

2010 Honda Odyssey EX

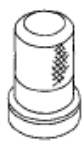
2007-10 ENGINE Engine Block - Odyssey

2007-10 ENGINE

Engine Block - Odyssey

SPECIAL TOOLS

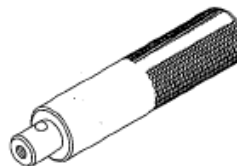
Ref. No.	Tool Number	Description	Qty
①	070AD-RCAA100	Oil Seal Driver, 64 mm	1
②	070AD-RCAA200	Driver Attachment, 106 mm	1
③	07749-0010000	Handle Driver	1



①



②



③

Fig. 1: Identifying Special Tools

Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

J35A6 ENGINE

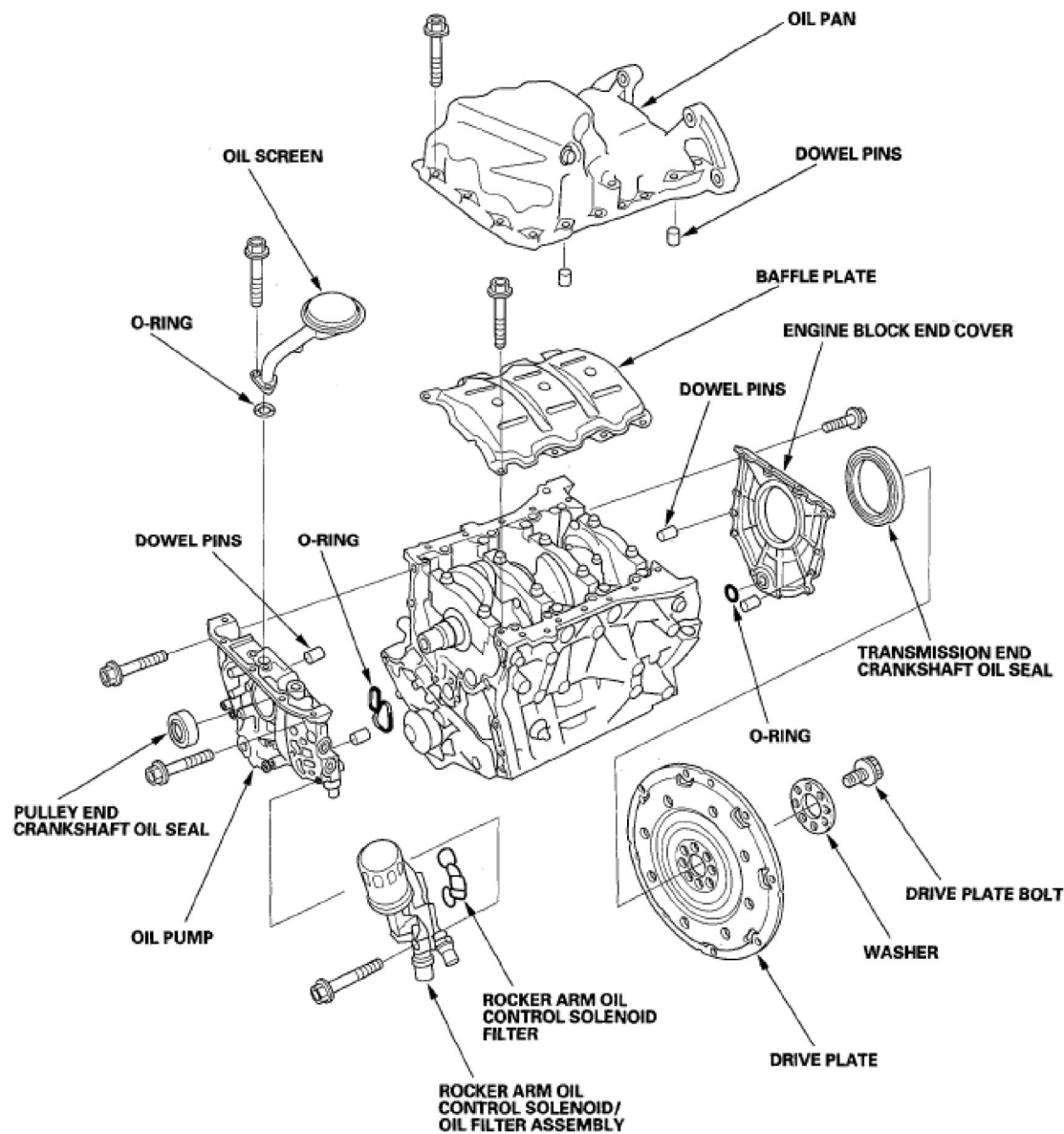


Fig. 2: Identifying Engine Block Component Location - J35A6 Engine
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

'07 MODEL J35A7 ENGINE

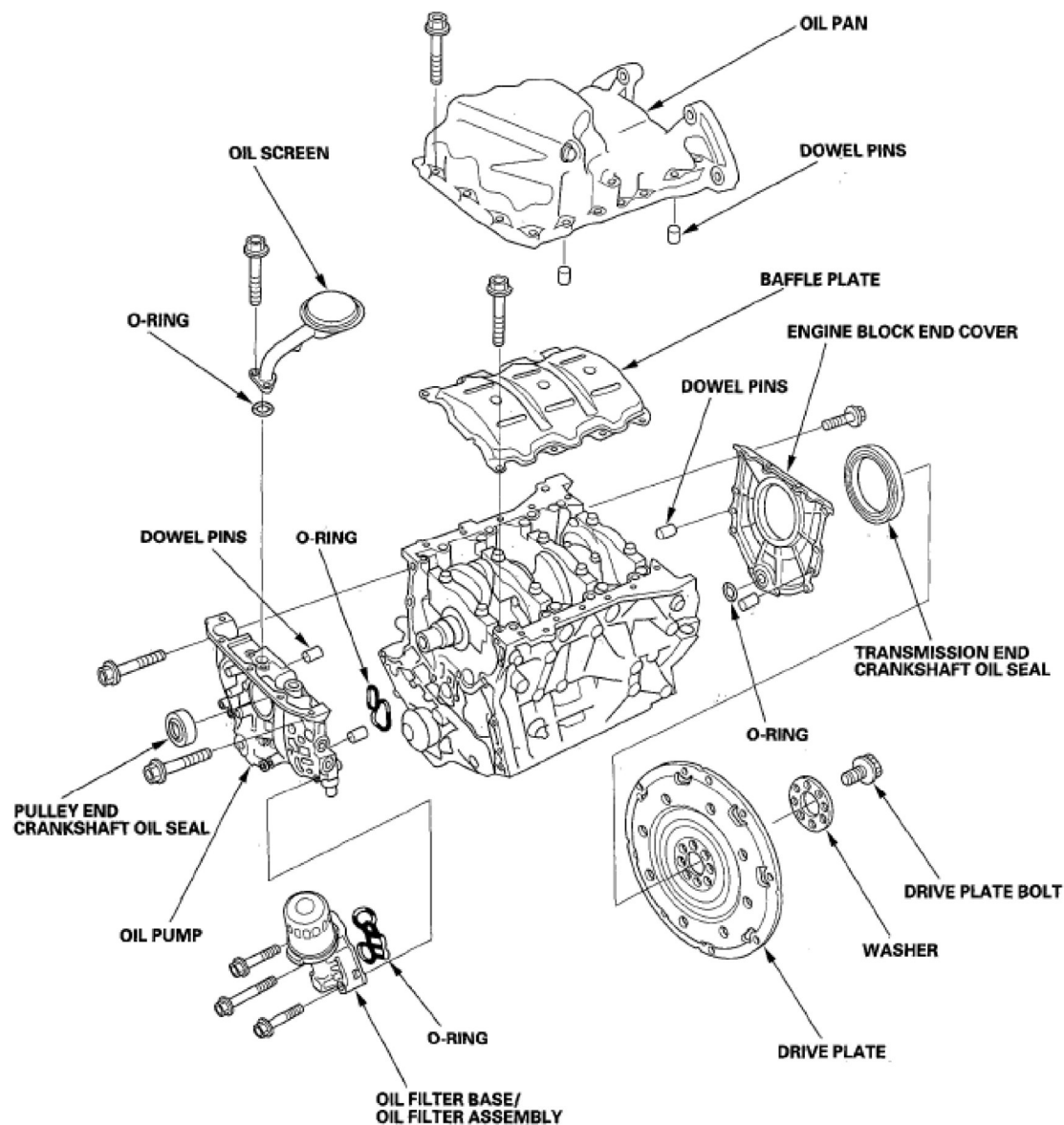


Fig. 3: Identifying Engine Block Component Location - '07 Model J35A7 Engine
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

'08-09 MODELS J35A7 ENGINE

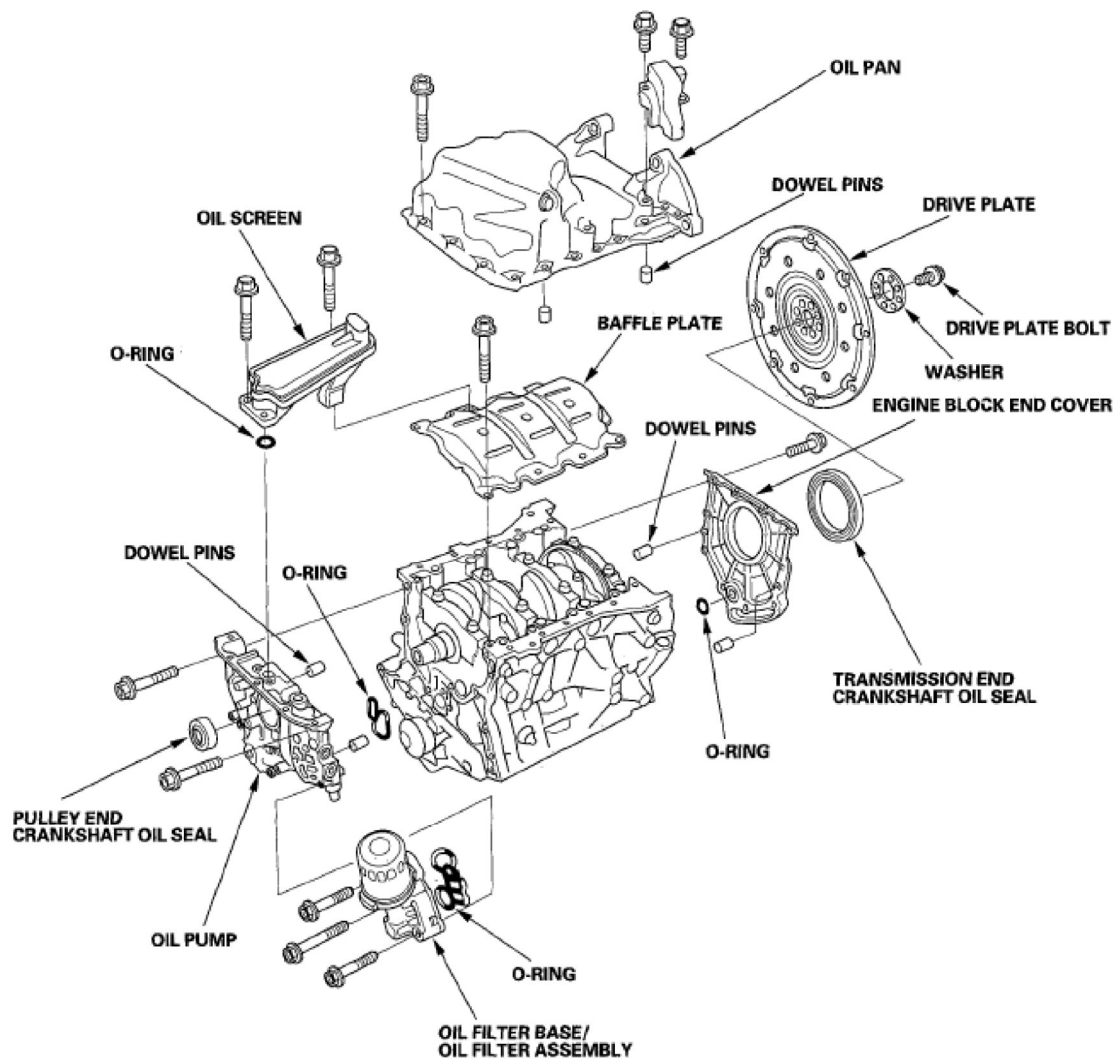


Fig. 4: Identifying Engine Block Component Location - '08-09 models J35A7 Engine
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

