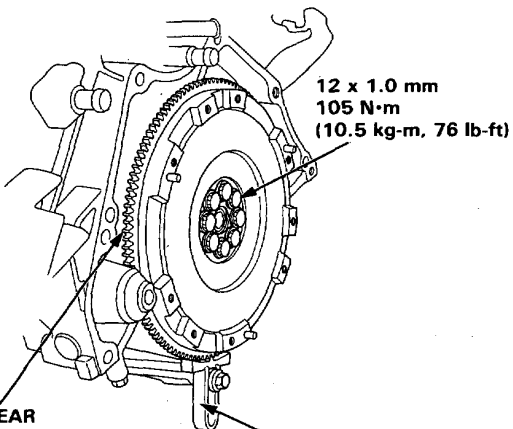
Manual Transmission:

Remove the eight flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in the crisscross pattern.

RING GEAR HOLDER
07924-PD20003



**ENGINE
BLOCK**



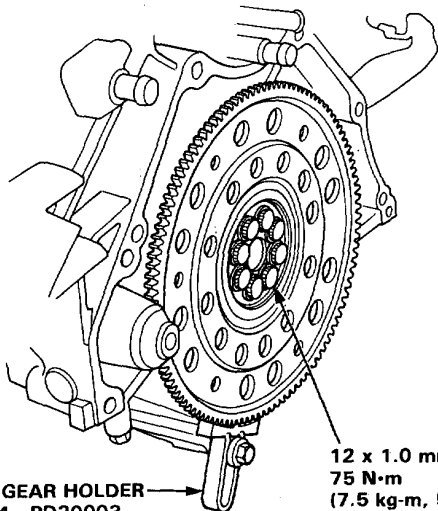
12 x 1.0 mm
105 N·m
(10.5 kg-m, 76 lb-ft)

RING GEAR
Inspect ring gear
teeth for wear or
damage.

RING GEAR HOLDER
07924-PD20003

Automatic Transmission:

Remove the eight drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in the crisscross pattern.



12 x 1.0 mm
75 N·m
(7.5 kg-m, 54 lb-ft)

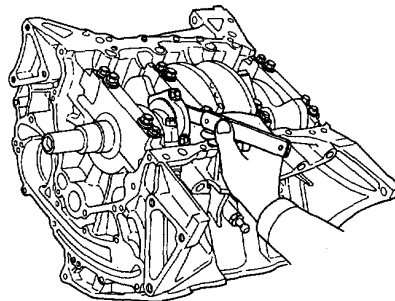
RING GEAR HOLDER
07924-PD20003

Connecting Rod and Crankshaft

End Play

Connecting Rod End Play:

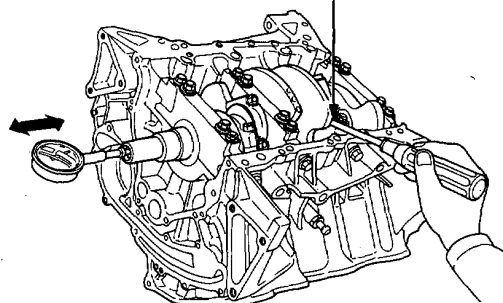
Standard (New): 0.15–0.30 mm
(0.006–0.012 in)



- If out-of-tolerance, install a new connecting rod.
- If still out-of-tolerance, replace the crankshaft (pages 7-9, 10 and 7-20).

Push the crank firmly away from the dial indicator, and zero the dial against the end of the crank. Then pull the crank firmly back toward the indicator; dial reading should not exceed service limit.

SCREWDRIVER



Crankshaft End Play:

Standard (New): 0.10–0.29 mm
(0.004–0.011 in)
Service Limit: 0.45 mm (0.018 in)

- If end play is excessive, inspect the thrust washers and thrust surface on the crankshaft. Replace parts as necessary.

NOTE: Thrust washer thickness is fixed and must not be changed either by grinding or shimming. Thrust washers are installed with grooved side facing outward.



Main Bearings

Clearance

1. To check main bearing clearance, remove the main caps and bearing halves.
2. Clean each main journal and bearing half with a clean shop rag.
3. Place one strip of plastigage across each main journal.

NOTE: If the engine is still in the car when you bolt the main cap down to check clearance, the weight of the crank and flywheel will flatten the plastigage further than just the torque on the cap bolts, and give you an incorrect reading. For an accurate reading, support the crank with a jack under the counterweights and check only one bearing at a time.

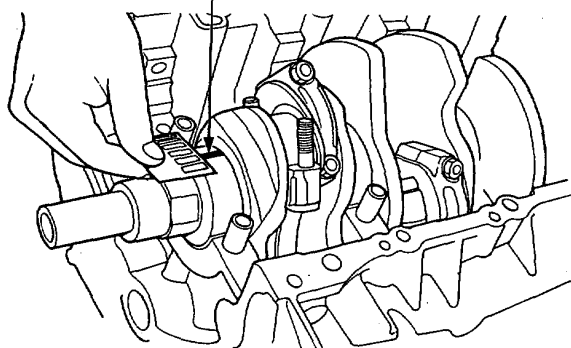
4. Reinstall the bearings and caps, then torque the 9 mm cap bolts to 40 N·m (4.0 kg-m, 29 lb-ft). Torque the 11 mm cap bolts to 78 N·m (7.8 kg-m, 57 lb-ft).
5. Torque the side bolts to 50 N·m (5.0 kg-m, 36 lb-ft).
6. Remove the caps and bearings, and measure the widest part of the plastigage.

Main Bearing Clearance:

Standard (New): 0.020–0.044 mm
(0.0008–0.0017 in)

Service Limit: 0.05 mm (0.002 in)

PLASTIGAGE STRIP



If the plastigage measures too wide or too narrow, (remove the engine if it's still in the car), remove the crank, remove the upper half of the bearing, then install a new, complete bearing with the same color code (select the color as shown on next page), and recheck the clearance.

CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.

If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check again.

NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crank and start over.

Rod Bearings

Clearance

1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop rag.
3. Place plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts to 45 N·m (4.5 kg-m, 33 lb-ft).

NOTE: Do not rotate the crank during inspection.

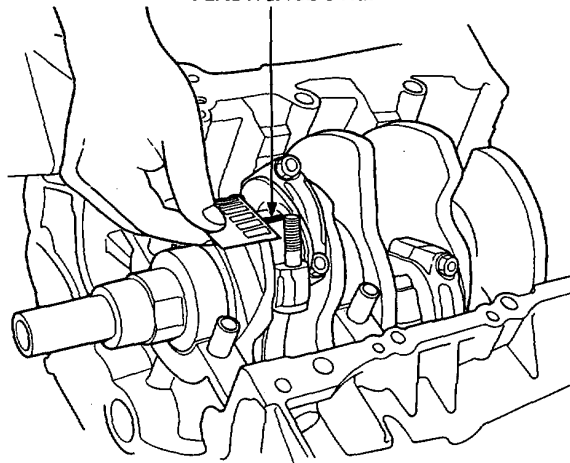
5. Remove the rod cap and bearing half and measure the widest part of the plastigage.

Connecting Rod Bearing Clearance:

Standard (New): 0.022–0.046 mm
(0.0009–0.0018 in)

Service Limit: 0.05 mm (0.002 in)

PLASTIGAGE STRIP



6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code (select color as shown on next page), and recheck the clearance.

CAUTION: Do not file, shim, or scrape the bearing or the caps to adjust clearance.

7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again.

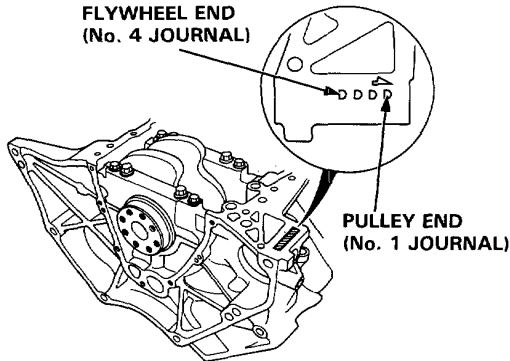
NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crank and start over.

Main Bearings

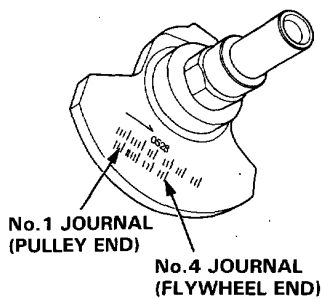
Selection

Crank Bore Code Locations (Letters)

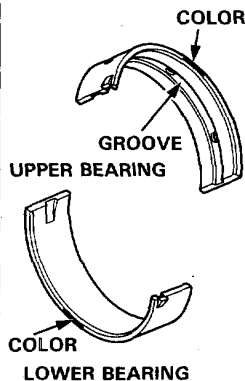
Letters have been stamped on the end of the block as a code for the size of each of the 4 main journal bores. Use them, and the numbers stamped on the crank (codes for main journal size), to choose the correct bearings.



Main Journal Code Locations (Numbers)



Bearing Design



Bearing Identification

Color code is on the edge of the bearing

Smaller main journal	Smaller bearing (thicker)
1 or I	Pink
2 or II	Pink Yellow
3 or III	Yellow
4 or IIII	Yellow Green
5 or IIIII	Green
6 or IIIII	Green Brown

Larger crank bore			
A or I	B or II	C or III	D or IIII
Smaller bearing (thicker)			

Pink	Pink Yellow	Yellow	Yellow Green
Pink Yellow	Yellow	Yellow Green	Green
Yellow	Yellow Green	Green	Green Brown
Yellow Green	Green	Green Brown	Brown
Green	Green Brown	Brown	Brown Black
Green Brown	Brown	Brown Black	Black

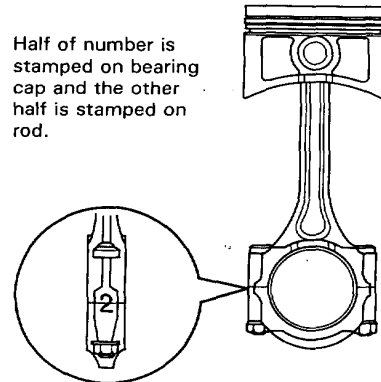
On bearing sets with two colors, such as green/brown, it doesn't matter which color is on the top.

Rod Bearings

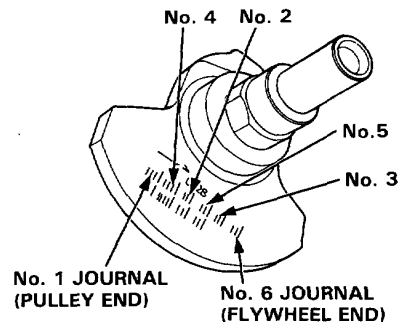
Selection

Rod Code Location (Numbers)

Numbers have been stamped on the side of each connecting rod as a code for the size of the big end. Use them, and the letters stamped on the crank (codes for rod journal size), to choose the correct bearings.



Rod Journal Code Locations (Letters)



Bearing Identification

Color code is on the edge of the bearing

Smaller rod journal	Smaller bearing (thicker)
A or I	Pink
B or II	Pink Yellow
C or III	Yellow
D or IIII	Yellow Green
E or IIIII	Green
F or IIIII	Green Brown

Larger big end bore			
1 or I	2 or II	3 or III	4 or IIII
Smaller bearing (thicker)			

Pink	Pink Yellow	Yellow	Yellow Green
Pink Yellow	Yellow	Yellow Green	Green
Yellow	Yellow Green	Green	Green Brown
Yellow Green	Green	Green Brown	Brown
Green	Green Brown	Brown	Brown Black
Green Brown	Brown	Brown Black	Black

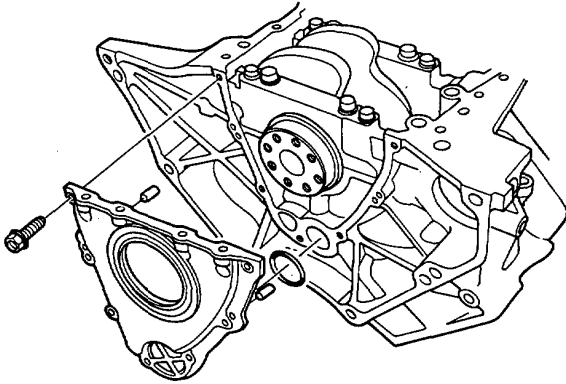
On bearing sets with two colors, such as green/brown, it doesn't matter which color is on the top.

Pistons and Crankshaft

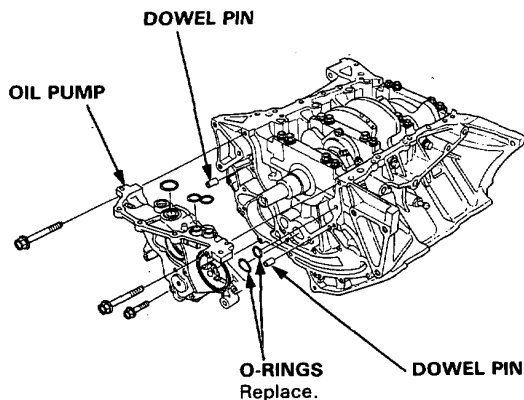


Removal

1. Remove the oil pan assembly.
2. Remove the rear cover.

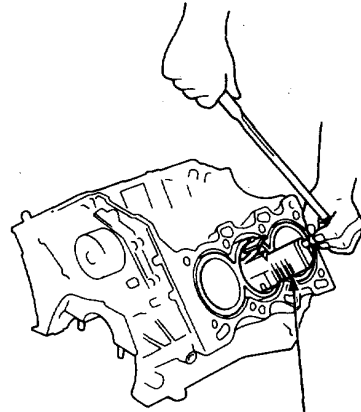


3. Remove the oil pump.



If you can feel a ridge of metal or hard carbon around the top of any cylinder, remove it with a ridge reamer. Follow reamer manufacturer's instructions.

CAUTION: If the ridge is not removed, it may damage the pistons as they are pushed out.

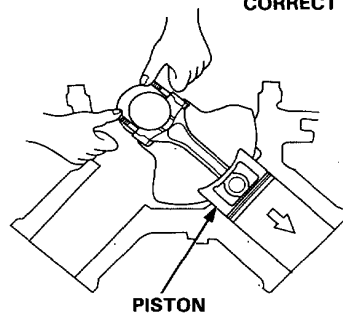


RIDGE REAMER

- Remove the connecting rod caps after setting the crank pin at BDC for each cylinder. Remove the piston assembly by pushing on the connecting rod.

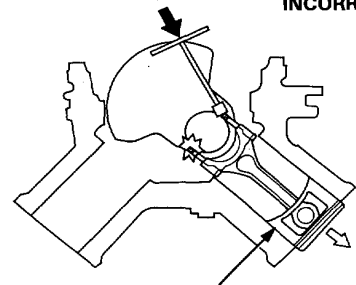
CAUTION: Take care not to damage the crank pin or cylinder with the connecting rod.

CORRECT



PISTON

INCORRECT



PISTON

(cont'd)

cardiagn.com

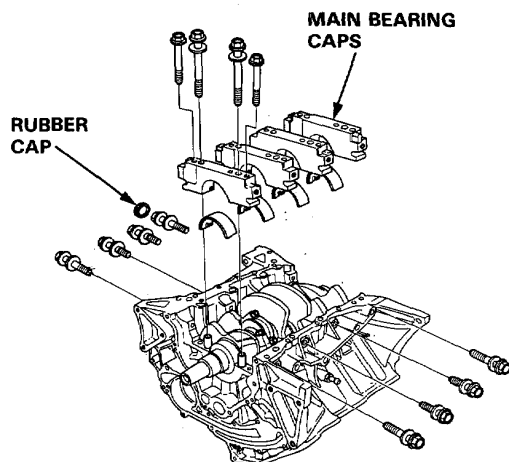
Pistons and Crankshaft

Removal (cont'd)

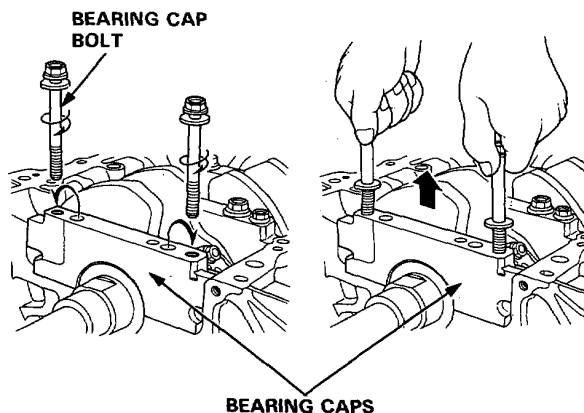
- Remove the bearing from the cap. Keep all caps/bearings in order.
- Remove upper bearing halves from connecting rods and set aside with their respective caps.
- Reinstall the cap on the rod after removing each piston/connecting rod assembly.
- Mark piston/connecting rod assemblies with cylinder numbers to avoid mixup on reassembly.

NOTE: The existing number on the connecting rod does not indicate its position in the engine, it indicates the rod bore size.

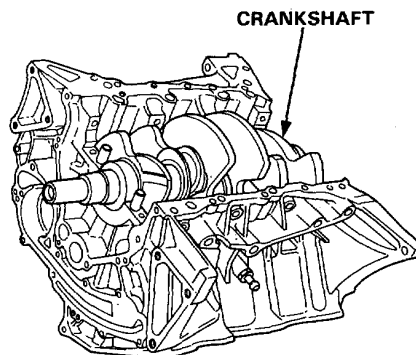
- Remove the bearing cap bolts and bearing cap side bolts, then remove the bearing caps.



- To help with removal of the caps, install the bearing cap bolts in the outside bolt holes.



- Lift the crankshaft out of engine, being careful not to damage journals.



- Reinstall main caps and bearings on engine in proper order.



Crankshaft

Inspection

- Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
- Check the keyway and threads.

Alignment

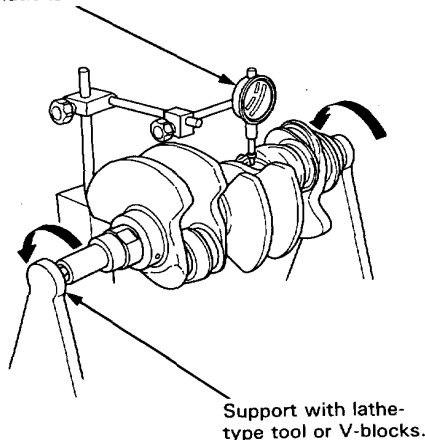
- Measure runout on all main journals to make sure the crank is not bent.
- The difference between measurements on each journal must not be more than the service limit.

Crankshaft Total Indicated Runout:

Standard (New): 0.020 mm (0.0008 in) max.

Service Limit: 0.03 mm (0.0012 in)

DIAL INDICATOR
Rotate two complete revolutions.



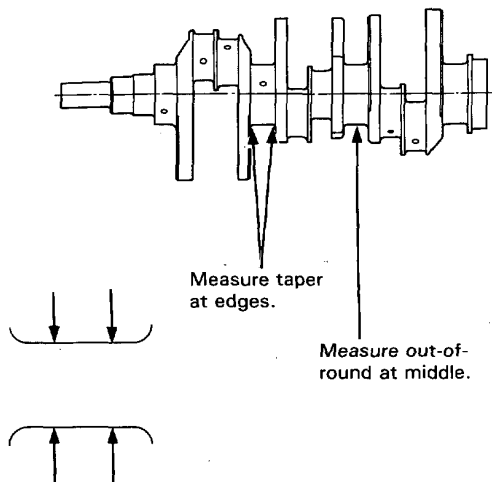
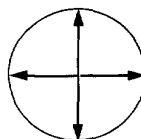
Out-of-Round and Taper

- Measure out-of-round at the middle of each rod and main journal in two places.
- The difference between measurements on each journal must not be more than the service limit.

Journal Out-of-Round:

Standard (New): 0.004 mm (0.0002 in) max.

Service Limit: 0.010 mm (0.0004 in)



- Measure taper at edges of each rod and main journal.
- The difference between measurements on each journal must not be more than the service limit.

Journal Taper:

Standard (New): 0.005 mm (0.0002 in) max.

Service Limit: 0.010 mm (0.0004 in)

Pistons

Inspection

1. Check the piston for distortion or cracks.

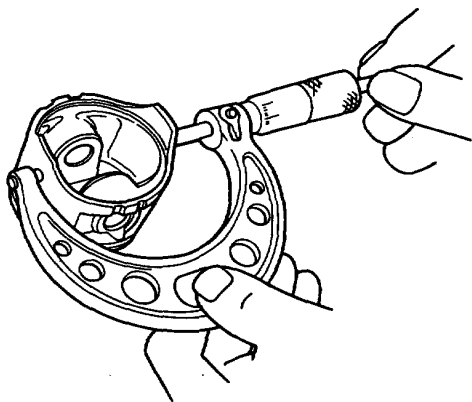
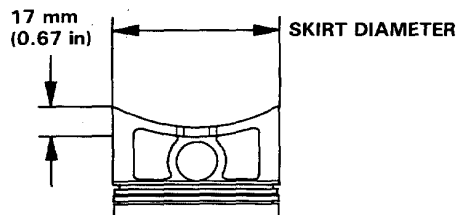
NOTE: If cylinder is bored, an oversized piston must be used.

2. Measure piston diameter at a point 17 mm (0.67 in.) from bottom of skirt.

NOTE: There are two standard-size pistons (A or B). The letter is stamped on the top of the piston. These letters are also stamped on the block as cylinder bore sizes.

Piston Diameter

	Standard (NEW)	Service Limit
A	89.98–89.99 mm (3.5425–3.5429 in)	89.97 mm (3.5421 in)
B	89.97–89.98 mm (3.5421–3.5425 in)	89.96 mm (3.5417 in)



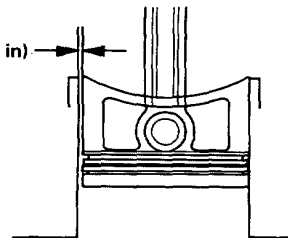
3. Calculate difference between cylinder bore diameter on page 7-13 and piston diameter.

Piston-to-Block Clearance

Standard (NEW): 0.02–0.04 mm
(0.001–0.002 in)

Service Limit: 0.08 mm (0.003 in)

SERVICE LIMIT
0.08 mm (0.003 in)



Oversize Piston Diameter

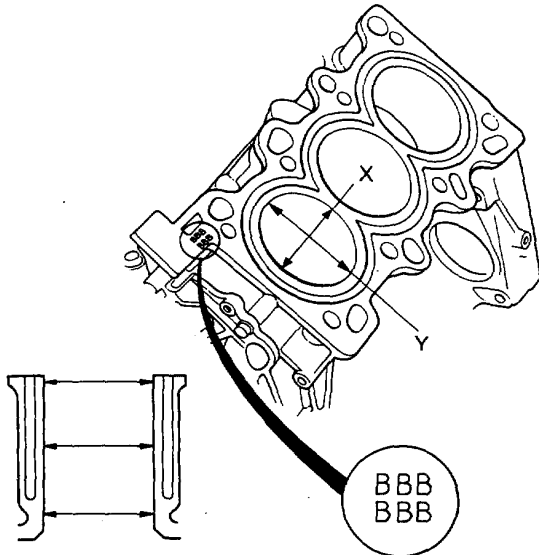
0.25: 90.22–90.23 mm (3.5520–3.5524 in)
0.50: 90.47–90.48 mm (3.5618–3.5622 in)

Cylinder Block



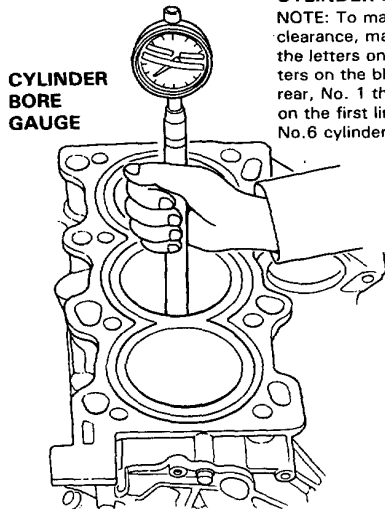
Inspection

1. Measure wear and taper in directions X and Y at three levels in each cylinder as shown.



CYLINDER BORE SIZES (A or B)

NOTE: To maintain proper piston clearance, match these letters with the letters on the pistons. The letters on the block read from front to rear, No. 1 through No. 3 cylinders on the first line and No. 4 through No. 6 cylinders on the second line.



CYLINDER BORE GAUGE

Cylinder Bore Size

Standard (New): 90.00–90.02 mm
(3.543–3.544 in)

Service Limit: 90.07 mm (3.546 in)

Oversize

0.25: 90.25–90.27 mm (3.553–3.554 in)

0.50: 90.50–90.52 mm (3.563–3.564 in)

Bore Taper

Limit: (Difference between first and third measurement) 0.05 mm (0.002 in)

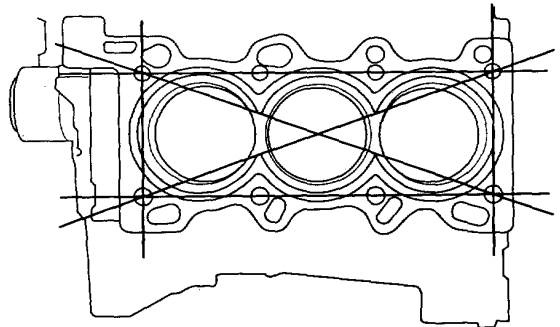
- If measurements in any cylinder are beyond Oversize Bore Service Limit, replace the block.
- If block is to be rebored, refer to Piston Clearance Inspection (page 7-12) after reboring.

NOTE: Scored or scratched cylinder bores must be honed.

Reboring Limit: 0.50 mm (0.020 in)

2. Check the top of the block for warpage. Measure along the edges and across the center as shown.

SURFACES TO BE MEASURED

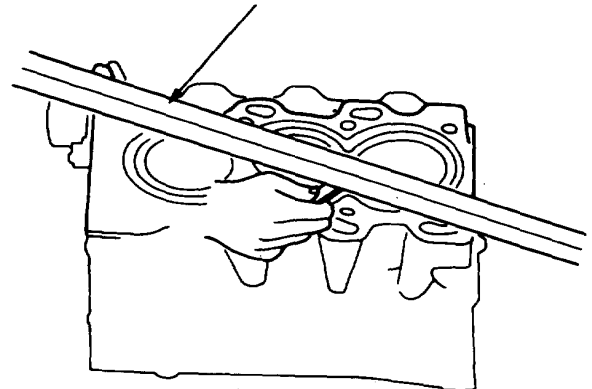


Engine Block Warpage:

Standard (New): 0.07 mm (0.003 in) max.

Service Limit: 0.10 mm (0.004 in)

PRECISION STRAIGHT EDGE



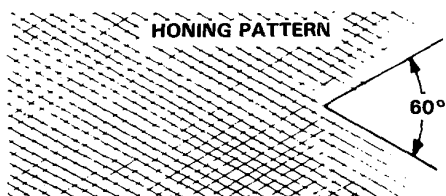
Cylinder Block

Bore Honing

1. Measure cylinder bores as shown on page 7-13. If the block is to be re-used, hone the cylinders and remeasure the bores.
2. Hone cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree cross-hatch pattern.

NOTE:

- Use only a rigid hone with 400 grit or finer stone.
- Do not use stones that are worn or broken.

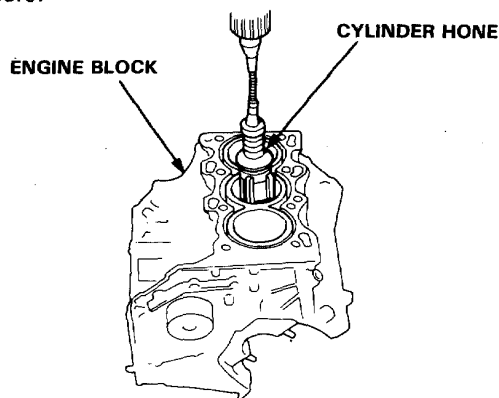


3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil immediately to prevent rusting.