J35A6 ENGINE

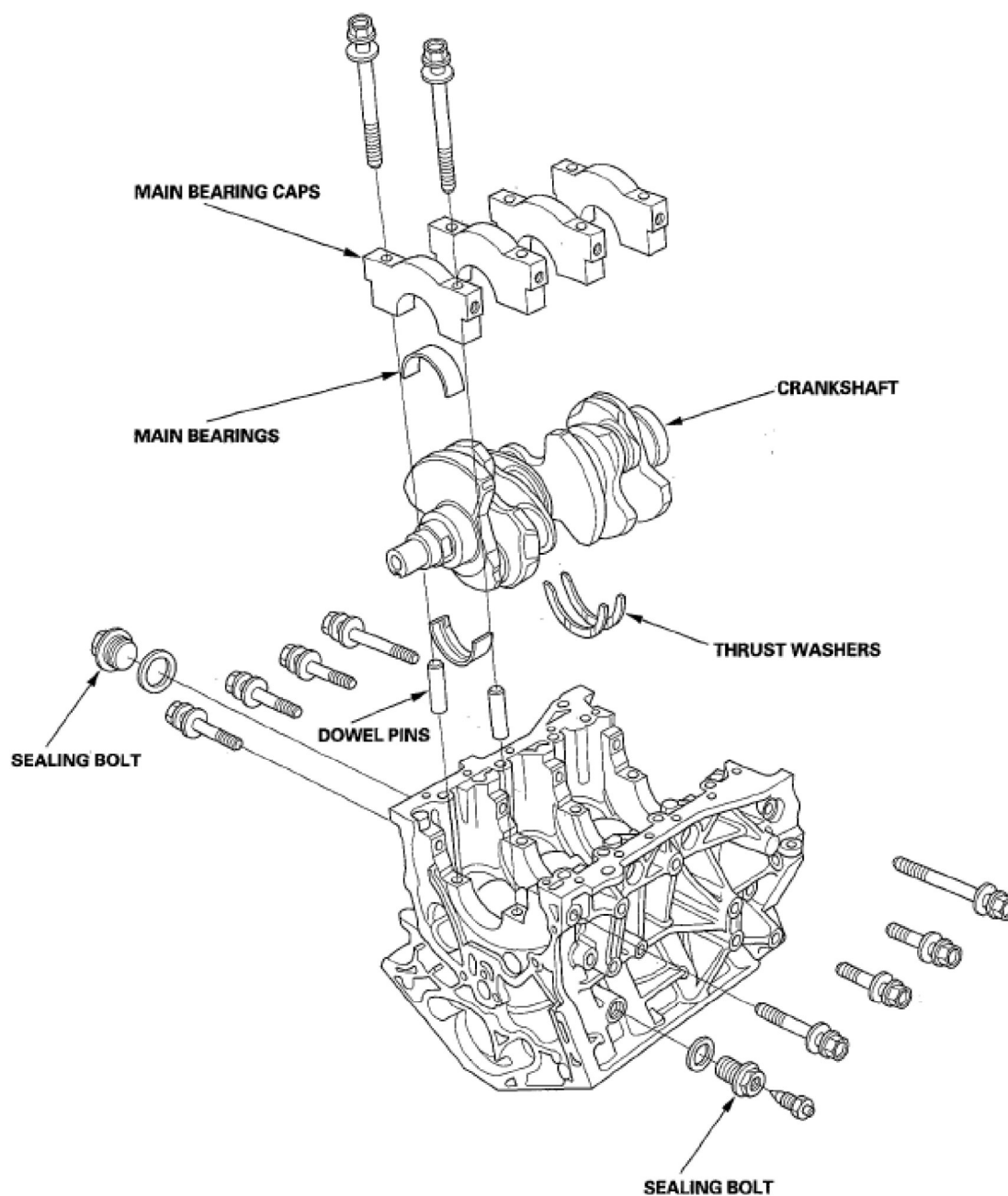


Fig. 5: Identifying Engine Block Component Location - J35A6 Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

'07 MODEL J35A7 ENGINE

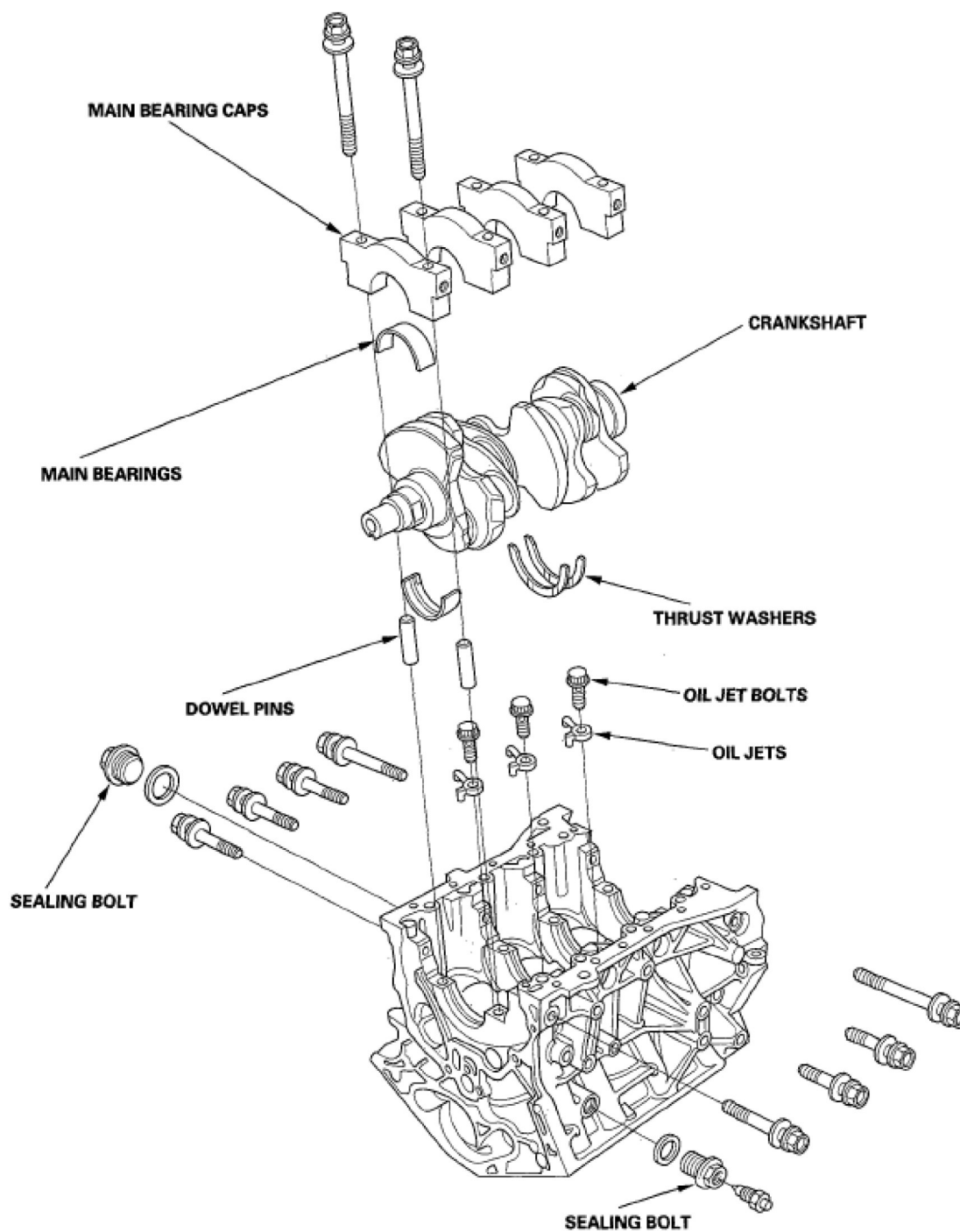


Fig. 6: Identifying Engine Block Component Location - '07 Model J35A7 Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

'08-09 MODELS J35A7 ENGINE

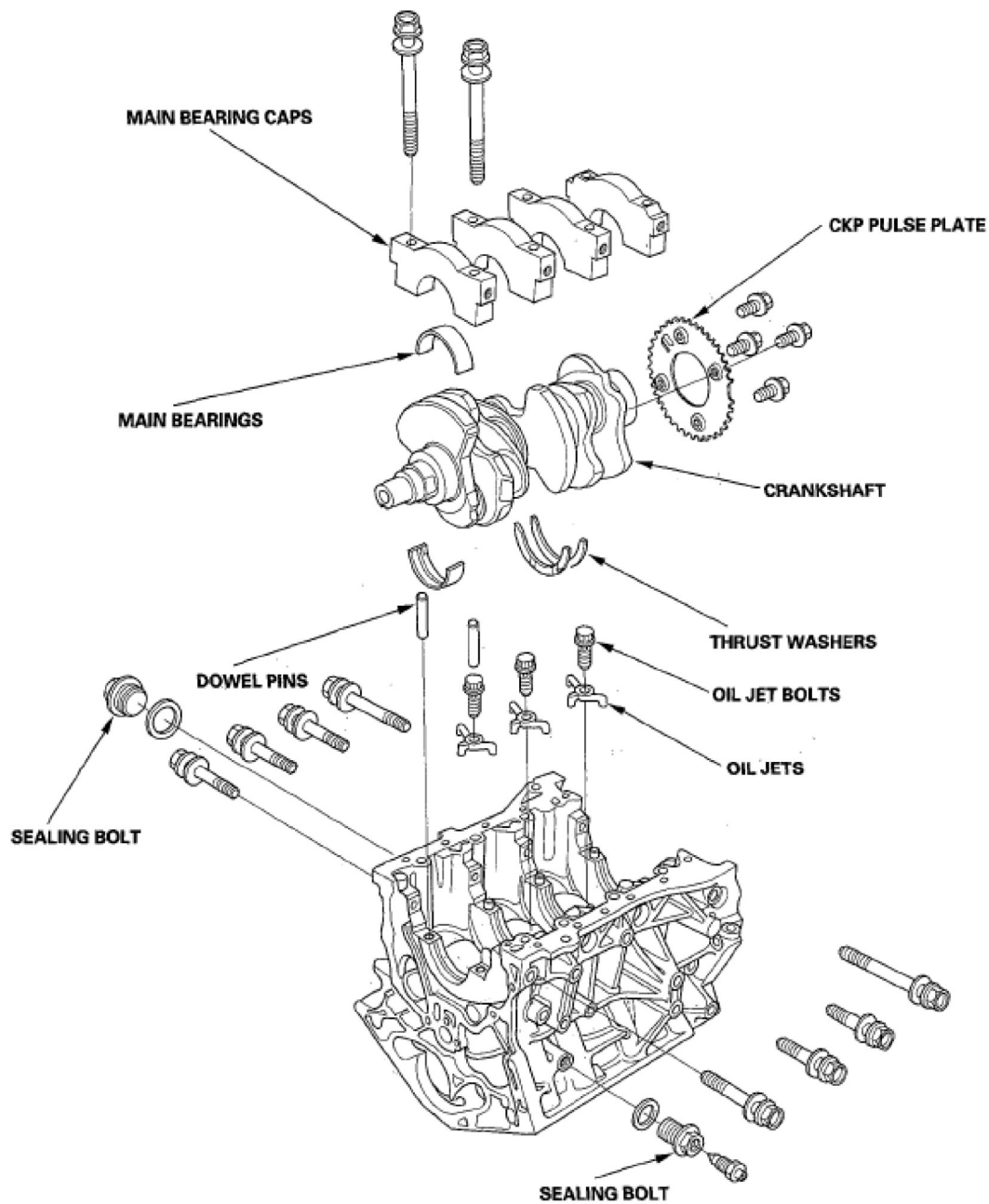


Fig. 7: Identifying Engine Block Component Location - '08-09 models J35A7 Engine
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