NOTE: Never use solvent, it will only redistribute the grit on the cylinder walls.

4. If scoring or scratches are still present in cylinder bores after honing to service limit, rebore the engine block.

NOTE: Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail and does not run the full length of the bore.



NOTE:

- After honing, clean the cylinder thoroughly with soapy water.
- Only scored or scratched cylinder bores must be honed.

Piston Pins

Removal

1. Assemble the special tool as shown.

PISTON BASE HEAD
07HAF-PL20102 or
07HAF-PL20101

PISTON PIN BASE INSERT
07GAF-PH60300

PISTON BASE
07973-6570500

PISTON BASE SPRING
07973-6570600

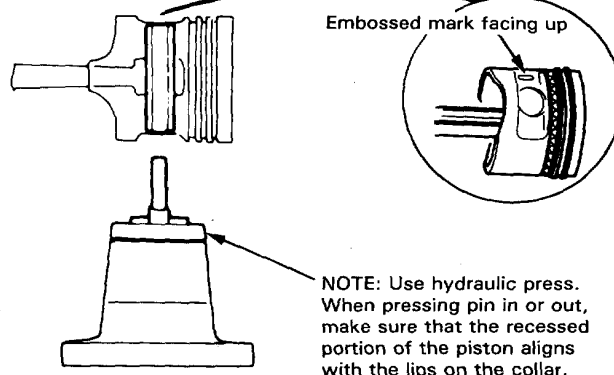
2. Adjust the length of piston pin driver to 52.5 mm (2.07 in) as shown.

PISTON PIN DRIVER HEAD
07973-PE00320

52.5 mm
(2.07 in)

PISTON PIN DRIVER SHAFT
07973-PE00310

PILOT COLLAR
07GAF-PH70100



3. Place the piston on the special tool and press the pin out with a hydraulic press.



Connecting Rods

Selection

Each rod is sorted into one of four tolerance ranges (from 0 to 0.024 mm, in 0.006 mm increments) depending on the size of its big end bore. It's then stamped with a number (1, 2, 3 or 4) indicating that tolerance. You may find any combination of 1, 2, 3 or 4 in any engine.

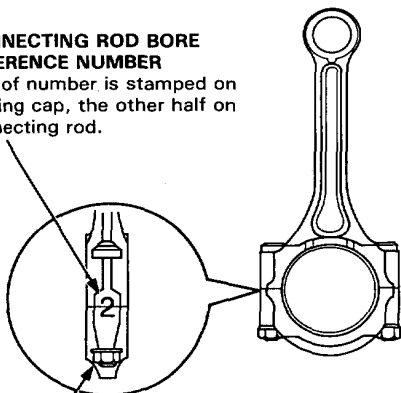
Normal Bore Size: 57 mm (2.244 in)

NOTE:

- Reference numbers are for big end bore size and do NOT indicate the position of rod in engine.
- Inspect connecting rod for cracks and heat damage.

CONNECTING ROD BORE REFERENCE NUMBER

Half of number is stamped on bearing cap, the other half on connecting rod.



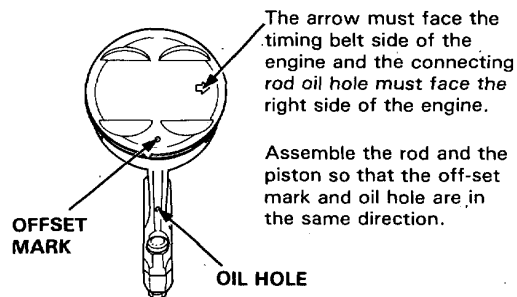
Inspect bolts and nuts for stress cracks.

Piston Pins

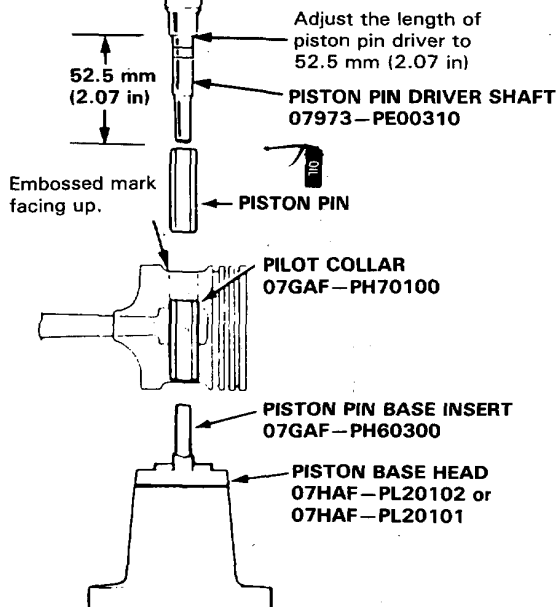
Installation

1. Use a hydraulic press for installation.

- When pressing pin in or out, be sure you position the recessed flat on the piston against the lugs on the base attachment.



PISTON PIN DRIVER HEAD 07973-PE00320



NOTE: Install the assembled piston and rod with the oil hole facing the rear of the engine.

Piston Pins

Inspection

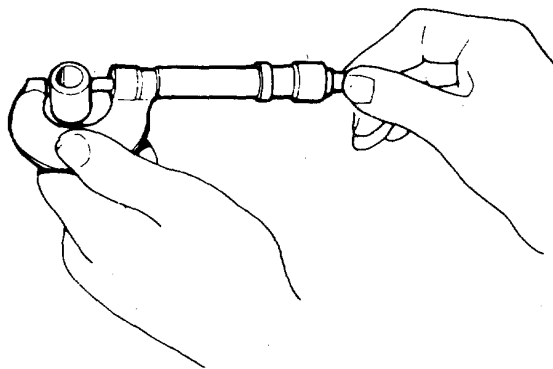
1. Measure the diameter of the piston pin.

Piston Pin Diameter:

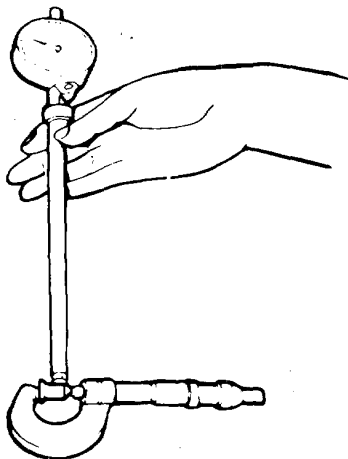
Standard (New): 21.994–22.000 mm
(0.8659–0.8661 in)

Oversize: 21.997–22.003 mm
(0.8660–0.8663 in)

NOTE: All replacement piston pins are oversize.



2. Zero the dial indicator to the piston pin diameter.



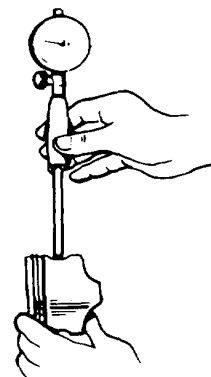
3. Measure the piston pin-to-piston clearance.

NOTE: Check the piston for distortion or cracks.

If the piston pin clearance is greater than 0.024 mm (0.0009 in), re-measure using an oversize piston pin.

Piston Pin-to-Piston Clearance:

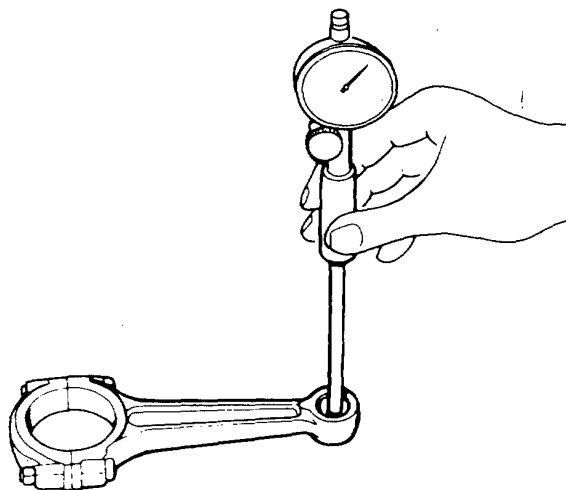
Service Limit: 0.012–0.024 mm
(0.0005–0.0009 in)



4. Check the difference between piston pin diameter and connecting rod small end diameter.

Piston Pin-to-Connecting Rod Interference:

Standard (New): 0.013–0.032 mm
(0.0005–0.0013 in)





Piston Rings

End Gap

1. Using a piston, push a new ring into the cylinder bore 15–20 mm (0.6–0.8 in.) from the bottom.
2. Measure the piston ring end-gap with a feeler gauge:
 - If the gap is too small, check to see if you have the proper rings for your engine.
 - If the gap is too large, recheck the cylinder bore diameter against the wear limits on page 7-13. If the bore is over limit, the engine block must be rebored.

Piston Ring End-Gap:

Top Ring

Standard (New): 0.25–0.40 mm
(0.010–0.016 in)

Service Limit: 0.70 mm (0.027 in)

Second Ring

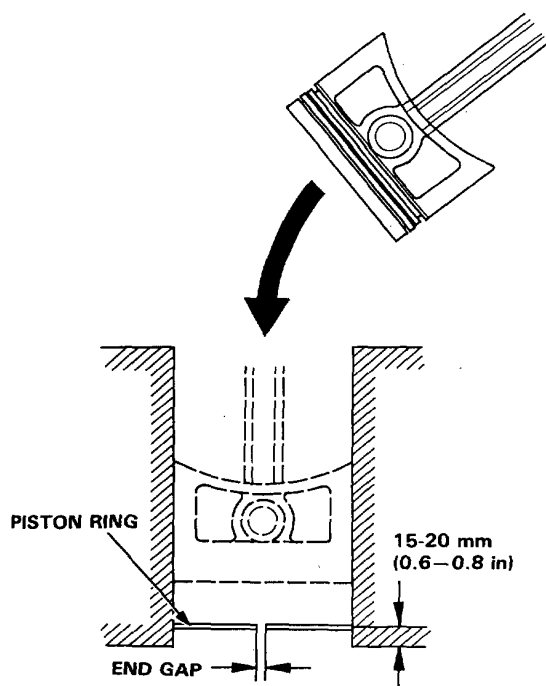
Standard (New): 0.40–0.55 mm
(0.016–0.022 in)

Service Limit: 0.85 mm (0.033 in)

Oil Ring

Standard (New): 0.2–0.7 mm (0.008–0.028 in)

Service Limit: 0.80 mm (0.032 in)



Replacement

1. Using ring expander, remove old piston rings.
2. Clean all ring grooves thoroughly.

NOTE:

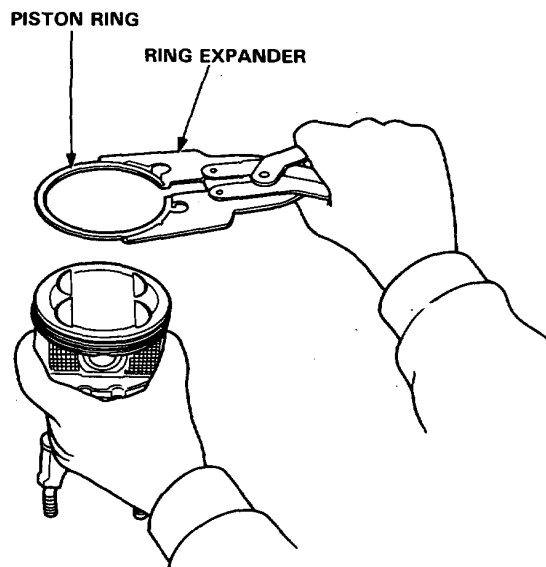
- Use a squared-off broken ring or ring groove cleaner with blade to fit piston grooves.
- Compression ring grooves are 1.2 mm wide and oil ring groove is 2.8 mm wide.
- File down blade if necessary.

CAUTION: Do not use a wire brush to clean ring lands, or cut ring lands deeper with cleaning tool.

NOTE: If piston is to be separated from connecting rod, do not install new rings yet.

3. Install new rings in proper sequence and position (page 7-18).

NOTE: Do not reuse old piston rings.



Piston Rings

Land Clearances

After installing a new set of rings, measure ring-to-land clearances:

Top Ring Clearance

Standard (New): 0.035–0.060 mm

(0.001–0.002 in)

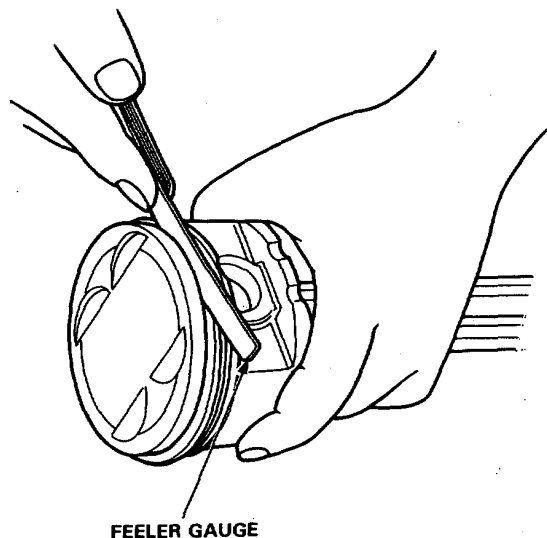
Service Limit: 0.13 mm (0.005 in)

Second Ring Clearance

Standard (New): 0.030–0.055 mm

(0.001–0.002 in)

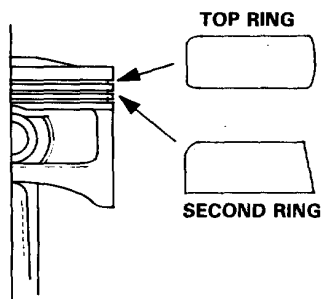
Service Limit: 0.13 mm (0.005 in)



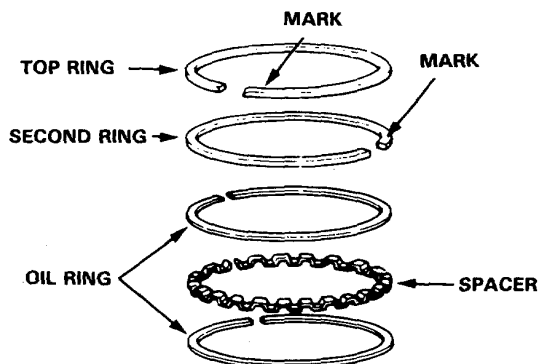
Alignment

1. Install the rings as shown on page 7-17.

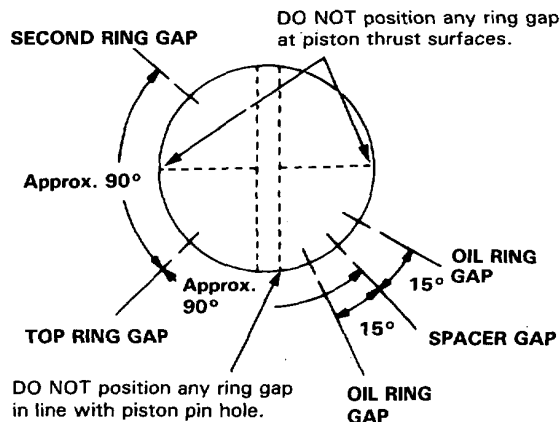
Identify top and second rings by the chamfer on the edge, and make sure they are in proper grooves on piston.



2. Rotate the rings in grooves to make sure they do not bind.
3. The manufacturing marks must be facing upward.



4. Position the ring end gaps as shown:



Pistons



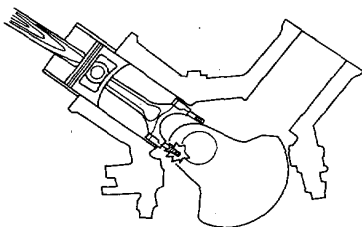
Installation

-  Before installing the piston, apply a coat of engine oil to the ring grooves and cylinder bores.

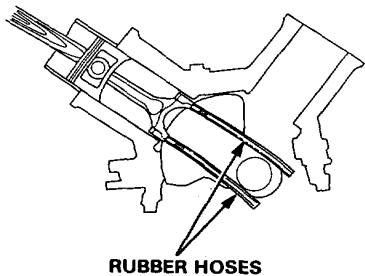
NOTE:

- Guide the piston carefully to prevent damage.
- Fit long rubber hoses (about 30 cm long) to connecting rod bolts to protect the crankshaft.
- Install the pistons after setting the crankshaft to BDC for each cylinder.

INCORRECT



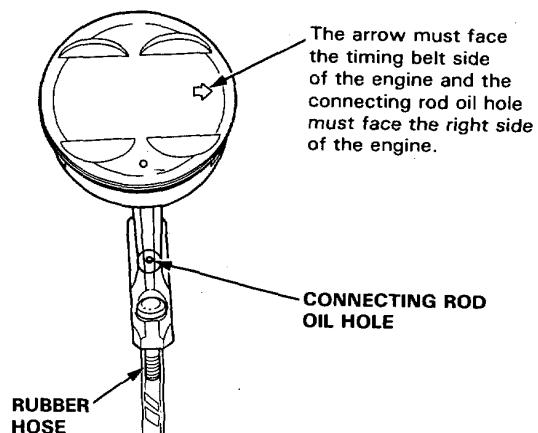
CORRECT



1. If the crankshaft is already installed:
 - Install the piston assemblies in No. 1 and No. 4 cylinders, No. 2 and No. 5 cylinders, and No. 3 and No. 6 cylinders.
 - Remove the connecting rod caps, then slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
 - Install the ring compressor, check that the bearing is securely in place; then position the piston in the cylinder and drive it in using the wooden handle of a hammer.
 - Stop after the ring compressor pops free and check the connecting rod-to-crank journal alignment before driving rod into place.
 - Install the rod caps with bearings, and torque the nuts to 45 N·m (4.5 kg-m, 33 lb-ft).

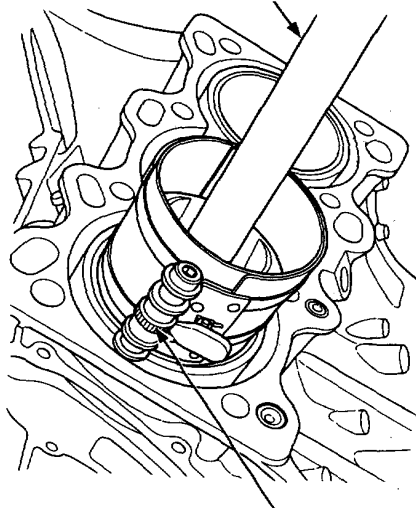
2. If the crankshaft is not installed:

- Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder and drive it in using the wooden handle of a hammer.



NOTE: Maintain downward force on ring compressor to prevent rings from expanding before entering the cylinder bore.

Use the wooden handle of a hammer to push, or tap the piston into the cylinder bore.



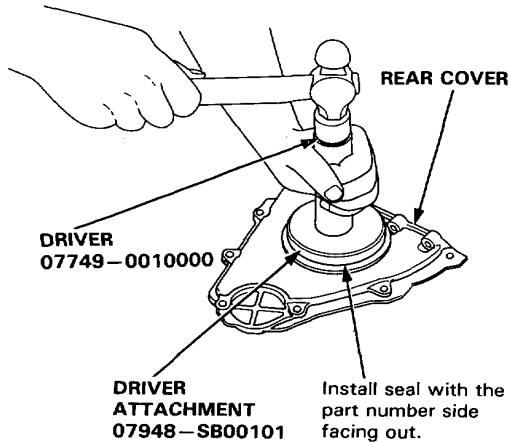
RING COMPRESSOR
Commercially available.

Oil Seal

Installation

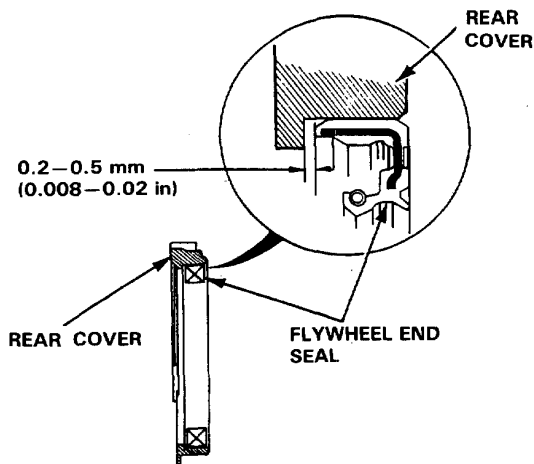
-  The seal surface on the block should be dry. Apply a light coat of oil to the crankshaft and to the lip of seal.

1. Drive flywheel-end seal into the rear cover.



2. Confirm clearance is equal all the way around with a feeler gauge.

Clearance: 0.2–0.5 mm (0.008–0.02 in)



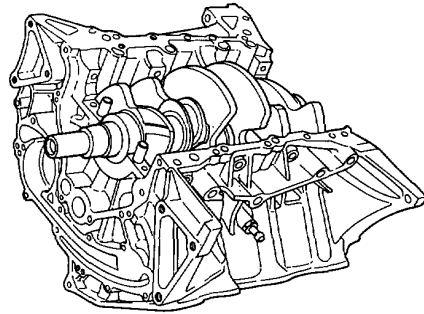
NOTE: Refer to page 8-12 for installation of the oil pump side oil seal.

Crankshaft

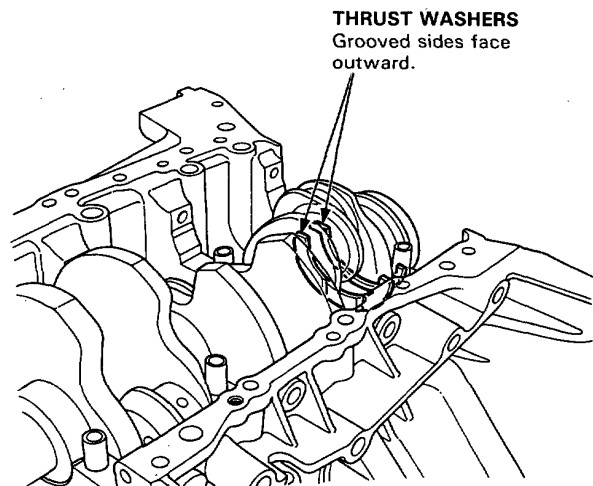
Installation

-  Before installing the crankshaft, apply a coat of engine oil to the main bearings and rod bearings.

1. Insert bearing halves in the engine block and connecting rods.
2. Lower the crankshaft into the block.

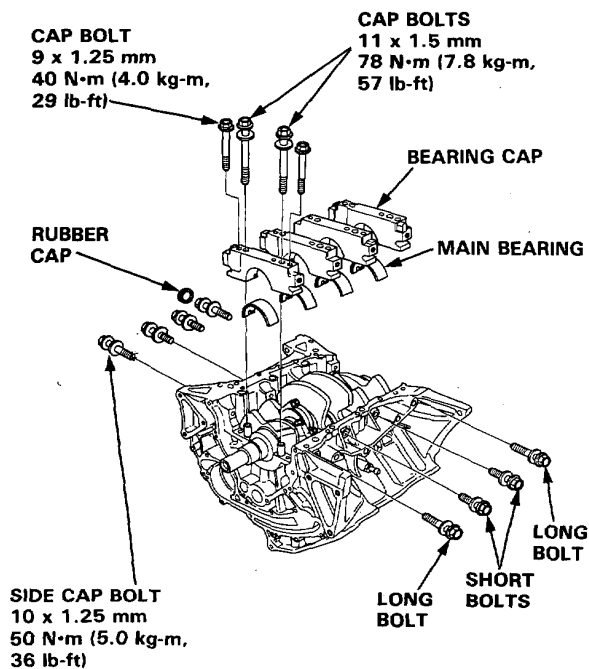
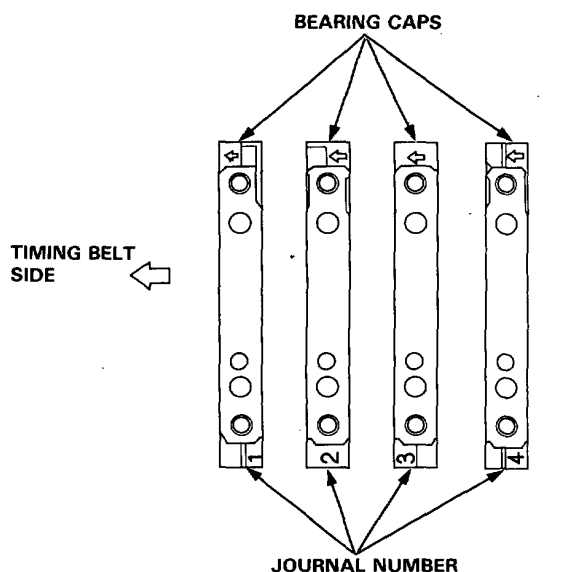


3. Install the thrust washers on the No. 4 journal. Oil thrust washer surfaces.





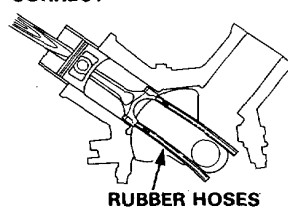
4. Install the bearings and caps. Torque the cap bolts.



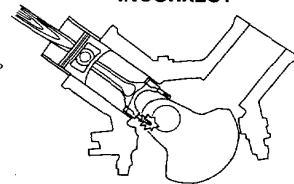
NOTE:

- Guide the piston carefully to prevent damage.
- Fit long rubber hoses (about 30 cm long) to connecting rod bolts to protect the crankshaft.
- Install the pistons after setting the crankshaft to BDC for each cylinder.

CORRECT

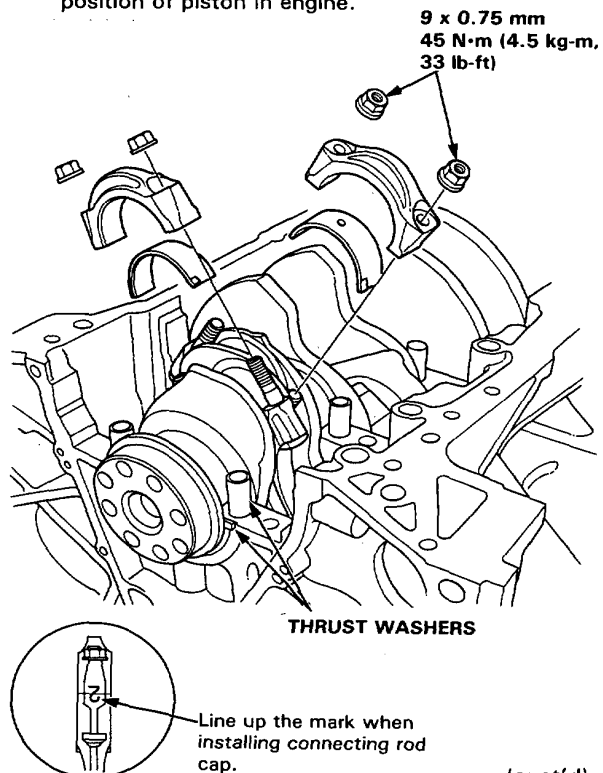


INCORRECT



5. Check the rod bearing clearance with plastigage (page 7-7), then torque the connecting rod cap nuts.

NOTE: Reference numbers on connecting rods are for big-end bore tolerance and do NOT indicate the position of piston in engine.



(cont'd)

Crankshaft

Installation (cont'd)

6. Tighten 9 x 1.25 mm cap bolts to specified torque.

Torque: 40 N·m (4.0 kg-m, 29 lb-ft)

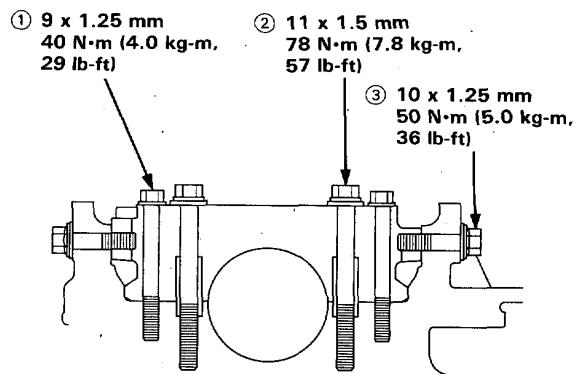
7. Tighten 11 x 1.5 mm cap bolts to specified torque.