J35A6, J35A7 ENGINES

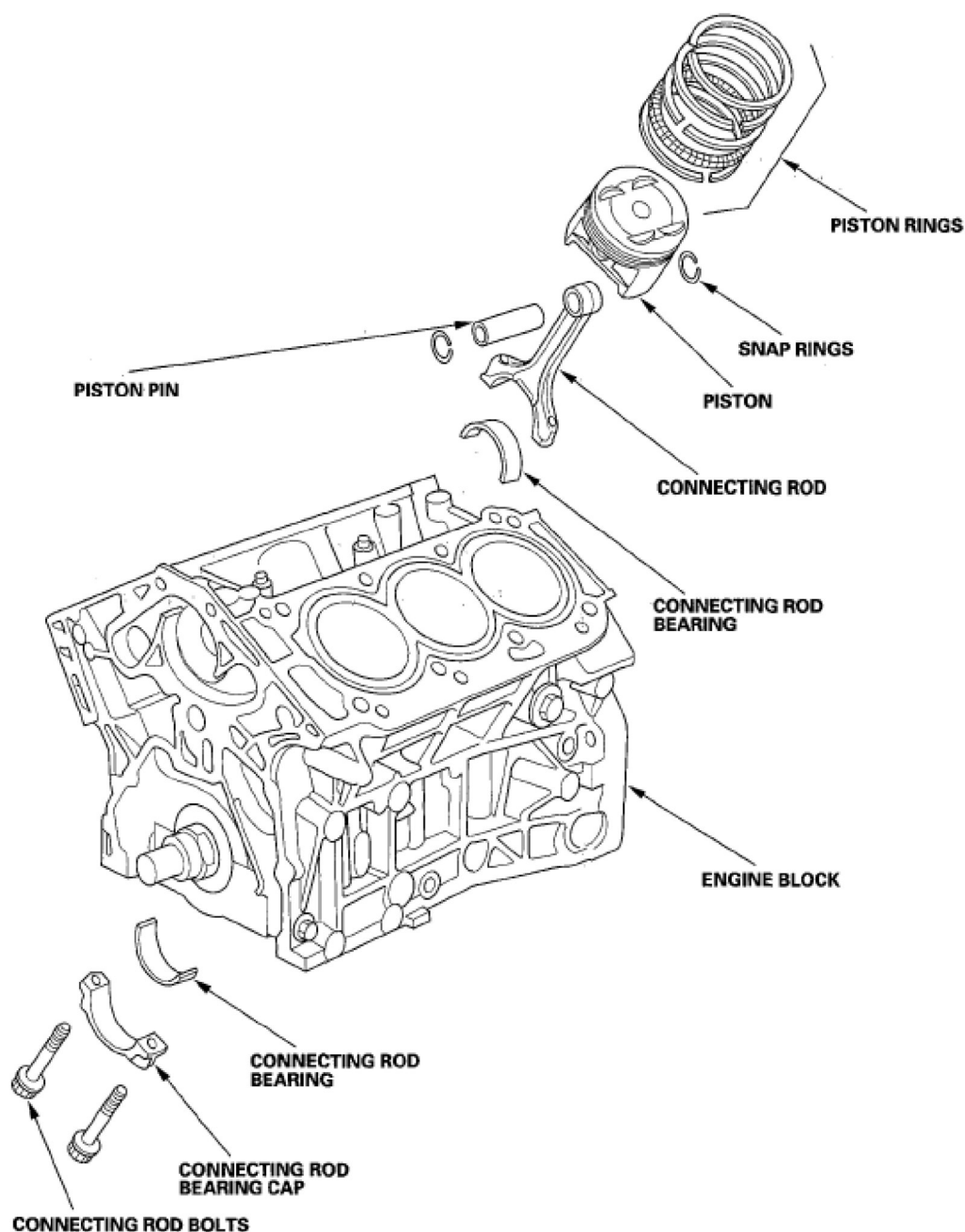


Fig. 8: Identifying Engine Block Component Location - J35A6, J35A7 Engines
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD AND CRANKSHAFT END PLAY INSPECTION

1. Remove the oil pump (see **REMOVAL**).
2. Remove the baffle plate (see step 10 on **CRANKSHAFT INSPECTION**).
3. Measure the connecting rod end play with a feeler gauge (A) between the connecting rod (B) and the crankshaft (C).

Connecting Rod End Play

Standard (New): 0.15-0.35 mm (0.006-0.014 in.)

Service Limit: 0.45 mm (0.018 in.)

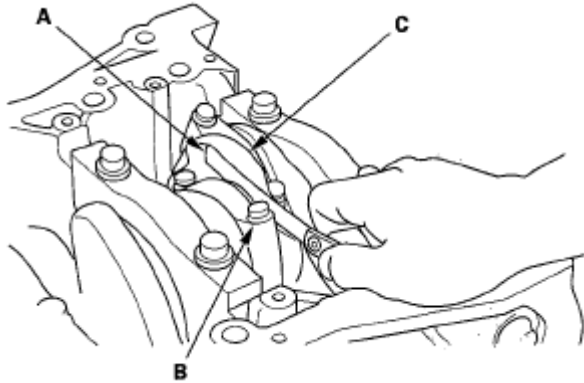


Fig. 9: Measuring Connecting Rod End Play

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. If the connecting rod end play is beyond the service limit, install a new connecting rod and recheck. If it is still beyond the service limit, replace the crankshaft (see **Crankshaft and Piston Removal**).
5. Push the crankshaft firmly away from the dial indicator, and zero the dial against the end of the crankshaft. Then pull the crankshaft firmly back toward the indicator; the dial reading should not exceed the service limit.

Crankshaft End Play

Standard (New): 0.10-0.35 mm (0.004-0.014 in.)

Service Limit: 0.45 mm (0.018 in.)

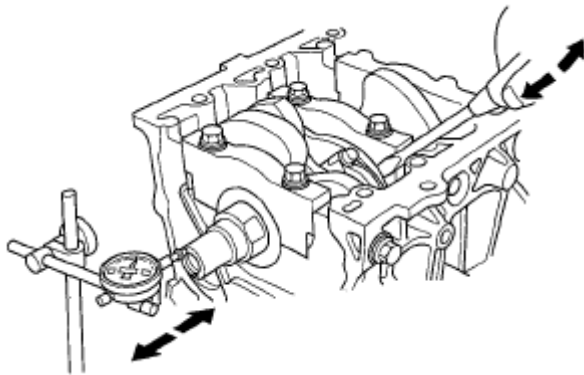


Fig. 10: Identifying Crankshaft End Play

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the end play is excessive, replace the thrust washers and recheck. If it is still beyond the service limit, replace the crankshaft (see **Crankshaft and Piston Removal**).

CRANKSHAFT MAIN BEARING REPLACEMENT

MAIN BEARING CLEARANCE INSPECTION

1. Remove the main bearing caps and the bearing halves (see **Crankshaft and Piston Removal**).
2. Clean each main journal and bearing half with a clean shop towel.
3. Place one strip of plastigage across each main journal.

NOTE: If the engine is still in the vehicle when you bolt the main cap down to check the clearance, the weight of the crankshaft and drive plate will flatten the plastigage further than just the torque on the cap bolt 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 the caps, then tighten the bearing cap bolts to 74 N.m (7.5 kgf.m, 55 lbf.ft), and the bearing cap side bolts to 49 N.m (5.0 kgf.m, 36 lbf.ft) in the proper sequence (see step 23 on **CKP PULSE PLATE REPLACEMENT**).

NOTE:

- Apply new engine oil to the bolt threads and flanges.
- Do not rotate the crankshaft during inspection.

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

'07 model

Main Bearing-to-Journal Oil Clearance

Standard (New): 0.020-0.044 mm (0.0008-0.0017 in.)

Service Limit: 0.050 mm (0.0020 in.)

'08-09 models

Main Bearing-to-Journal Oil Clearance

Standard (New): 0.019-0.045 mm (0.0007-0.0018 in.)

Service Limit: 0.050 mm (0.0020 in.)

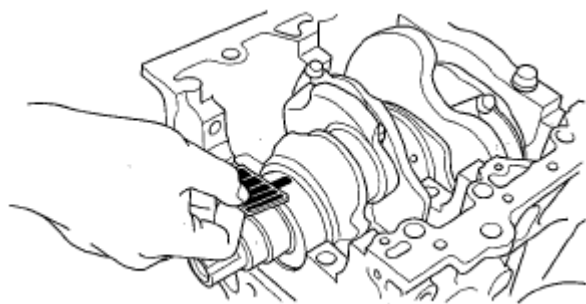


Fig. 11: Measuring Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the plastigage measures too wide or too narrow, remove the crankshaft, and remove the upper half of the bearing. Install a new, complete bearing with the same color code, and recheck the clearance. Do not file, shim, or scrape the bearings 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 again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over (see **Crankshaft and Piston Removal**).

MAIN BEARING SELECTION

Crankshaft Bore Code Location

Letters or bars have been stamped on the end of the engine block as a code for the size of each of the four main journal bores.

Use them, and the numbers stamped on the crankshaft (codes for main journal size), to choose the correct bearings. If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

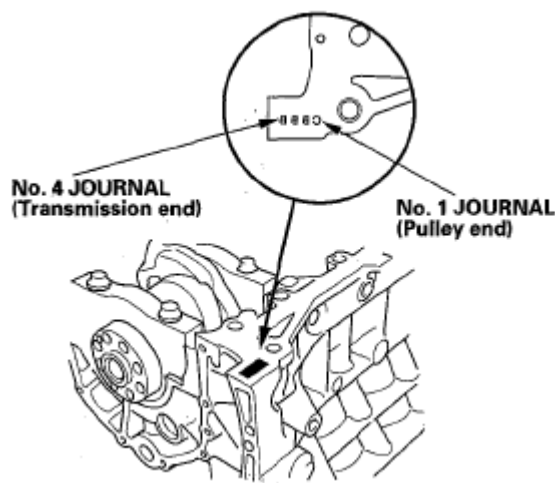


Fig. 12: Locating And Identifying Crankshaft Bore Code (1 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Bearing Identification
Color code is on the edge of the bearing

1 or I	2 or II	3 or III	4 or IIII	5 or IIIII	6 or IIIII
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Smaller main journal Smaller bearing (Thicker)

Larger block bore			
A or I	B or II	C or III	D or IIII
Smaller bearing (Thicker)			
Red/Pink	Pink	Pink/Yellow	Yellow
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

NOTE: When using bearing halves of different colors, it does not matter which color is used in the top or bottom.

Fig. 13: Locating And Identifying Crankshaft Bore Code (2 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Main Journal Code Locations (Numbers or Bars)

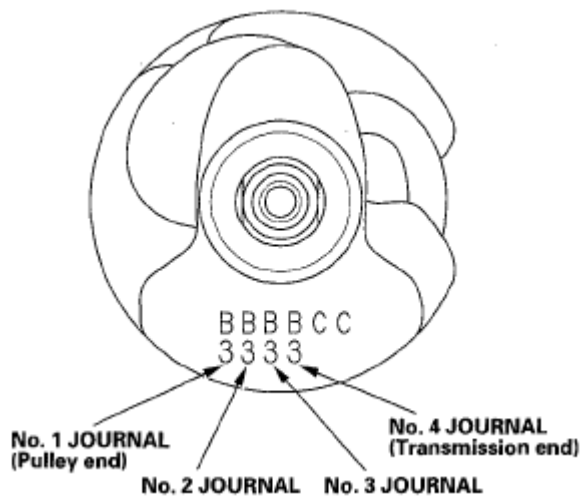


Fig. 14: Locating Main Journal Code (Numbers Or Bars)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD BEARING REPLACEMENT

CONNECTING ROD BEARING CLEARANCE INSPECTION

1. Remove the connecting rod cap and the bearing half (see **CRANKSHAFT AND PISTON REMOVAL**).

2. Clean the crankshaft rod journal and bearing half with a clean shop towel.
3. Place a strip of plastigage across the rod journal.
4. Reinstall the bearing half and the cap, and tighten the bolts.

NOTE:

- **Apply new engine oil to the bolt threads and flanges.**
- **Do not rotate the crankshaft during inspection.**

Tightening Torque:**20 N.m (2.0 kgf.m, 15 lbf.ft)+90°**

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

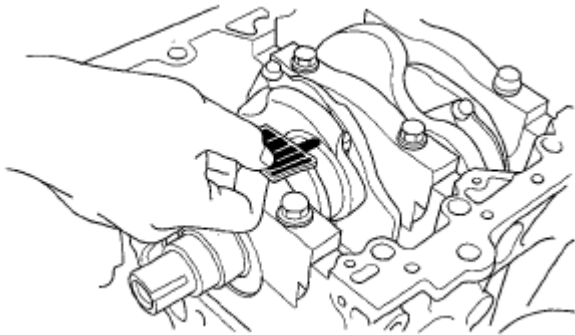
Connecting Rod Bearing-to-Journal Oil Clearance**Standard (New): 0.020-0.044 mm (0.0008-0.0017 in.)****Service Limit: 0.050 mm (0.0020 in.)**

Fig. 15: Measuring Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, then install a new, complete bearing with the same color code, and recheck the clearance. Do not file, shim, or scrape the bearings 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. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over (see **CRANKSHAFT AND PISTON REMOVAL**).

CONNECTING ROD BEARING SELECTION

Each connecting rod falls into one of four tolerance ranges (from 0 to 0.024 mm (0.0009 in.), in 0.006 mm (0.0002 in.) increments) depending on the size of its big end bore.

It's then stamped with a number or bar (1,2,3, or 4/I, II, III, or IIII) indicating the range. You may find any combination of 1,2,3, or 4/I, II, III, or IIII in any engine.

Normal Bore Size: 58.0 mm (2.28 in.)

Inspect the connecting rod for cracks and heat damage.