Torque: 78 N·m (7.8 kg-m, 57 lb-ft)

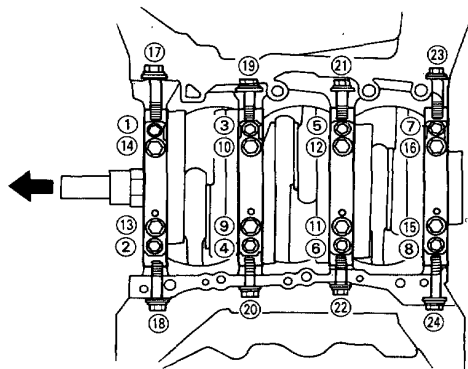
8. Tighten 10 x 1.25 mm cap side bolts to specified torque.

Torque: 50 N·m (5.0 kg-m, 36 lb-ft)

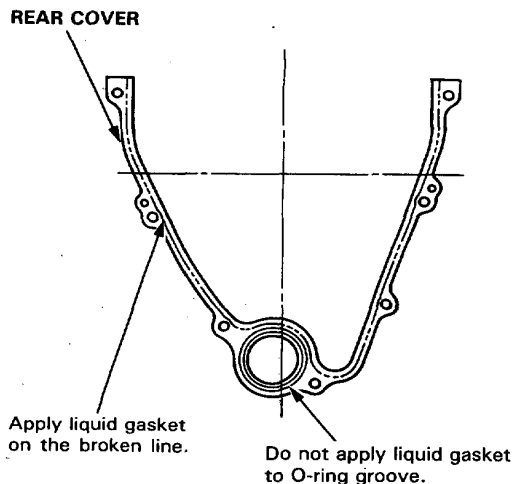
- Coat the bolt thread and seat surface with engine oil.



BEARING CAP BOLTS TORQUE SEQUENCE



9. Apply liquid gasket to the block mating surface of the rear cover, then install it on the engine block.



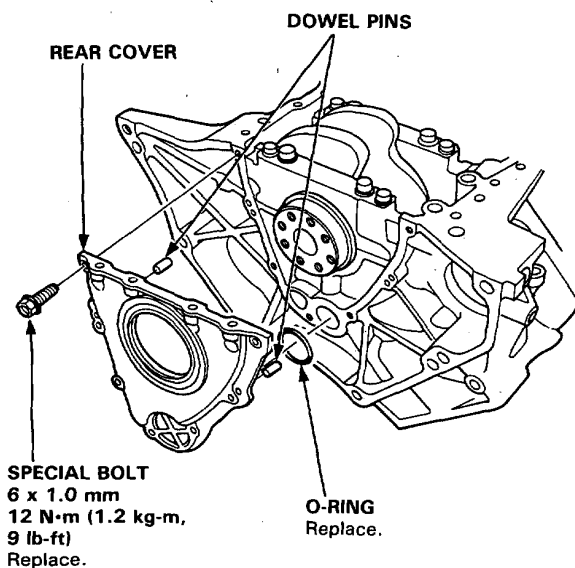
NOTE:

- Use liquid gasket, Part No. OY740—99986.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket by starting with an even band, centered between edges of the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not apply liquid gasket to O-ring grooves.
- Do not install the parts if 20 minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.



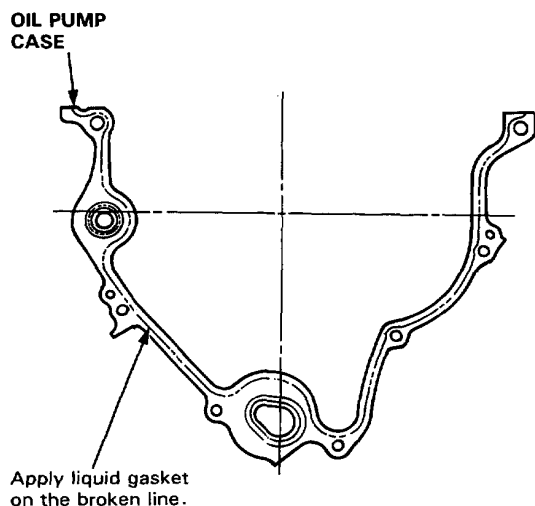
NOTE:

- Apply a light coat of oil to the crankshaft and to the lip of seal.
- Use a new O-ring and apply oil when installing it.
- Use new special bolts when installing the rear cover.



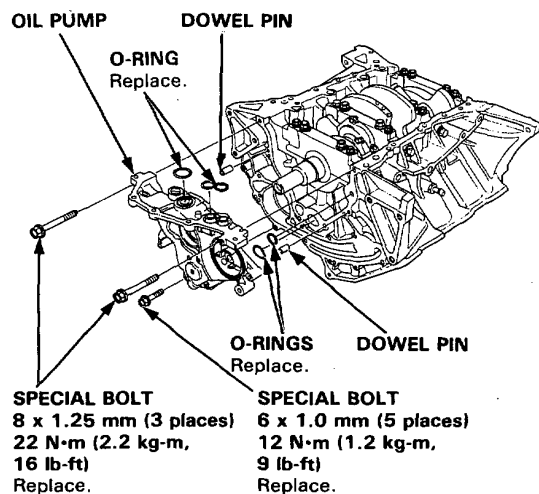
10. Apply liquid gasket to the block mating surface of the oil pump, then install it on the engine block.

NOTE: Do not apply liquid gasket to O-ring grooves.



NOTE:

- Apply a light coat of oil to the crankshaft and to the lip of seal.
- Use new O-rings and apply oil when installing them.
- Use new special bolts when installing the oil pump case.

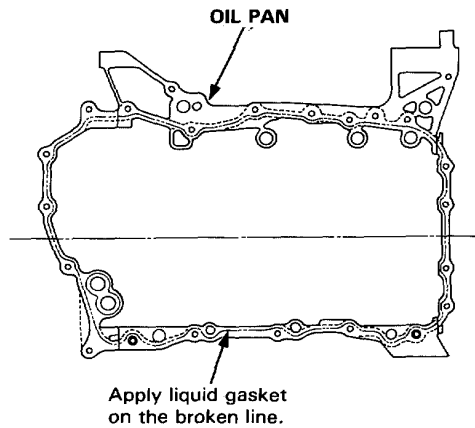


(cont'd)

Crankshaft

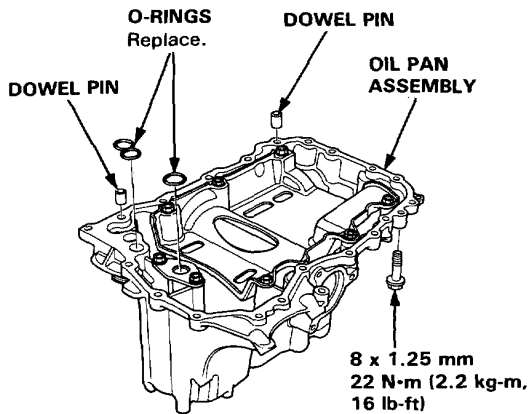
Installation (cont'd)

11. Apply liquid gasket to the block mating surface of oil pan, then install it on the engine block.



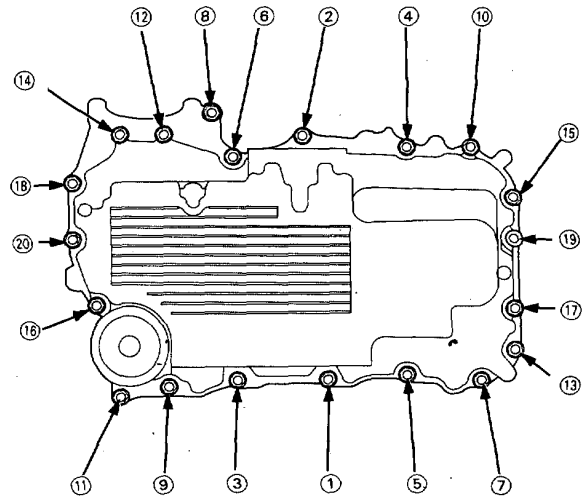
NOTE:

- Do not apply liquid gasket to O-ring grooves.
- Use new O-rings and apply oil when installing them.



12. Tighten the oil pan bolts as shown.

OIL PAN BOLT TORQUE SEQUENCE



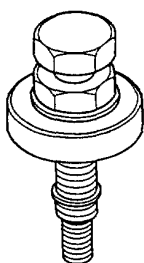
Engine Lubrication

Special Tools	8-2
Illustrated Index	8-3
Oil Level Inspection	8-4
Oil Replacement	8-4
Oil Filter Replacement	8-5
Oil Pressure Test	8-5
Oil Pan Removal/Installation	8-6
Oil Pump Illustrated Index	8-10
Oil Pump Removal/Inspection	8-11

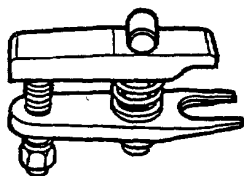


Special Tools

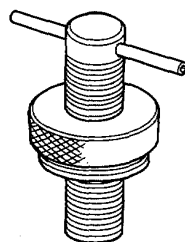
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAC—PW50100	Extension Shaft Puller	1	8-7
②	07MAC—SL00100	Ball Joint Remover, 32 mm	1	8-6
③	07MAF—PY40100	Extension Shaft Installer	1	8-9
④	07406—0030000	Oil Pressure Gauge Adapter	1	8-5
⑤	07746—0010500	Driver Attachment, 62 x 68 mm	1	8-12
⑥	07749—0010000	Driver	1	8-12
⑦	07912—6110001	Oil Filter Socket	1	8-5



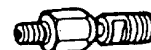
①



②



③



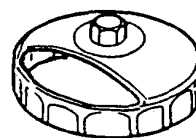
④



⑤



⑥



⑦

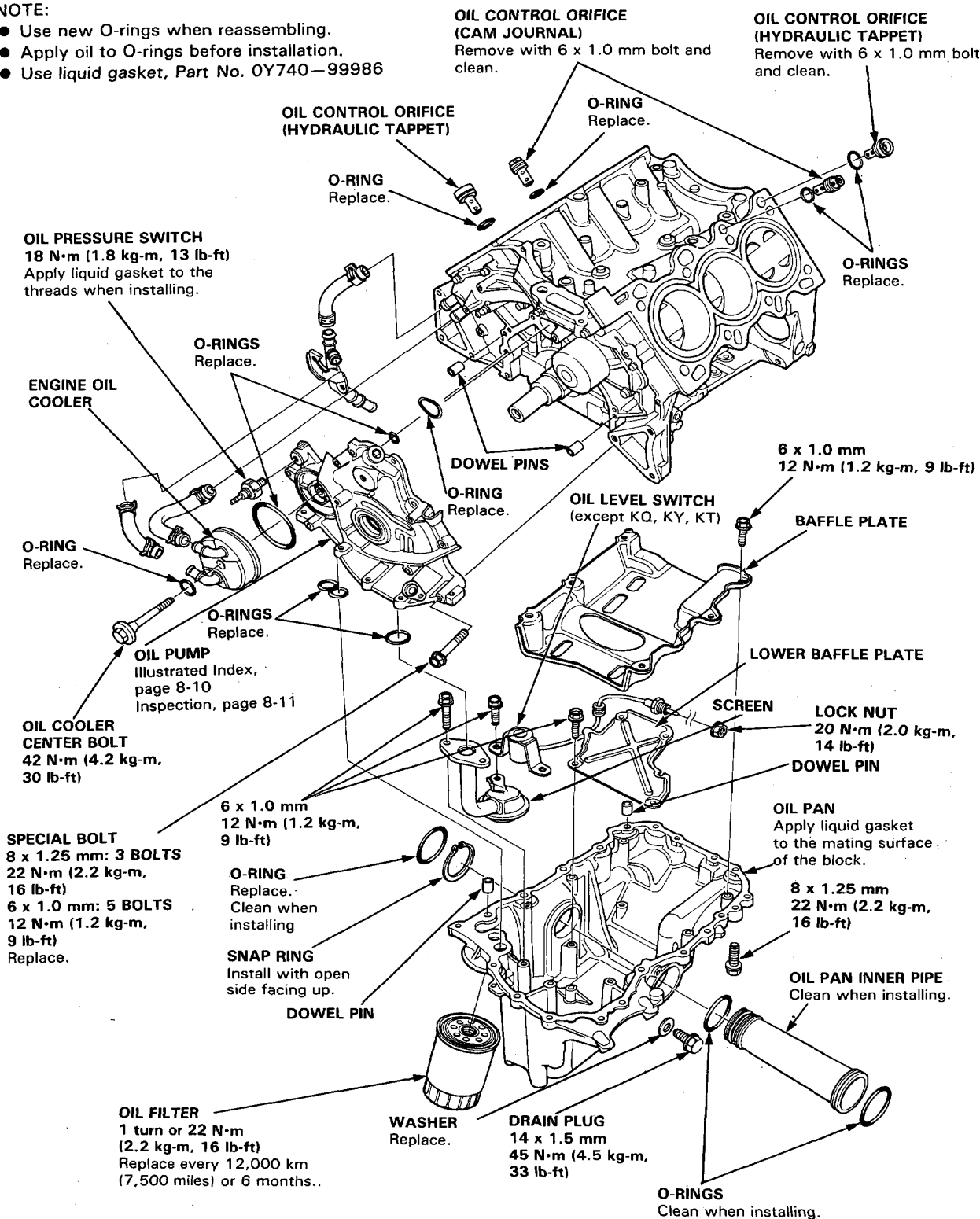
Engine Lubrication

Illustrated Index



NOTE:

- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. OY740-99986

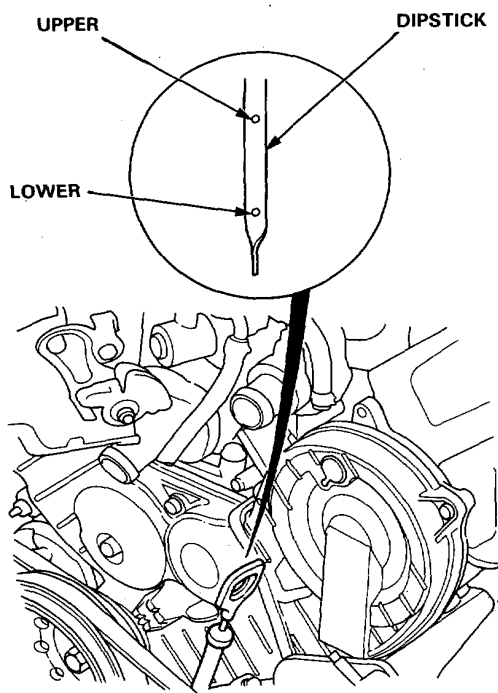


Oil Level

Inspection

1. Check engine oil with the engine off and the car parked on level ground.
2. Make certain that the oil level indicated on the dipstick is between the upper and lower marks.
3. If the level has dropped close to the lower mark, add oil until it reaches the upper mark.