Connecting Rod Journal Code Locations

Numbers or bars 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 or bars stamped on the crank (codes for rod journal size), to choose the correct bearings. If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

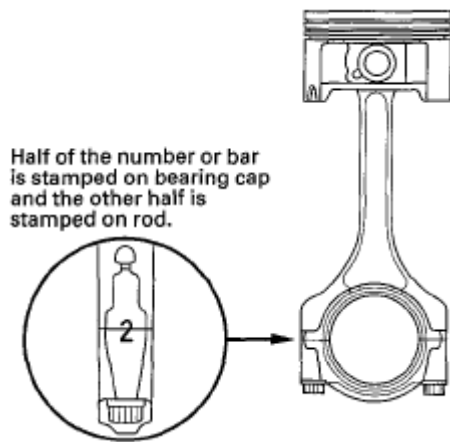


Fig. 16: Identifying And Locating Connecting Rod Journal Code (1 Of 2)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Bearing Identification
Color code is on the edge of the bearing

	→ Larger big end bore			
	1 or I	2 or II	3 or III	4 or IIII
	→ Smaller bearing (Thicker)			
A or I	Pink	Pink/ Yellow	Yellow	Yellow/ Green
B or II	Pink/ Yellow	Yellow	Yellow/ Green	Green
C or III	Yellow	Yellow/ Green	Green	Green/ Brown
D or IIII	Yellow/ Green	Green	Green/ Brown	Brown
E or IIIII	Green	Green/ Brown	Brown	Brown/ Black
F or IIIII	Green/ Brown	Brown	Brown/ Black	Black

NOTE: When using bearing halves of different colors, it does not matter which color is used in the top or bottom.

Fig. 17: Identifying And Locating Connecting Rod Journal Code (2 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Connecting Rod Journal Code Locations (Letters or Bars)

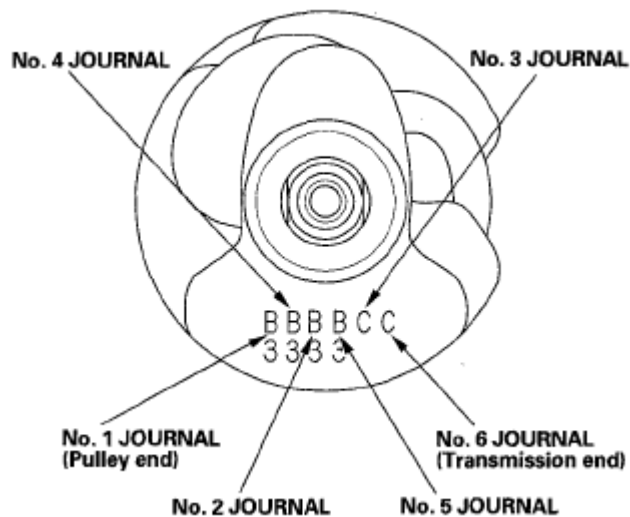


Fig. 18: Locating Connecting Rod Journal Code (Letters Or Bars)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OIL PAN REMOVAL

1. If the engine is already out of the vehicle, go to step 6.
2. Raise the vehicle on the lift.

3. Drain the engine oil (see **ENGINE OIL REPLACEMENT**).
4. Remove the splash shield (see step 34 on **ENGINE INSTALLATION**).
5. Remove exhaust pipe A (see step 38 on **ENGINE INSTALLATION**).
6. Remove the rear warm up three way catalytic converter (rear WU-TWC) bracket.

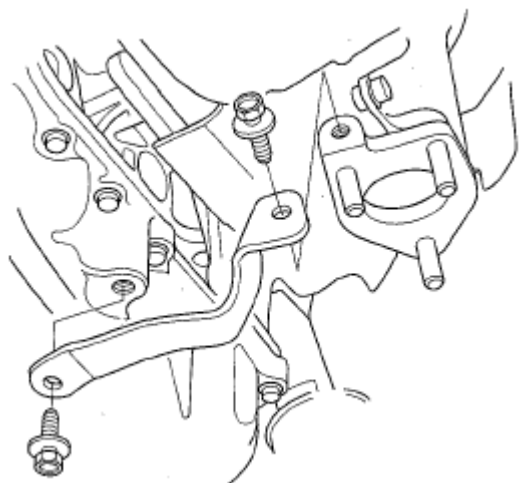


Fig. 19: Identifying Rear Warm Up Three Way Catalytic Converter Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. '08-09 models J35A7 engine: Remove the crankshaft position (CKP) sensor cover (A) and the bolt (B), then disconnect the CKP sensor connector (C).

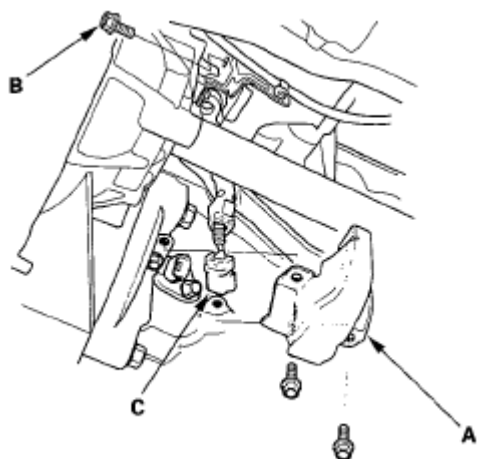


Fig. 20: Identifying Crankshaft Position (CKP) Sensor Cover, Bolt And CKP Sensor Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the torque converter cover (A) and the four bolts (B) securing the transmission.

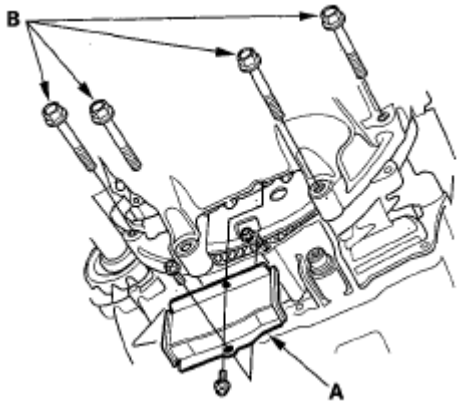


Fig. 21: Identifying Torque Converter Cover And Bolts
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the bolts securing the oil pan.
10. Using a flat blade screwdriver, separate the oil pan from the engine block in the places shown.

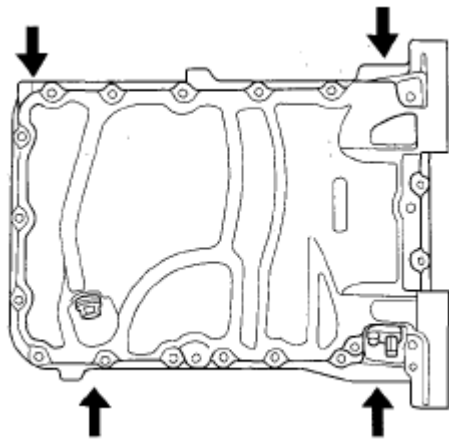


Fig. 22: Identifying Oil Pan
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the oil pan.

CRANKSHAFT AND PISTON REMOVAL

1. Remove the engine/transmission (see ENGINE REMOVAL).
2. Remove the transmission (see TRANSMISSION REMOVAL).
3. Remove the drive plate (see DRIVE PLATE REMOVAL AND INSTALLATION).
4. Remove the cylinder heads:
 - J35A6 engine (see CYLINDER HEAD REMOVAL)
 - '07 model J35A7 engine (see CYLINDER HEAD REMOVAL)
 - '08-09 models J35A7 engine (see CYLINDER HEAD REMOVAL)

5. Remove the timing belt drive pulley from the crankshaft.
 - J35A6 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
 - '07 model J35A7 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
 - '08-09 models J35A7 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
6. Remove the oil pan (see **OIL PAN REMOVAL**).
7. Remove the engine block end cover.

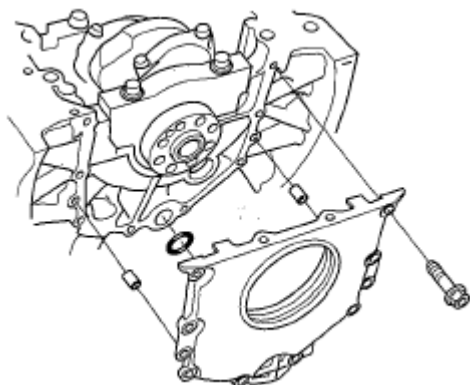


Fig. 23: Identifying Engine Block End Cover And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. J35A6 engine: Remove the rocker arm oil control solenoid/oil filter assembly.

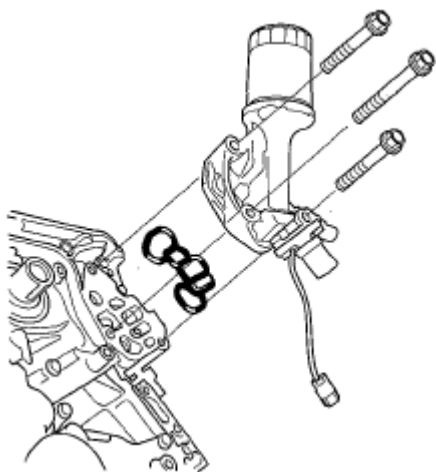


Fig. 24: Identifying Rocker Arm Oil Control Solenoid/Oil Filter Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. J35A7 engine: Remove the oil filter base/oil filter assembly.

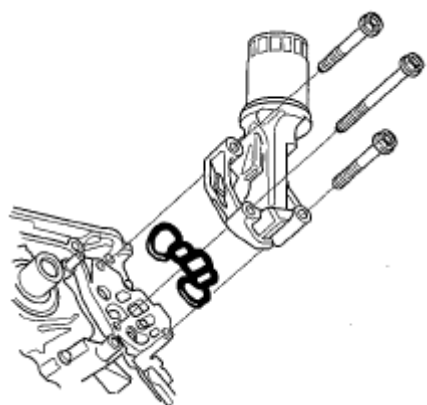


Fig. 25: Identifying Oil Filter Base/Oil Filter Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the oil screen (A), the baffle plate (B), and the oil pump (C).

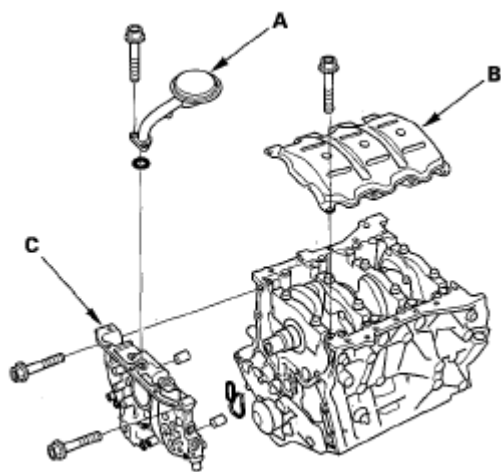


Fig. 26: Identifying Oil Screen, Baffle Plate And Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. If you can feel a ridge of metal or hard carbon around the top of any cylinder, remove it with a ridge reamer (A). Follow the reamer manufacturer's instructions. If the ridge is not removed, it may damage the piston as it's pushed out.

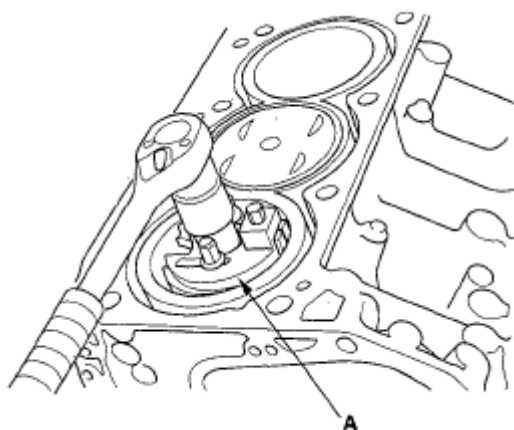


Fig. 27: Identifying Ridge Reamer

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the connecting rod caps after setting the crank pin at bottom dead center (BDC) for each cylinder. Remove the piston/connecting rod assembly by pushing on the connecting rod. Take care not to damage the oil jets, the crank pin, or the cylinder with the connecting rod.

CORRECT

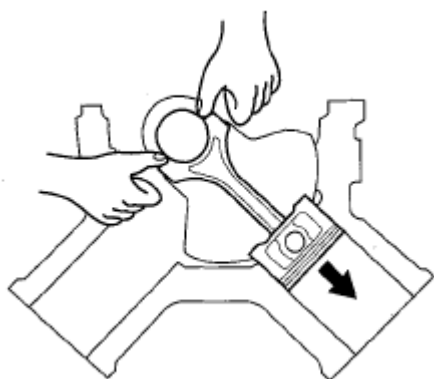


Fig. 28: Identifying Correct Procedure Of Removing Piston/Connecting Rod Assembly

Courtesy of AMERICAN HONDA MOTOR CO., INC.