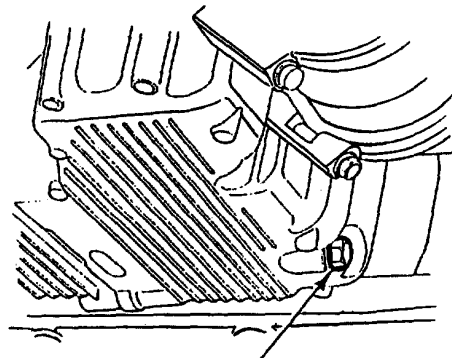
CAUTION: Insert the dipstick carefully to avoid bending it.



Engine Oil

Replacement

1. Warm up the engine.
2. Drain the engine oil.

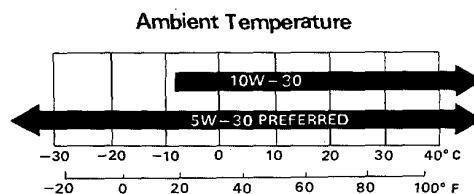


OIL PAN DRAIN PLUG
45 N·m (4.5 kg-m, 33 lb-ft)

3. Reinstall the drain plug with a new washer, and refill with the recommended oil.

Requirement	API Service Grade: SG or SF Fuel Efficient Oil Viscosity: 10 W-30 recommended see chart below.
Capacity	4.7 l (4.9 US qt, 4.1 Imp qt) at change, including filter. 5.0 l (5.3 US qt, 4.4 Imp qt) after engine overhaul.
Change	Every 10,000 km (6,000 miles) or 6 months whichever comes first.

Engine Oil Viscosity for Outside Temperature Ranges.



NOTE:

- Oil filter should be replaced at each oil change.

4. After refilling the engine oil replace the oil filler cap and tighten it until it clicks twice.

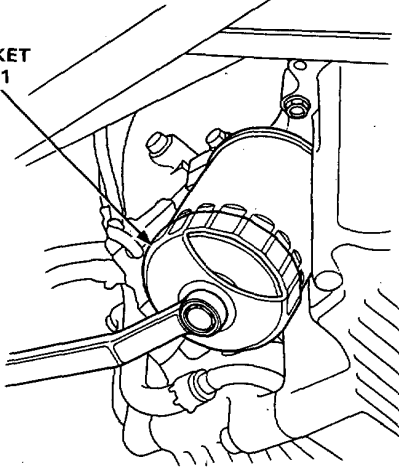
Oil Filter

Replacement

CAUTION: Loosen the oil filter carefully while the engine is hot, the hot oil may cause scalding.

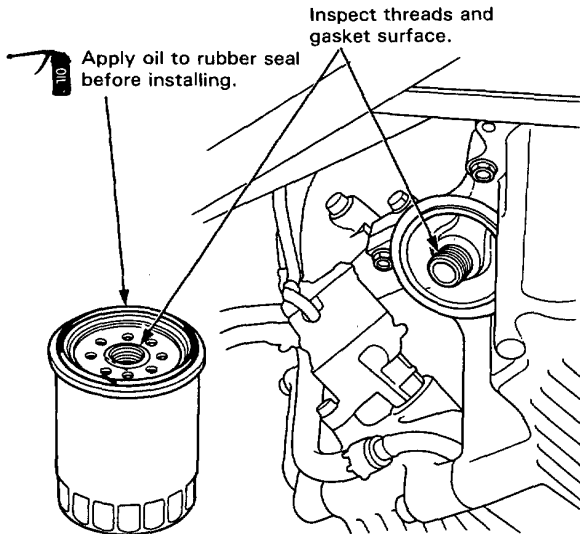
1. Remove the oil filter with the special tool as shown.

OIL FILTER SOCKET
07912-6110001



2. Inspect the threads and rubber seal on the new filter. Wipe off seat on oil filter base, then apply a light coat of oil to the rubber seal, and install filter.
3. After rubber seal is seated, tighten the oil filter by turning approximately one turn.

Torque: One turn (22 N·m (2.2 kg-m, 16 lb-ft)).



4. Start the engine and check the filter for oil leakage.

Oil Pressure

Test

If the oil pressure warning light stays on with the engine running, check the engine oil level. If the oil level is correct:

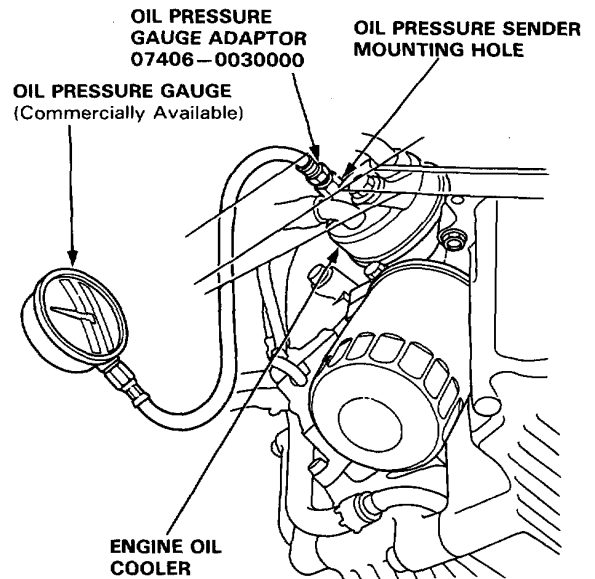
1. Remove the oil pressure sender and install an oil pressure gauge.
2. Start the engine and allow to reach operating temperature (fan comes on at least twice).
3. Pressure should be:

Engine Oil Pressure:

At Idle: 70 kPa (0.7 kg/cm², 10 psi)
minimum

At 3,000 rpm: 350 kPa (3.5 kg/cm², 50 psi)
minimum

- If oil pressure is within specifications, replace oil pressure sender and recheck.
- If oil pressure is NOT within specifications, inspect oil pump (page 8-11).



Oil Pan

Removal

Engine removal is not required in this procedure.

⚠ WARNING

- Make sure jacks and safety stands are placed properly and hoist brackets are attached to the correct positions on the engine (page 1-6).
- Apply parking brake and block rear wheels so the car will not roll off stands while you are working under it.

CAUTION:

- Use fender covers to avoid damaging painted surfaces.
- Disconnect wiring connectors carefully to avoid damage.
- Mark the wiring and hoses to avoid mis-connection.
Be sure they do not contact other wiring or hoses or interfere with other parts.

1. Disconnect the battery negative terminal first then the positive terminal. Remove the battery.

2. Remove the radiator cap.

⚠ WARNING

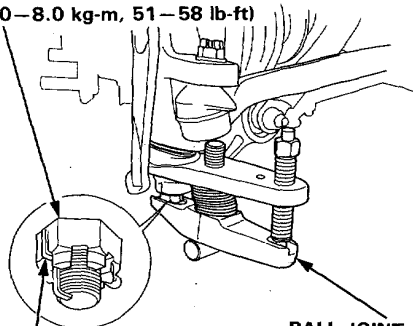
Use care when removing the radiator cap to avoid scalding by hot coolant or steam.

3. Remove the front wheels.

4. Remove the damper forks.

5. Disconnect the suspension lower arm balljoints with the special tool. Refer to section 18 for the proper procedure.

CASTLE NUT
70–80 N·m
(7.0–8.0 kg-m, 51–58 lb-ft)

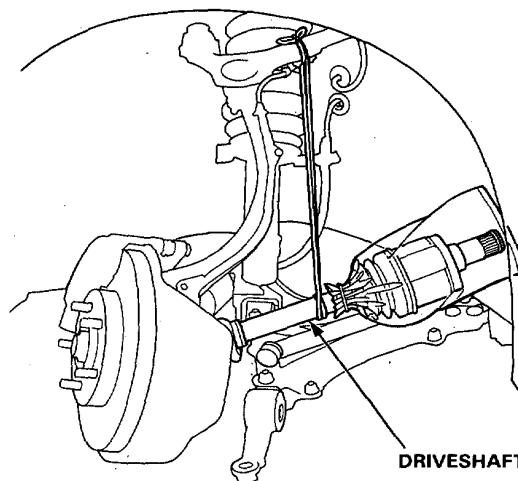


**BALL JOINT
REMOVER, 32 mm
07MAC–SL00100**

COTTER PIN
Replace.

6. Remove the driveshafts. Suspend them with a rope as shown.

NOTE: Coat all precision-finished surfaces with clean engine oil or grease. Tie plastic bags over the driveshaft ends.





7. Raise the hoist to full height.
8. Remove the engine splash shield and the lower plate under the rear beam.
9. Drain the engine oil. Reinstall the drain plug using a new washer.
10. Loosen the radiator drain plug and drain the coolant.
11. Drain the differential oil. Use a 3/8" drive socket wrench to remove the drain plug. Reinstall the drain plug using a new washer.

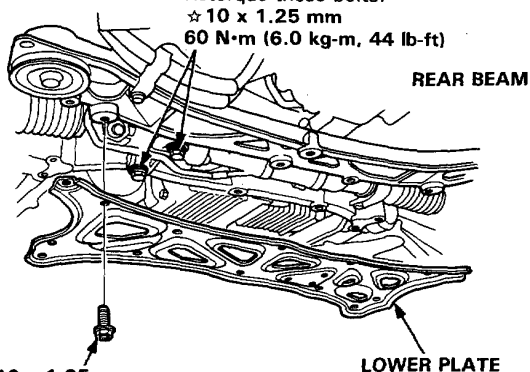
LHD is shown (RHD is symmetrical):

**STEERING GEAR BOX
MOUNTING BOLTS**

Retorque these bolts.

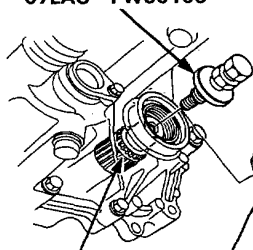
☆ 10 x 1.25 mm

60 N·m (6.0 kg-m, 44 lb-ft)

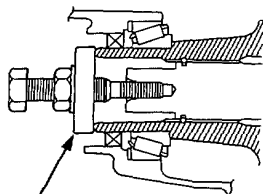


☆ 10 x 1.25 mm
39 N·m (3.9 kg-m, 29 lb-ft)

**EXTENSION SHAFT
PULLER
07LAC-PW50100**



SET RING 36 mm **SEALING
BOLT**
Replace.



**EXTENSION SHAFT
PULLER
07LAC-PW50100**

**SECONDARY
COVER**

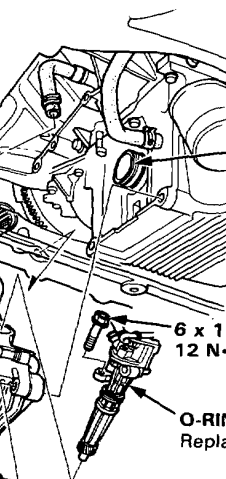
Set this bolt and breather
hose clamp into the bolt hole
before installing the differential
assembly.

12 x 1.25 mm
65 N·m
(6.5 kg-m, 47 lb-ft)

12 x 1.25 mm
65 N·m (6.5 kg-m, 45 lb-ft)

26 mm SHIM

12 x 1.25 mm
65 N·m
(6.5 kg-m, 47 lb-ft)



6 x 1.0 mm
12 N·m (1.2 kg-m, 9 lb-ft)

12 x 1.25 mm
65 N·m (6.5 kg-m, 47 lb-ft)

12. Remove the power steering speed sensor.
 - Do not disconnect the oil hoses.
13. Disconnect the differential oil cooler hoses.
14. Remove the secondary cover and 36 mm sealing bolt.
- NOTE: Shift to low gear or **P** position to lock the secondary shaft.
15. Disconnect the extension shaft from the differential with the special tool.
16. Remove the mounting bolts and 26 mm shim, then remove the differential assembly.
17. Loosen the adjusting nut, then remove the air conditioner belt and the compressor.
18. Remove the intermediate shaft.
19. Remove the engine stiffener.
20. Remove the flywheel cover or the drive plate cover.
21. Remove the oil pan.

☆: CORROSION RESISTANT BOLT

Oil Pan

Installation

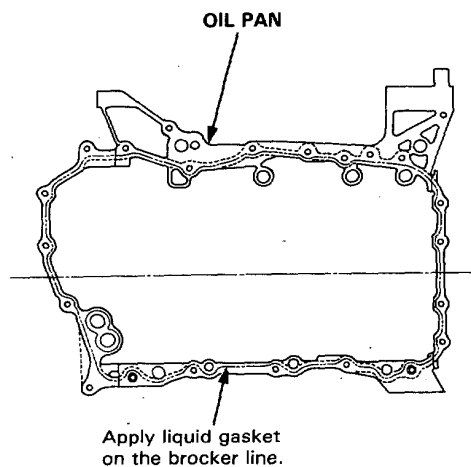
Install the oil pan in the reverse order of removal:

- Always use new O-rings.
- Oil pan and engine block mating surface must be clean.

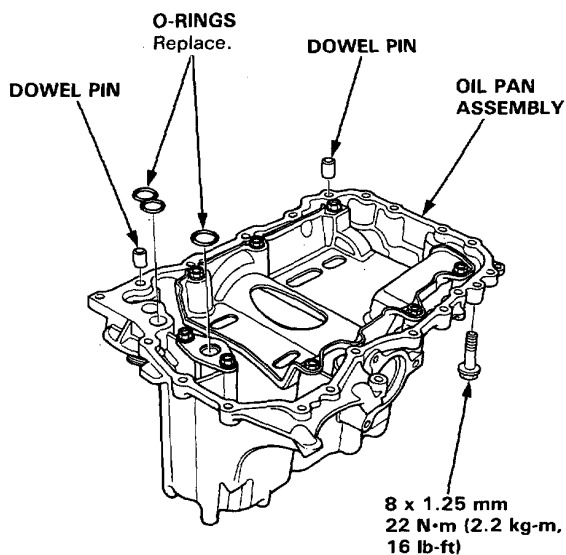
1. Apply liquid gasket to the block mating surface, then install the oil pan.

NOTE:

- Use liquid gasket, Part No. OY740—99986.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, in a narrow bead centered on the mating surface.
- Do not apply liquid gasket to O-ring grooves.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if 20 minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

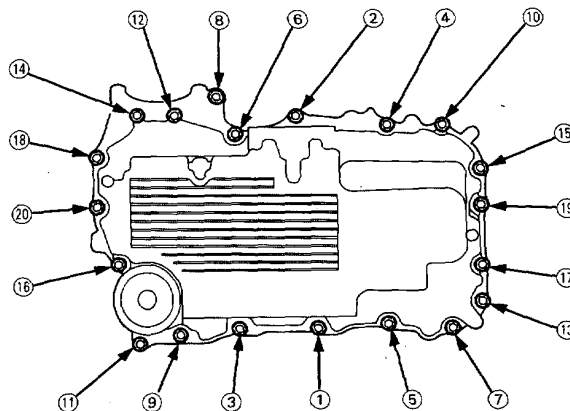


NOTE: Use new O-rings. Apply oil to O-rings before installation.



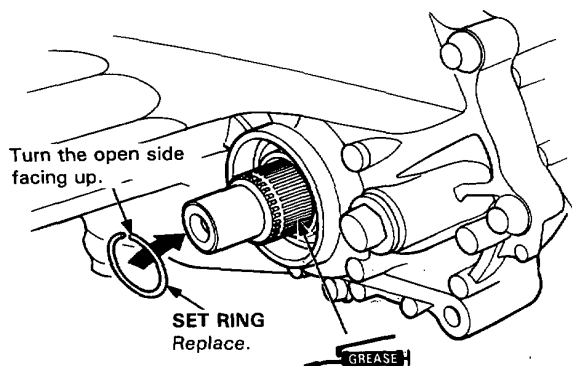
2. Tighten the oil pan bolts as shown.

OIL PAN BOLT TORQUE SEQUENCE



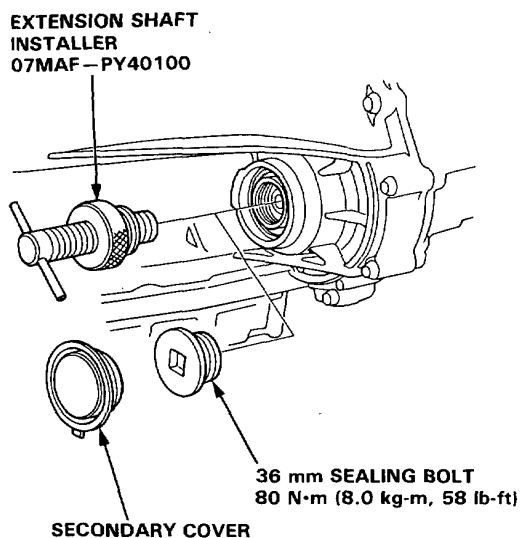


3. Install the differential assembly.
 - Select the appropriate 26 mm shim whenever the oil pan or the cylinder block is replaced. Refer to section 15 for selection of the correct 26 mm shim.
4. Apply grease to the spline of the extension shaft, then install the new set ring.



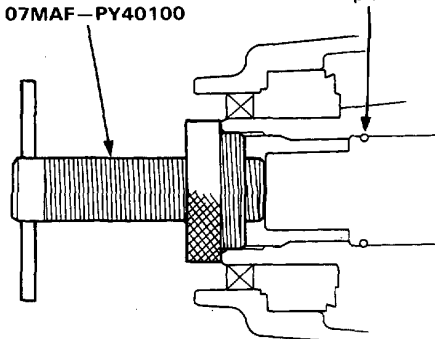
5. Install the extension shaft with the special tool.

NOTE: Make sure the extension shaft locks in place.

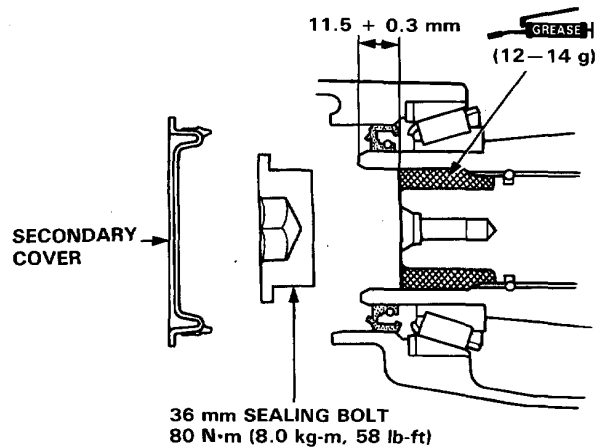


EXTENSION SHAFT
INSTALLER
07MAF-PY40100

SET RING
Replace.



6. Fill the cavity with Honda genuine UM264 grease.
7. Reinstall the 36 mm sealing bolt and the secondary cover.
 - Apply liquid gasket (P/N 0Y740-99986) to the sealing bolt threads.



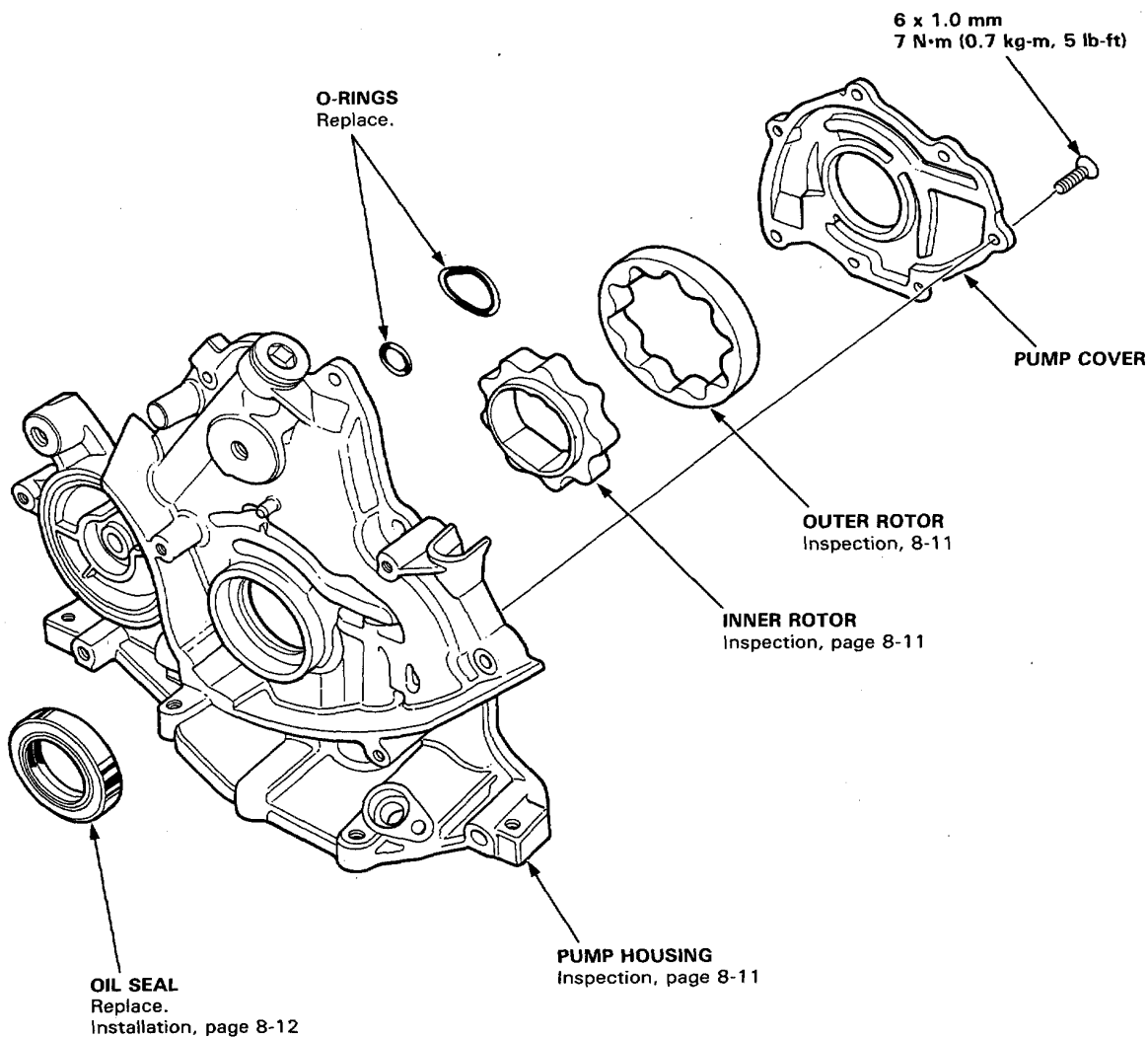
8. Check the following items after reassembly.
 - Refill hypoid gear oil in the differential.
 - Refill engine oil.
 - Refill coolant in the cooling system.
 - The set rings on the driveshafts are completely inserted into the groove of the differential or intermediate shaft.
 - Adjust the A/C belt tension.

Oil Pump

Illustrated Index

NOTE:

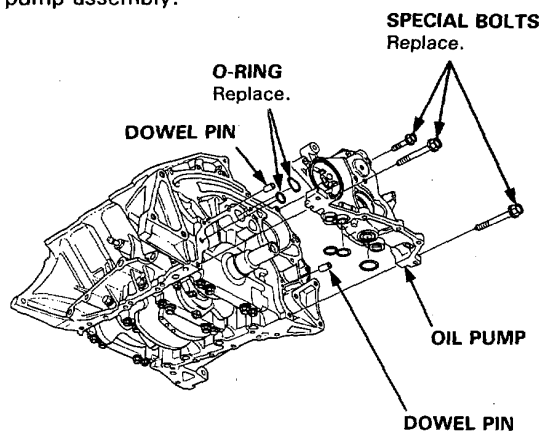
- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.





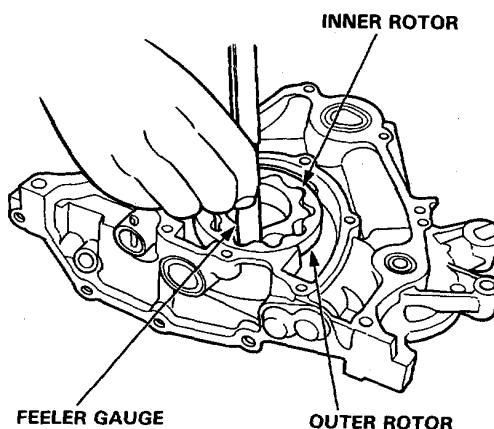
Removal/Inspection

1. Drain the engine oil and the differential oil.
2. Turn the crankshaft to TDC.
3. Remove the timing belt (page 6-28).
4. Remove the oil pan (page 8-6).
5. Remove the special bolts, then remove the oil pump assembly.



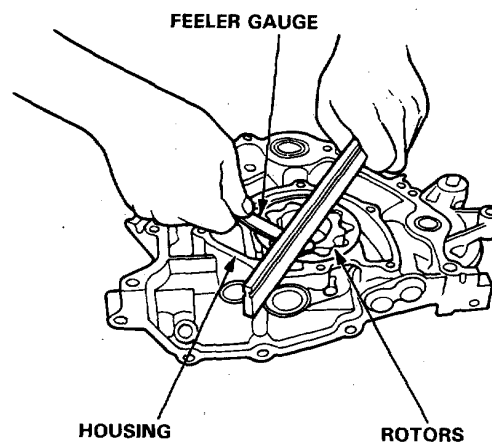
6. Remove the seven screws from the pump housing, then separate the housing and cover.
7. Check the radial clearance on the pump rotor.