INCORRECT

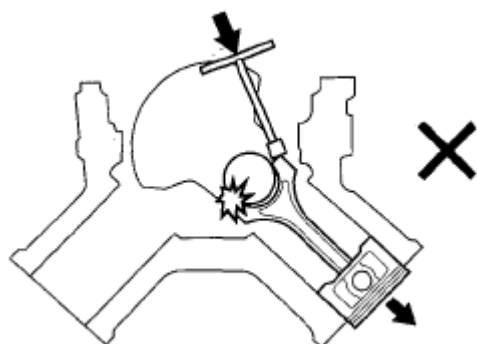


Fig. 29: Identifying Incorrect Procedure Of Removing Piston/Connecting Rod Assembly
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the bearing from the cap. Keep all caps/ bearings in order.
14. Remove the upper bearing halves from the connecting rods, and set them aside with their respective caps.
15. After removing a piston/connecting rod assembly, reinstall the cap on the rod.
16. To avoid confusion during reassembly, mark each piston/connecting rod assembly with its cylinder number.
17. Loosen the bearing cap bolts and bearing cap side bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

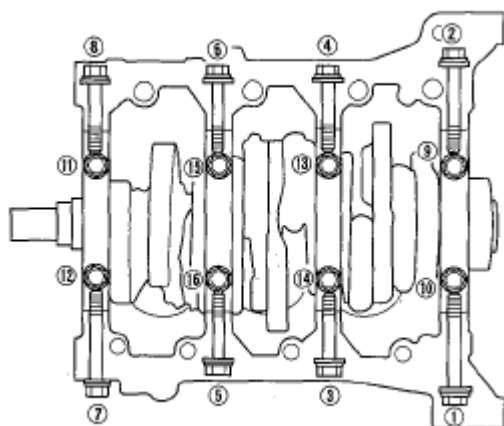


Fig. 30: Identifying Bearing Cap Bolts In Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the bearing cap bolts (A) and the bearing cap side bolts (B), then remove the bearing caps (C).

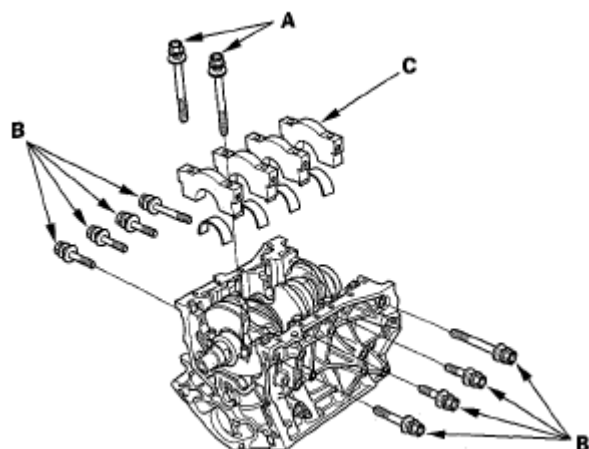


Fig. 31: Identifying Bearing Cap Bolts, Bearing Cap Side Bolts And Bearing Caps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Lift the crankshaft (A) out of the engine block, being careful not to damage the journals and the CKP pulse plate ('08-09 models J35A7 engine).

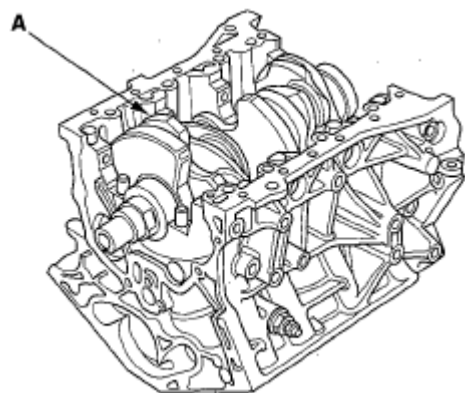


Fig. 32: Identifying Crankshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. '08-09 models J35A7 engine: Remove the CKP pulse plate from the crankshaft (see **CKP PULSE PLATE REPLACEMENT**).
21. Reinstall the main caps and bearings on the engine block in the proper order.

CRANKSHAFT INSPECTION

Out-of-Round and Taper

1. Remove the crankshaft from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. '08-09 models J35A7 engine: Remove the crankshaft position (CKP) pulse plate from the crankshaft (see **CKP Pulse Plate Replacement**).
3. Clean the crankshaft oil passages with pipe cleaners or a suitable brush.

4. Check the keyway and threads.
5. Measure the out-of-round at the middle of each rod and the 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): 0.005 mm (0.0002 in.) max.

Service Limit: 0.010 mm (0.0004 in.)

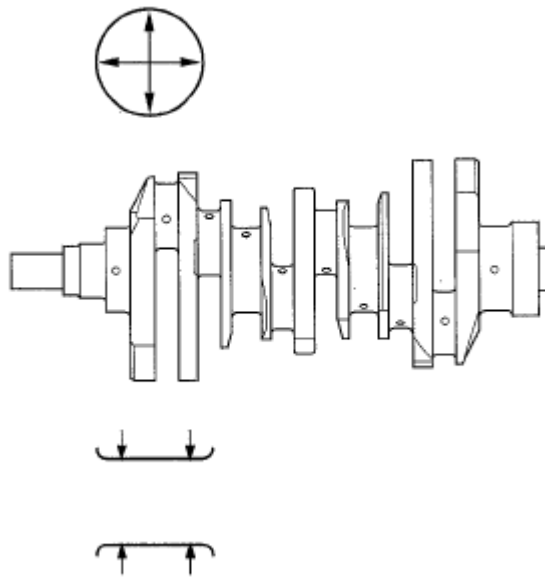


Fig. 33: Identifying Measuring Out-Of-Round At Middle Of Each Rod And Main Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Measure the taper at the 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.)

Straightness

7. Place the engine block on a flat surface, crankshaft side up.
8. Lower the crankshaft into the engine block.
9. Measure the runout on all of the main journals. Rotate the crankshaft two complete revolutions. The difference between measurements on each journal must not be more than the service limit.

Crankshaft Total Runout

Standard (New): 0.025 mm (0.0010 in.) max.

Service Limit: 0.030 mm (0.0012 in.)

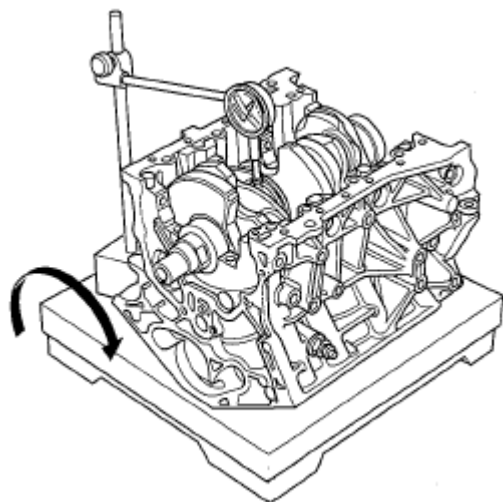


Fig. 34: Identifying Runout On Main Journals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

BLOCK AND PISTON INSPECTION

1. Remove the pistons from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Check the pistons for distortion or cracks.
3. Measure the piston diameter at a point 16.0 mm (0.63 in.) from the bottom of the skirt.

Piston Skirt Diameter

Standard (New): 88.975-88.985 mm (3.5029-3.5033 in.)

Service Limit: 88.965 mm (3.5026 in.)

Oversize Piston Skirt Diameter

0.25: 89.225-89.235 mm (3.5128-3.5132 in.)

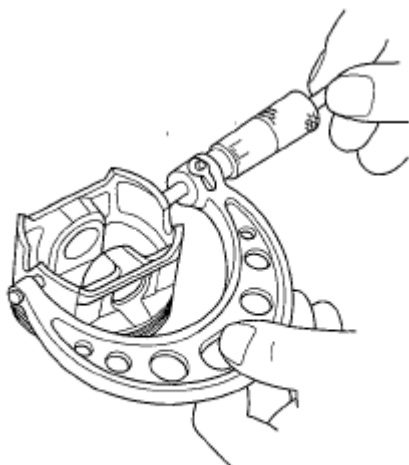
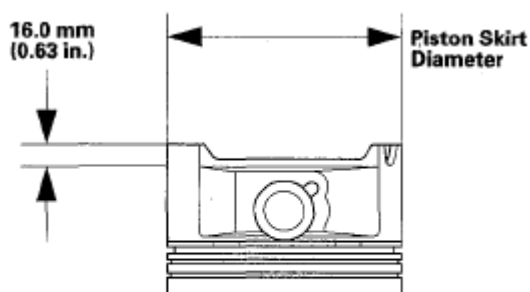


Fig. 35: Identifying Piston Diameter

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Measure the wear and taper in direction X and Y at three levels in each cylinder as shown. If measurements in any cylinder are beyond the oversize bore service limit, replace the engine block. If the engine block has to be rebored, refer to step 7 after reboring.

Cylinder Bore Size

Standard (New): 89.000-89.015 mm (3.5039-3.5045 in.)

Service Limit: 89.065 mm (3.5065 in.)

Oversize

0.25: 89.250-89.265 mm (3.5138-3.5144 in.)

Reboring Limit: 0.25 mm (0.01 in.)

Bore Taper

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

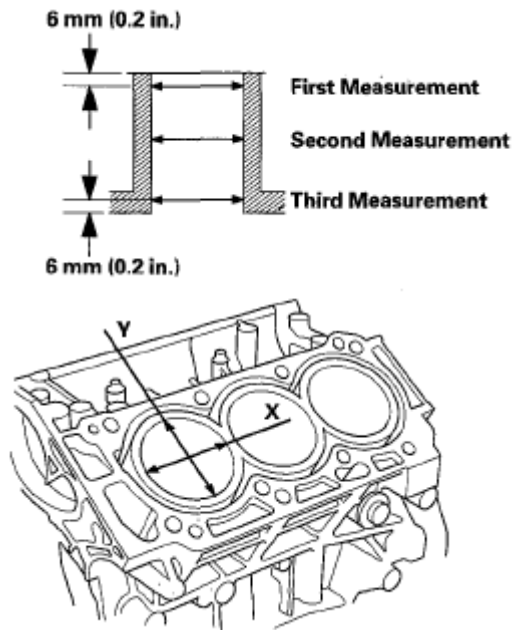


Fig. 36: Identifying Cylinder Bore Size

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Hone any scored or scratched cylinder bores, (see **CYLINDER BORE HONING**).
6. Check the top of the engine block for warpage. Measure along the edges and across the center as shown.

Engine Block Warpage

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

Service Limit: 0.10 mm (0.004 in.)

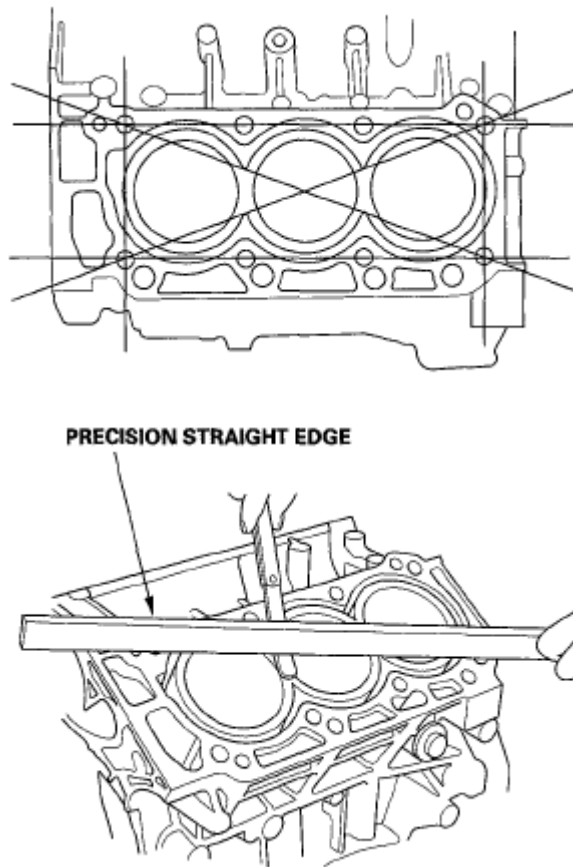


Fig. 37: Identifying Top Of Engine Block For Warpage
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Calculate the difference between cylinder bore diameter and piston diameter. If the clearance is near or exceeds the service limit, inspect the piston and cylinder bore for excessive wear.

Piston-to-Cylinder Bore Clearance

Standard (New): 0.015-0.040 mm (0.0006-0.0016 in.)

Service Limit: 0.08 mm (0.003 in.)

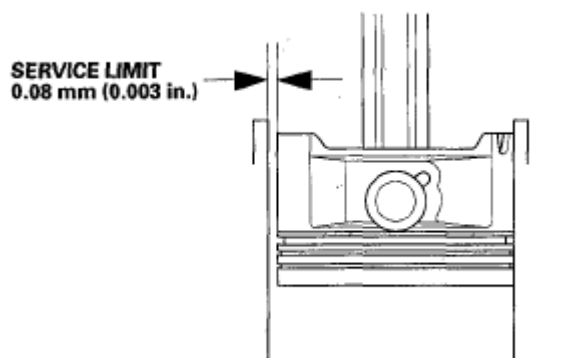


Fig. 38: Identifying Clearance Between Cylinder Bore Diameter And Piston Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER BORE HONING

1. Measure the cylinder bores (see step 4 on **BLOCK AND PISTON INSPECTION**). If the engine block is to be reused, hone the cylinders and remeasure the bores. Only scored or scratched cylinder bores must be honed.
2. J35A7 engine: Remove the oil jets (see **J35A7 ENGINE**).
3. Hone the cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree Crosshatch pattern.

NOTE:

- Use only a rigid hone with 400 grit or finer stone, such as Sunnen, Ammco, or equivalent.
- Do not use stones that are worn or broken.

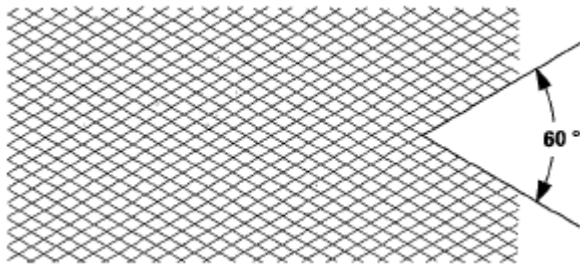


Fig. 39: Honing Cylinder Bores With Honing Oil And Fine Stone
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. 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 them immediately to prevent rusting.

NOTE:

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

5. If scoring or scratches are still present in the cylinder bores after honing to the service limit, rebore the engine block. 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.
6. J35A7 engine: Install the oil jets (see **J35A7 ENGINE**).

PISTON, PIN, AND CONNECTING ROD REPLACEMENT

DISASSEMBLY

1. Remove the pistons from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Apply new engine oil to the piston pin snap rings (A) and turn them in the ring grooves until the end gaps are lined up with the cutouts in the piston pin bores (B).

NOTE: Take care not to damage the ring grooves.

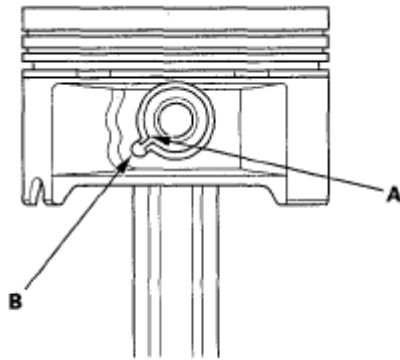


Fig. 40: Identifying Piston Pin Snap Rings And Piston Pin Bores
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove snap rings (A) from both sides of each piston. Start at the cutout in the piston pin bore. Remove the snap rings carefully so they do not go flying or get lost. Wear eye protection.

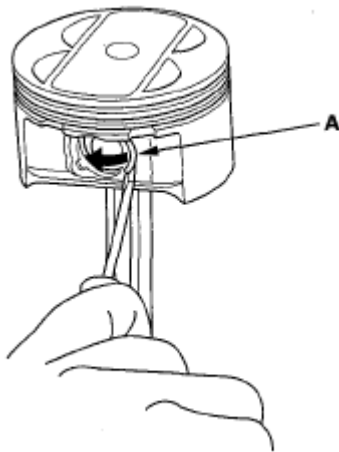


Fig. 41: Identifying Snap Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Separately heat each piston and connecting rod assembly to about 158°F (70°C), then remove the piston pin.

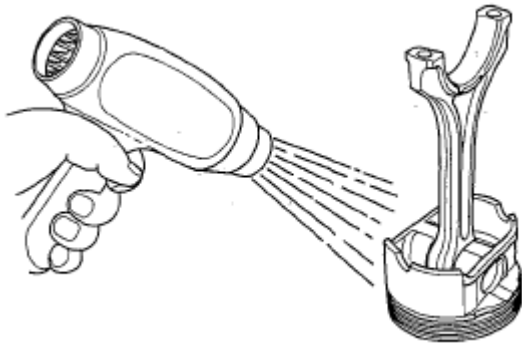


Fig. 42: Heating Piston And Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSPECTION

NOTE: **Inspect the piston, the piston pin, and the connecting rod when they are at room temperature.**

1. Measure the diameter of the piston pin.

Piston Pin Diameter

Standard (New): 21.962-21.965 mm (0.8646-0.8648 in.)

Service Limit: 21.954 mm (0.8643 in.)

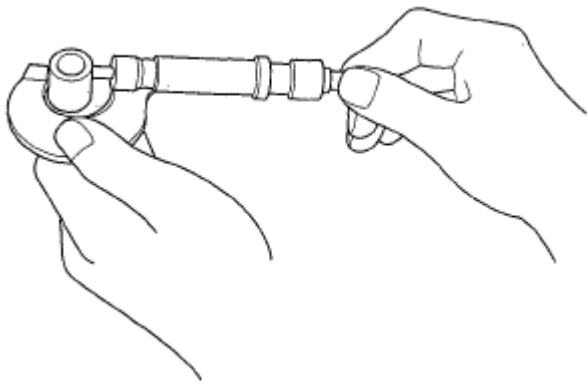


Fig. 43: Measuring Diameter Of Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

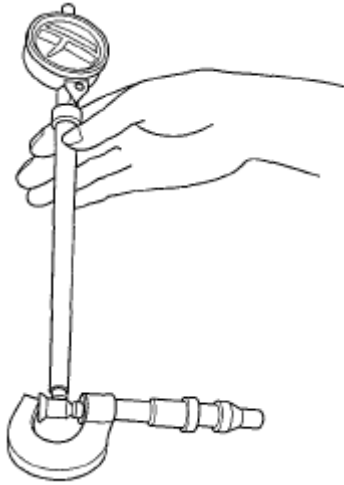


Fig. 44: Identifying Zero Dial Indicator To Piston Pin Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Check the difference between the piston pin diameter and the piston pin hole diameter on the piston.

Piston Pin-to-Piston Clearance

Standard (New): -0.0050 to +0.0010 mm (-0.00020 to +0.00004 in.)

Service Limit: 0.004 mm (0.0002 in.)

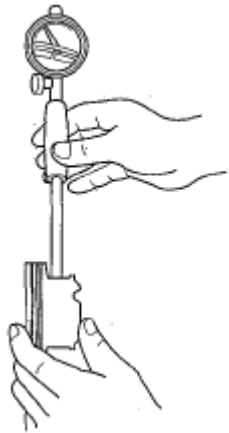


Fig. 45: Identifying Piston Pin-To-Piston Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Measure the piston pin-to-connecting rod clearance.

Piston Pin-to-Connecting Rod Clearance

Standard (New): 0.005-0.014 mm (0.0002-0.0006 in.)

Service Limit: 0.019 mm (0.0007 in.)

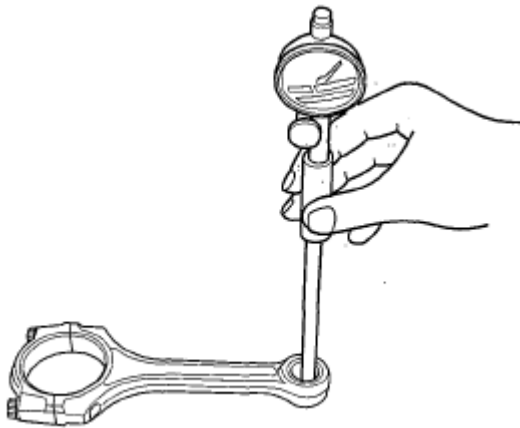


Fig. 46: Identifying Piston Pin-To-Connecting Rod Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REASSEMBLY

1. Install a piston pin snap ring (A) only on one side.

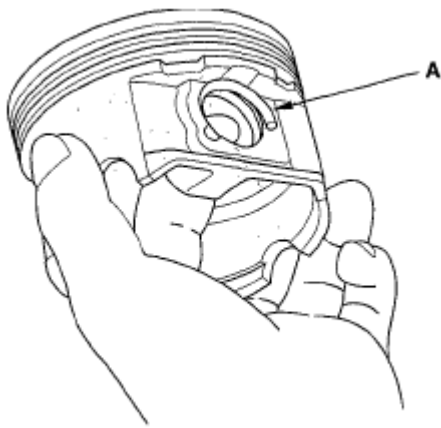


Fig. 47: Identifying Piston Pin Snap Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Coat the piston pin bore in the piston, the bore in the connecting rod, and the piston pin with new engine oil.
3. Heat the piston to about 158°F (70°C).

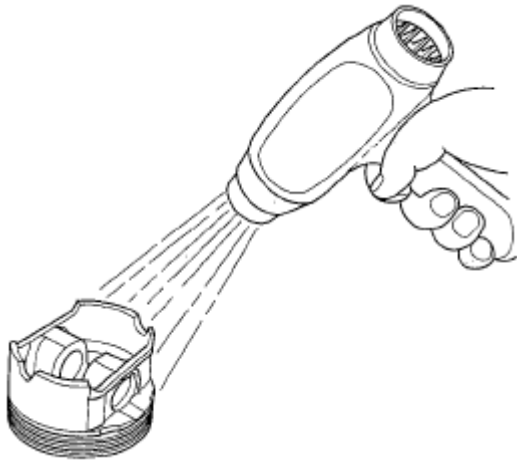


Fig. 48: Heating Piston

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Assemble the piston (A) and the connecting rod (B) with the embossed marks (C) on the same side. Install the piston pin (D).

NOTE: Apply new engine oil to the piston pin.

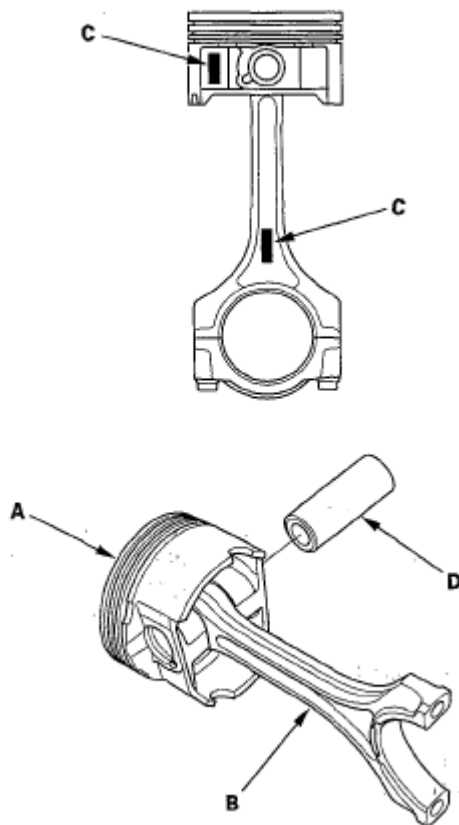


Fig. 49: Identifying Piston, Connecting Rod And Marks

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the remaining snap ring.
6. Reassemble the other pistons the same way.

PISTON RING REPLACEMENT

1. Remove the pistons from the engine block (see CRANKSHAFT AND PISTON REMOVAL).
2. Using a ring expander (A), remove the old piston rings (B).

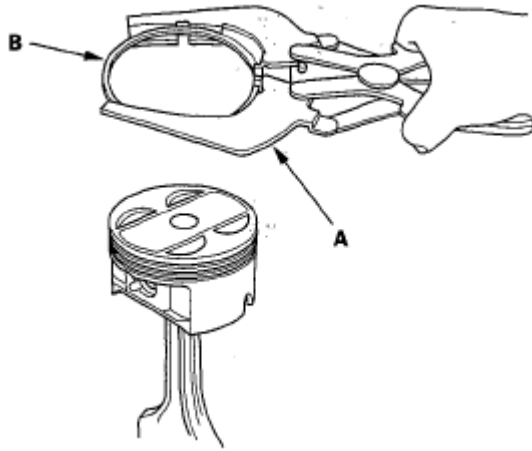


Fig. 50: Identifying Old Piston Rings

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Clean all the ring grooves thoroughly with a squared-off broken ring, or a ring groove cleaner with a blade to fit the piston grooves. File down the blade, if necessary. The top ring and second ring grooves are 1.2 mm (0.05 in.) wide, and the oil ring groove is 2.8 mm (0.11 in.) wide. Do not use a wire brush to clean the ring grooves, or cut the ring grooves deeper with the cleaning tool.

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

4. Using a piston, push a new ring (A) into the cylinder bore 15-20 mm (0.6-0.8 in.) from the bottom.

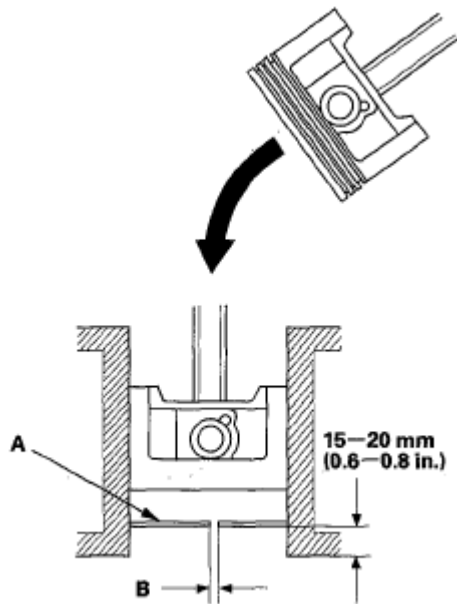


Fig. 51: Identifying Ring Into Cylinder Bore

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the piston ring end-gap (B) 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 (see step 4 on **BLOCK AND PISTON INSPECTION**). If the bore is over the service limit, the engine block must be rebored.