Inner-to-Outer Rotor Clearance
Standard (New): 0.04–0.16 mm
(0.002–0.006 in)
Service Limit: 0.20 mm (0.008 in)



8. Check the axial clearance on the outer pump rotor.

Housing-to-Rotor Axially Clearance
Standard (New): 0.02–0.07 mm
(0.001–0.003 in)
Service Limit: 0.12 mm (0.005 in)



(cont'd)

Oil Pump

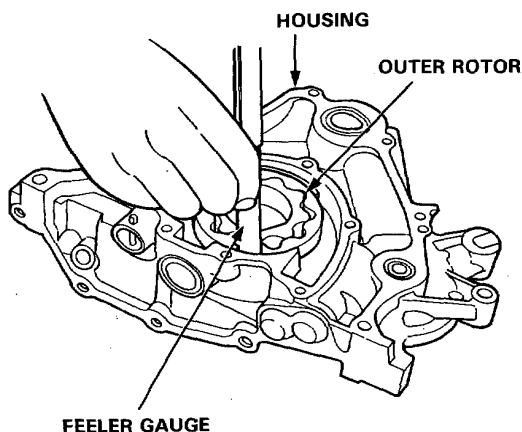
Removal/Inspection (cont'd)

9. Check the radial clearance between the housing and the outer rotor.

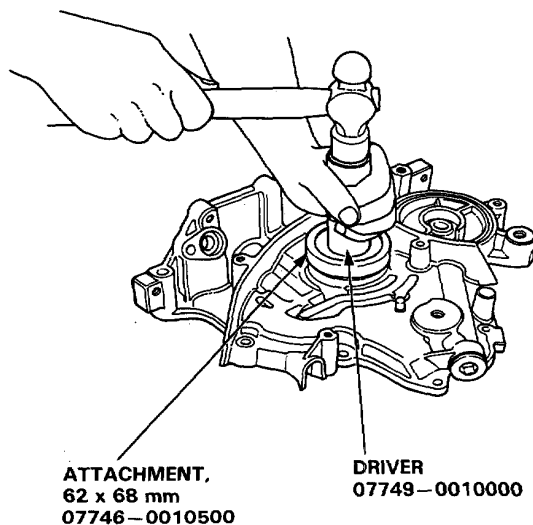
Housing-to-Outer Rotor Clearance

Standard (New): 0.10–0.18 mm
(0.004–0.007 in)

Service Limit: 0.20 mm (0.008 in)



10. Inspect both rotors and pump housing for scoring or other damage. Replace parts if necessary.
11. Remove the old oil seal from the oil pump.
12. Gently tap in the new oil seal until the tool bottoms on the pump using the special tools.

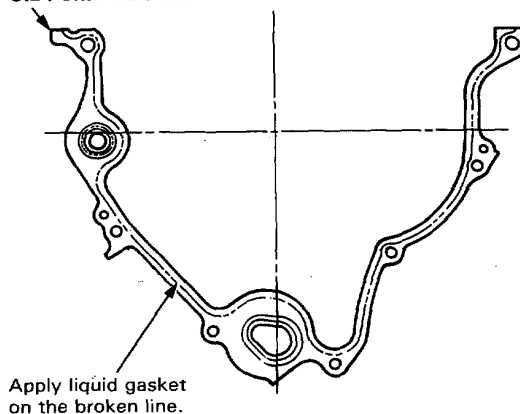


13. Reassemble the oil pump, applying liquid gasket to the pump housing screws.
14. Check that the oil pump turns freely.
15. Apply a light coat of oil to the seal lip.
16. Install the two dowel pins and new O-ring on the cylinder block.
17. Apply liquid gasket to the cylinder block mating surface of the oil pump.

NOTE:

- Use liquid gasket, Part No. 0Y740-99986.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, in a narrow bead centered on the mating surface.
- Do not apply liquid gasket to the O-ring grooves.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.

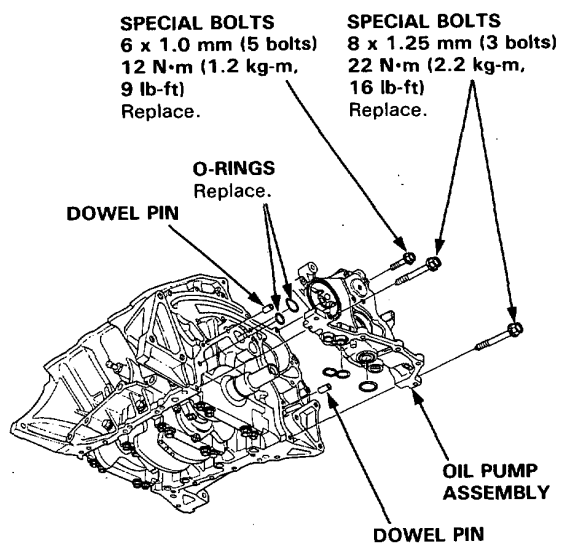
OIL PUMP HOUSING



- Do not install the parts if 20 minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.



18. Install the oil pump assembly to the engine block.



19. Install the oil pan (page 8-8).

20. Install the timing belt.

Intake Manifold/Exhaust System

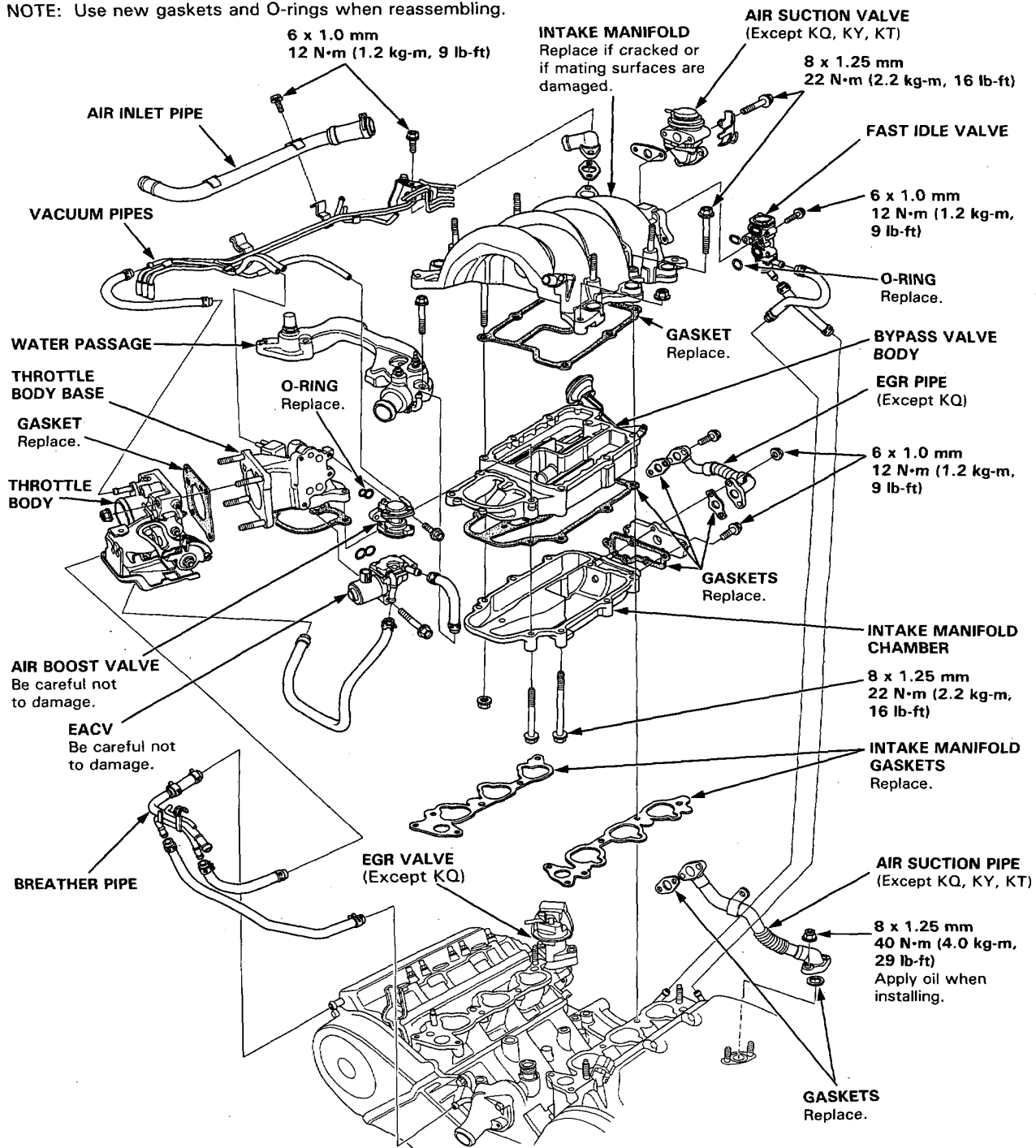
Intake Manifold	9-2
Exhaust Manifold	9-3
Exhaust Pipe and Muffler	9-4



Intake Manifold

Replacement

NOTE: Use new gaskets and O-rings when reassembling.



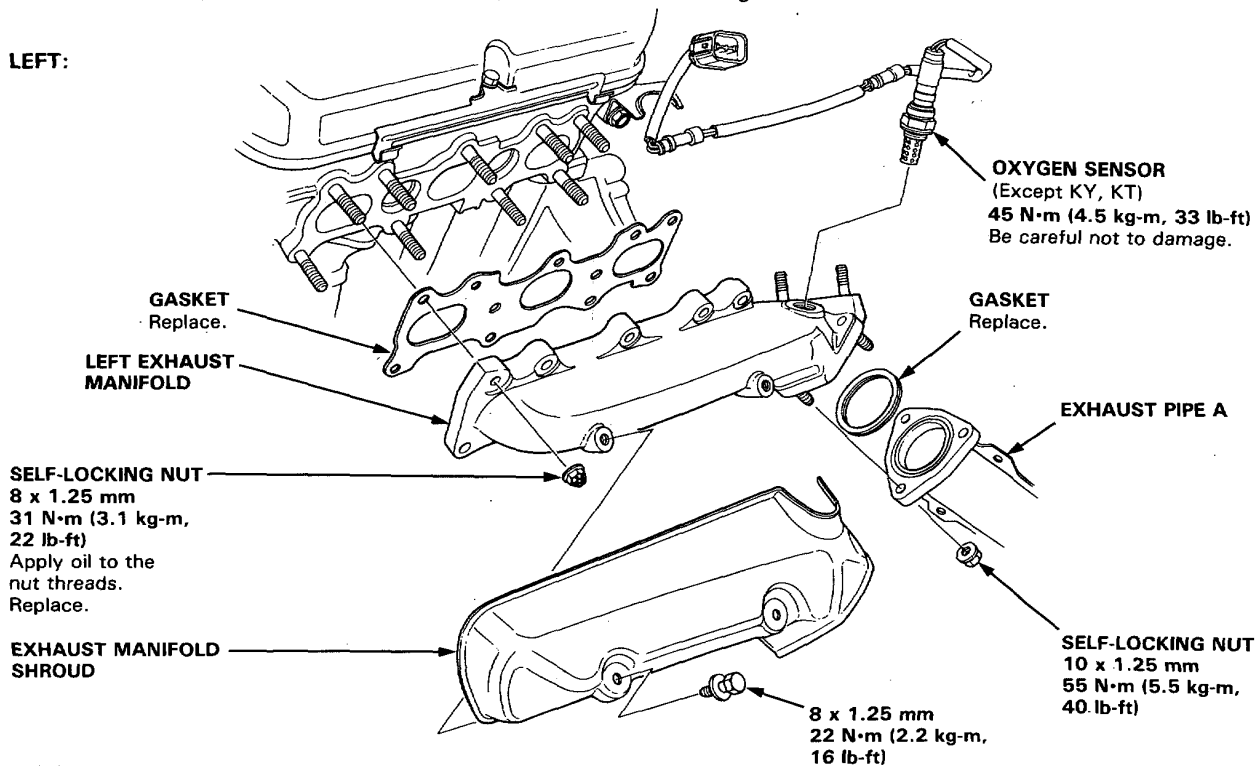


Exhaust Manifold

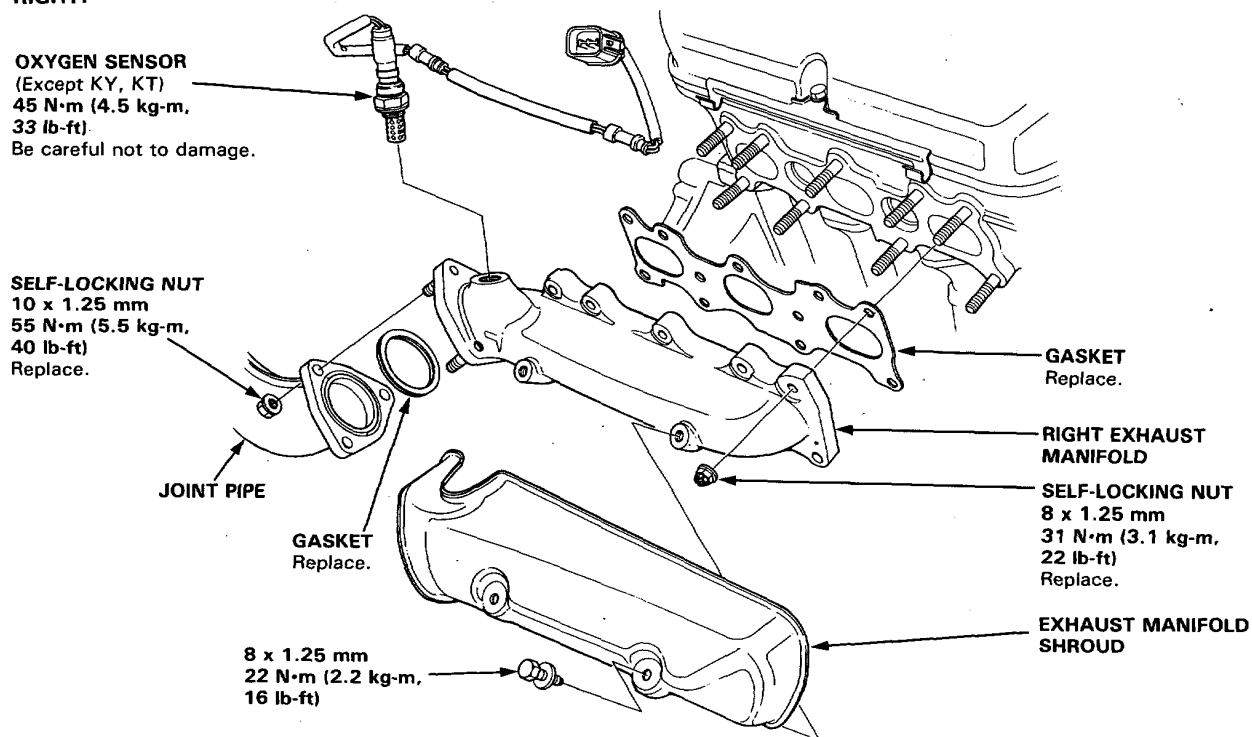
Replacement

NOTE: Use new gaskets and new self-locking nuts when assembling.

LEFT:



RIGHT:



Exhaust Pipe and Muffler

Replacement