Piston Ring End-Gap

Top Ring:

Standard (New): 0.20-0.35 mm (0.008-0.014 in.)

Service Limit: 0.60 mm (0.024 in.)

Second Ring:

Standard (New): 0.40-0.55 mm (0.016-0.022 in.)

Service Limit: 0.70 mm (0.028 in.)

Oil Ring:

Standard (New): 0.20-0.70 mm (0.008-0.028 in.)

Service Limit: 0.80 mm (0.031 in.)

6. Install the rings as shown. The top ring (A) has a 1D mark and the second ring (B) has a 2C mark (J35A6, '07 model J35A7 engine) or 2X mark ('08-09 models J35A7 engine). The manufacturing marks (C) must be facing upward.

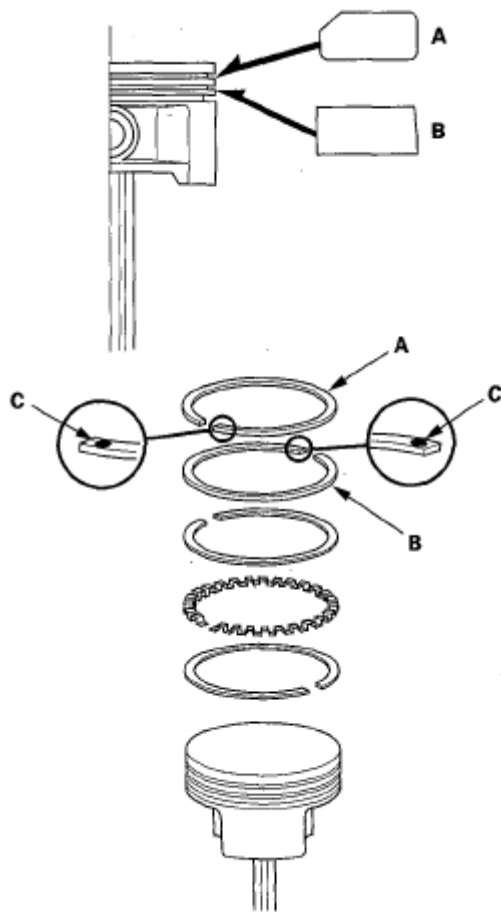


Fig. 52: Identifying Top Ring, Second Ring And Manufacturing Marks
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Piston Ring Dimensions:

J35A6, '07 model J35A7 engines

Top Ring (Standard)

A: 3.1 mm (0.12 in.)

B: 1.2 mm (0.05 in.)

Second Ring (Standard)

A: 3.4 mm (0.13 in.)

B: 1.2 mm (0.05 in.)

'08-09 models J35A7 engine

Top Ring (Standard)

A: 3.1 mm (0.12 in.)

B: 1.2 mm (0.05 in.)

Second Ring (Standard)

A: 3.6 mm (0.14 in.)

B: 1.2 mm (0.05 in.)

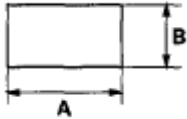


Fig. 53: Identifying Piston Ring Dimensions

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. After installing a new set of rings, measure the ring-to-groove clearance:

Top Ring Clearance

Standard (New): 0.055-0.080 mm (0.0022-0.0031 in.)

Service Limit: 0.15 mm (0.006 in.)

Second Ring Clearance

Standard (New): 0.030-0.055 mm (0.0012-0.0022 in.)

Service Limit: 0.13 mm (0.005 in.)



Fig. 54: Identifying Top Ring Clearance

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Rotate the rings in their grooves to make sure they do not bind.
9. Position the ring end gaps as shown:

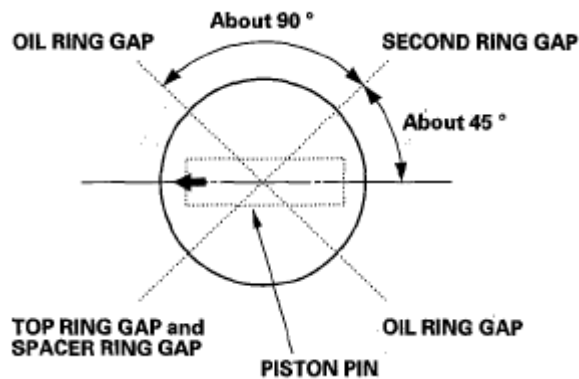


Fig. 55: Identifying Ring End Gaps Pattern

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CRANKSHAFT AND PISTON INSTALLATION

Special Tools Required

- Handle driver 07749-0010000
 - Driver attachment, 106 mm 070AD-RCAA200
1. Check the connecting rod bearing clearance with plastigage (see CONNECTING ROD BEARING REPLACEMENT).
 2. Check the main bearing clearance with plastigage (see CRANKSHAFT MAIN BEARING REPLACEMENT).
 3. Install the bearing halves in the engine block and the connecting rods.
 4. Apply new engine oil to the inside of the main bearings and rod bearings.
 5. '08-09 models J35A7 engine: Install the CKP pulse plate to the crankshaft (see CKP PULSE PLATE REPLACEMENT).
 6. Lower the crankshaft (A) into the engine block.

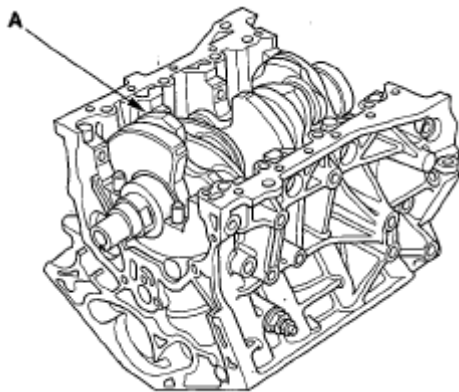


Fig. 56: Identifying Crankshaft

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Apply new engine oil to the side with the thrust washer groove. Install the thrust washers (A) in the No. 3 journal.

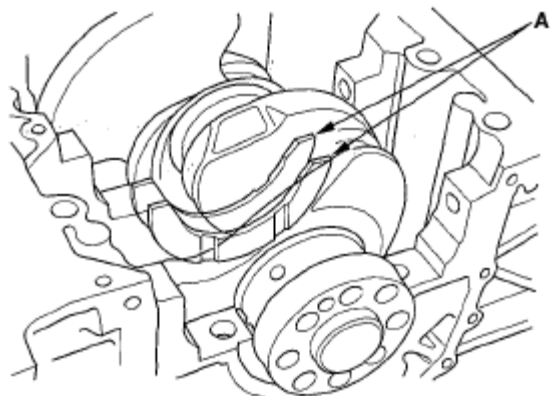


Fig. 57: Identifying Thrust Washers

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Install the bearings (A) and the bearing caps (B) with the arrow (C) facing the timing belt end of the engine block.

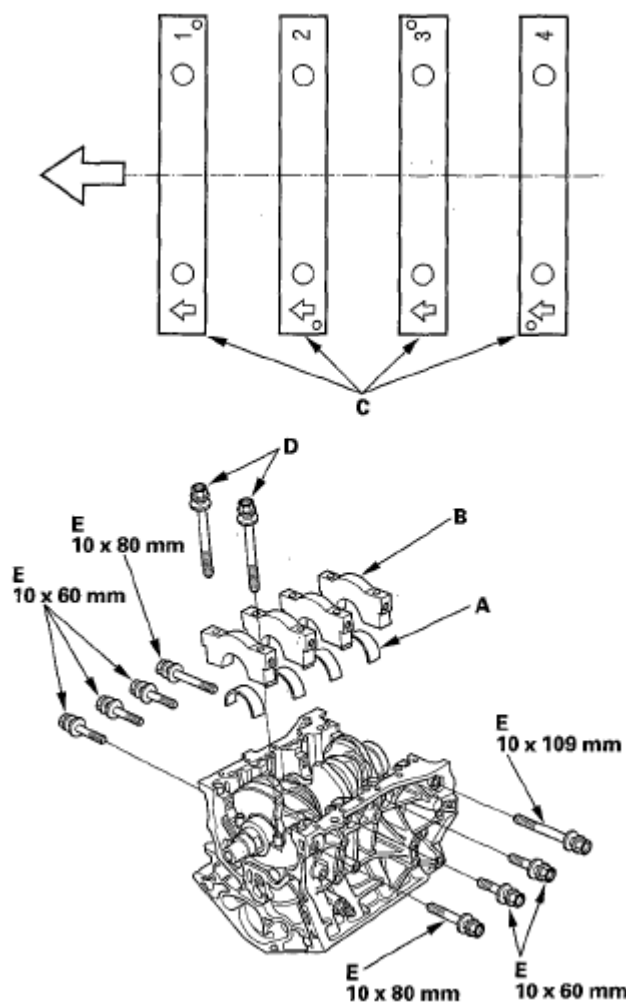


Fig. 58: Identifying Bearings And Bearing Caps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Apply new engine oil to the bolt threads and flanges, then loosely install the bearing cap bolts (D) and bearing cap side bolts (E).
10. Set the crankshaft to bottom dead center (BDC) for the cylinder you are installing the piston in.
11. Apply new engine oil to the piston, the inside of the ring compressor, and the cylinder bore.
12. Attach the ring compressor to the piston/ connecting rod assembly, and check that the bearing is securely in place.
13. Position the piston/connecting rod assembly with the arrow (A) facing the timing belt side of the engine.

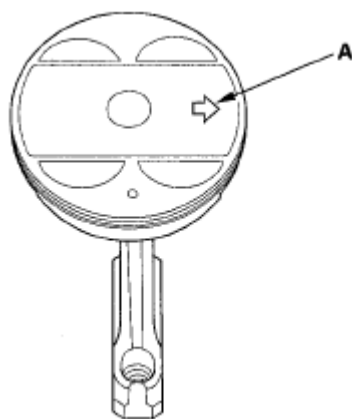


Fig. 59: Identifying Arrow On Piston/Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Position the piston/connecting rod assembly in the cylinder, and tap it in using the wooden handle of a hammer (A). Maintain downward force on the ring compressor (B) to prevent the rings from expanding before entering the cylinder bore.

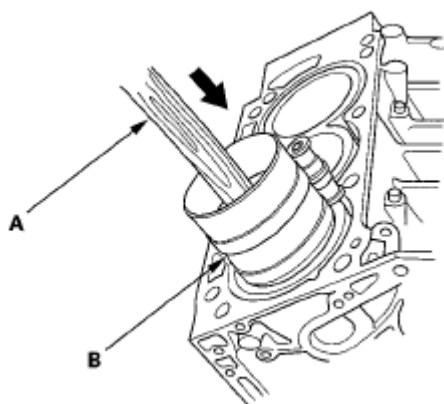


Fig. 60: Identifying Piston/Connecting Rod Assembly In Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Stop after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing the piston into place.
16. Measure the diameter of each connecting rod bolt at point A and point B.

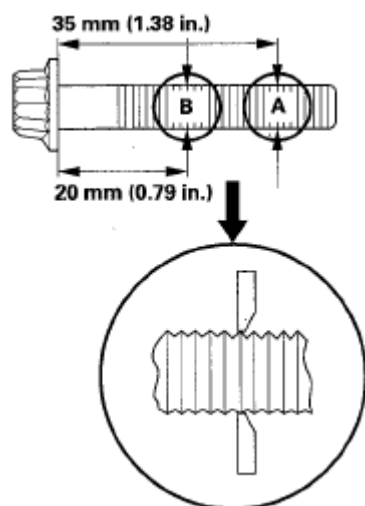


Fig. 61: Identifying Diameter Of Connecting Rod Bolt
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Calculate the difference in diameter between point A and point B.

Point A-Point B = Difference in Diameter

Difference in Diameter

Specification: 0-0.1 mm (0-0.004 in.)

18. If the difference in diameter is out of tolerance, replace the connecting rod bolt.
 19. Line up the mark (A) on the connecting rod and the cap, then install the cap.

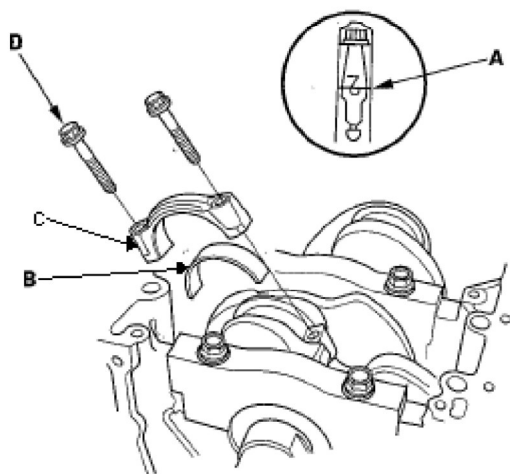


Fig. 62: Identifying Mark And Bolt
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Apply new engine oil to the bolt threads and flanges. Tighten the bolts (B) to 20 N.m (2.0 kgf.m, 15

lbf.ft).

21. Mark the connecting rod (A) and the bolt head (B) as shown.

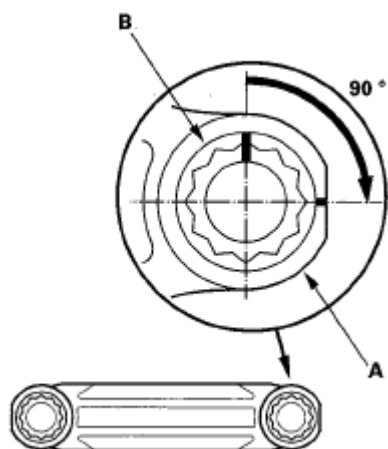


Fig. 63: Identifying Connecting Rod And Bolt Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Tighten the bolt until the mark on the bolt head lines up with the mark on the connecting rod (turn the bolt 90°).

NOTE: Remove the connecting rod bolt if you tightened it beyond the specified angle, and go back to step 16 of the procedure. Do not loosen it back to the specified angle. Repeat steps 10 to 21 for the remaining cylinders.

23. Tighten the bearing cap bolts, and then the bearing cap side bolts to the specified torque in the sequence as shown. Repeat the torque sequence again to ensure the bolts are properly torqued.

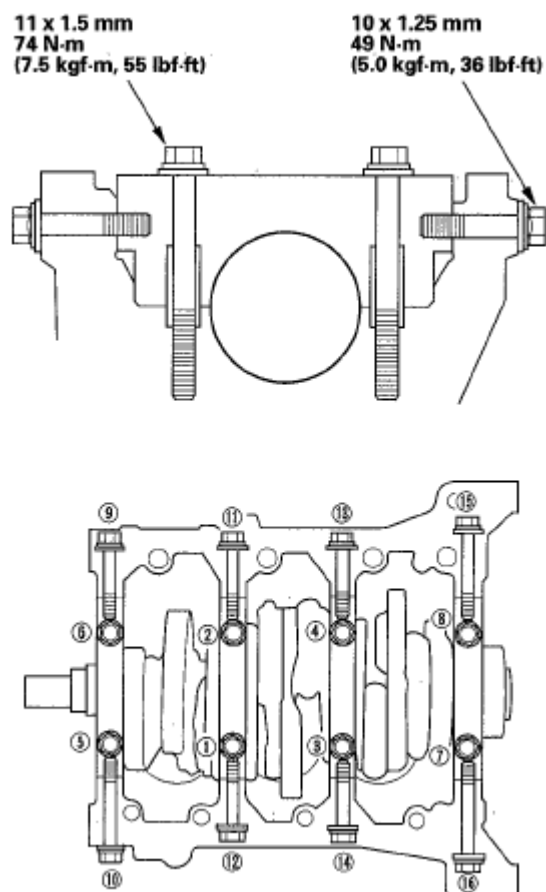


Fig. 64: Identifying Bearing Cap Bolts With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Remove all of the old liquid gasket from the engine block end cover mating surfaces, the bolts, and the bolt holes.
25. Clean and dry the engine block end cover mating surfaces.
26. Apply a light coat of new engine oil to the lip of the crankshaft oil seal.
27. Apply a light coat of multipurpose grease to the crankshaft and to the lip of the seal.
28. Drive the new crankshaft oil seal until the driver attachment bottoms on the engine block end cover.

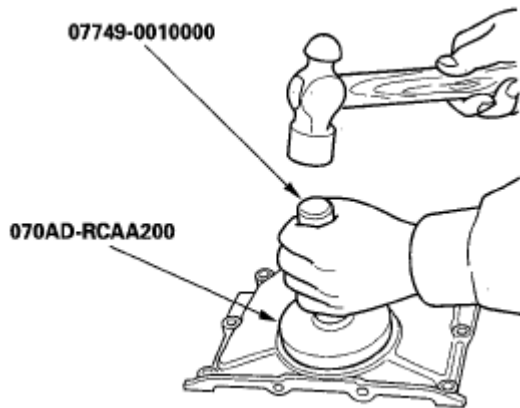


Fig. 65: Driving Crankshaft Oil Seal

Courtesy of AMERICAN HONDA MOTOR CO., INC.

29. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the engine block mating surface of the engine block end cover. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

J35A6, '07 model J35A7 engines

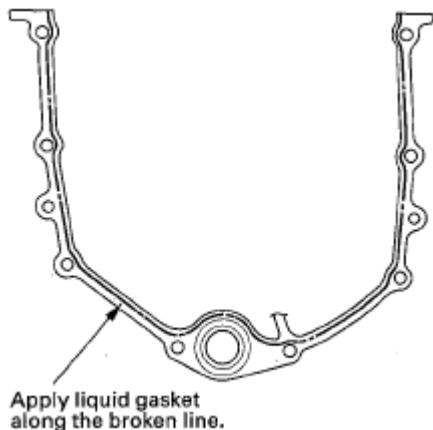


Fig. 66: Applying Liquid Gasket To Engine Block Mating Surface

Courtesy of AMERICAN HONDA MOTOR CO., INC.

'08-09 models J35A7 engine

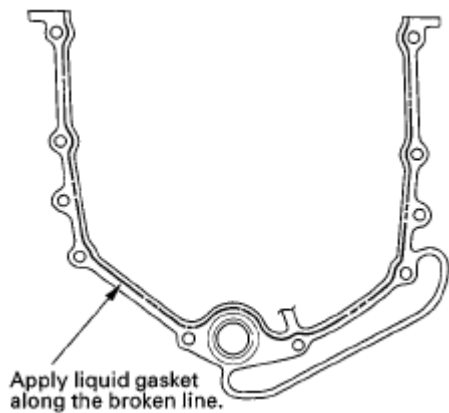


Fig. 67: Applying Liquid Gasket To Engine Block Mating Surface
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

30. Install the dowel pins (A), a new O-ring (B), and the engine block end cover (C) on the engine block.

NOTE:

- Wait at least 30 minutes before filling the engine with oil.
- Do not run the engine for at least 3 hours after installing the engine block end cover.

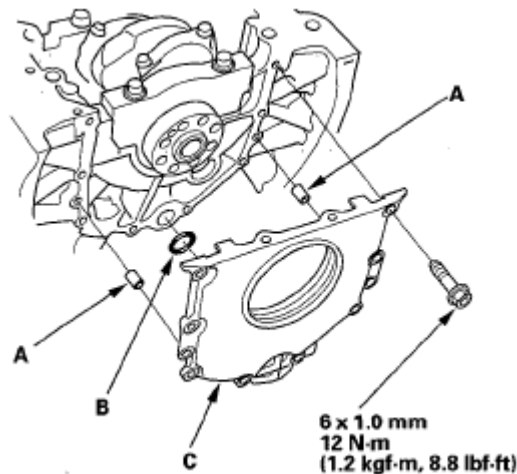


Fig. 68: Identifying Dowel Pins, O-Ring And Engine Block End Cover With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

31. Clean the excess grease off the crankshaft, and check the seal for distortion.
32. Install a new crankshaft oil seal in the oil pump (see step 2 on **INSTALLATION**).
33. Remove all of the old liquid gasket from the oil pump mating surfaces, the bolts, and the bolt holes.
34. Clean and dry the oil pump mating surfaces.
35. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the engine block mating surface of the oil pump. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

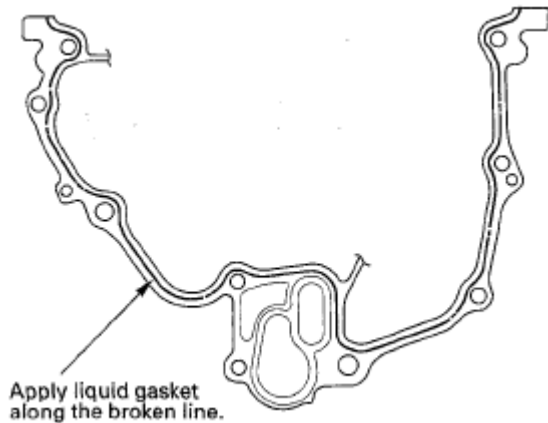


Fig. 69: Applying Liquid Gasket to Engine Block Mating Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

36. Grease the lip of the oil seal, and apply new engine oil to the new O-ring (A).

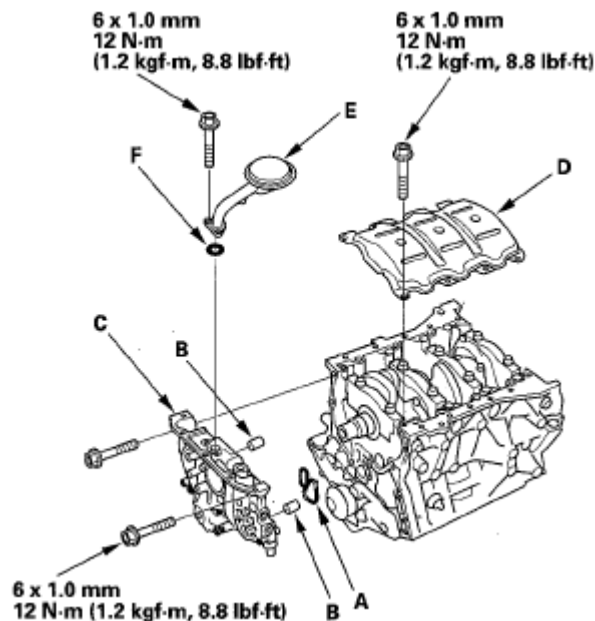


Fig. 70: Identifying O-Ring, Dowel Pins And Oil Pump With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

37. Install the dowel pins (B), then align the inner rotor with the crankshaft, and install the oil pump (C).
38. Clean the excess grease off the crankshaft, and check the seal for distortion.

39. Install the baffle plate (D), then install the oil screen (E) with a new O-ring (F).
40. J35A6 engine: Install the rocker arm oil control solenoid/oil filter assembly (A), with a new rocker arm oil control solenoid filter (B).

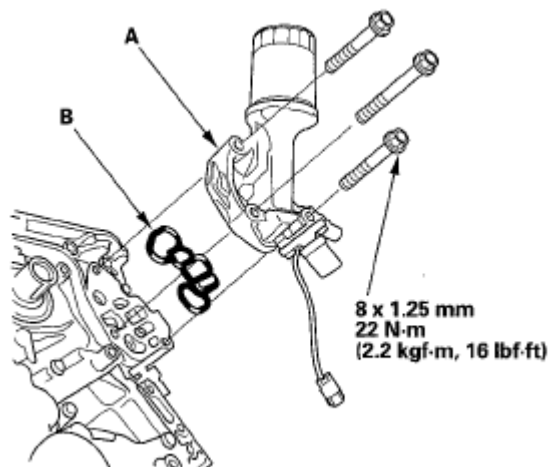


Fig. 71: Identifying Rocker Arm Oil Control Solenoid/Oil Filter Assembly And Rocker Arm Oil Control Solenoid Filter With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

41. J35A7 engine: Install the oil filter base/oil filter assembly (A), with a new O-ring (B).

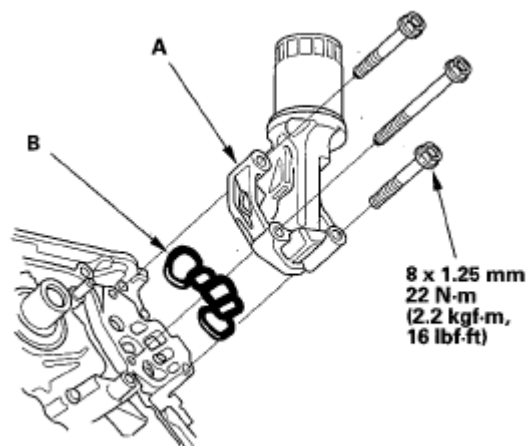


Fig. 72: Identifying Oil Filter Base/Oil Filter Assembly And O-Ring With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

42. Install the oil pan (see **CKP PULSE PLATE REPLACEMENT**)
43. Install the timing belt drive pulley to the crankshaft.
44. Install the cylinder heads:
 - J35A6 engine (see **CYLINDER HEAD INSTALLATION**)
 - '07 model J35A7 engine (see **CYLINDER HEAD INSTALLATION**)

- '08-09 models J35A7 engine (see CYLINDER HEAD INSTALLATION)

45. Install the drive plate (see DRIVE PLATE REMOVAL AND INSTALLATION).

46. Install the transmission (see TRANSMISSION INSTALLATION).

NOTE: When any crankshaft or connecting rod bearing is replaced, run the engine at idle speed until it reaches normal operating temperature, then continue to run it for about 15 minutes. Install the engine/transmission (see ENGINE INSTALLATION).

47.

CKP PULSE PLATE REPLACEMENT

'08-09 MODELS J35A7 ENGINE

1. Remove the crankshaft (see CRANKSHAFT AND PISTON REMOVAL).

2. Remove the CKP pulse plate (A).

NOTE: Be careful not to damage the journals and the CKP pulse plate.

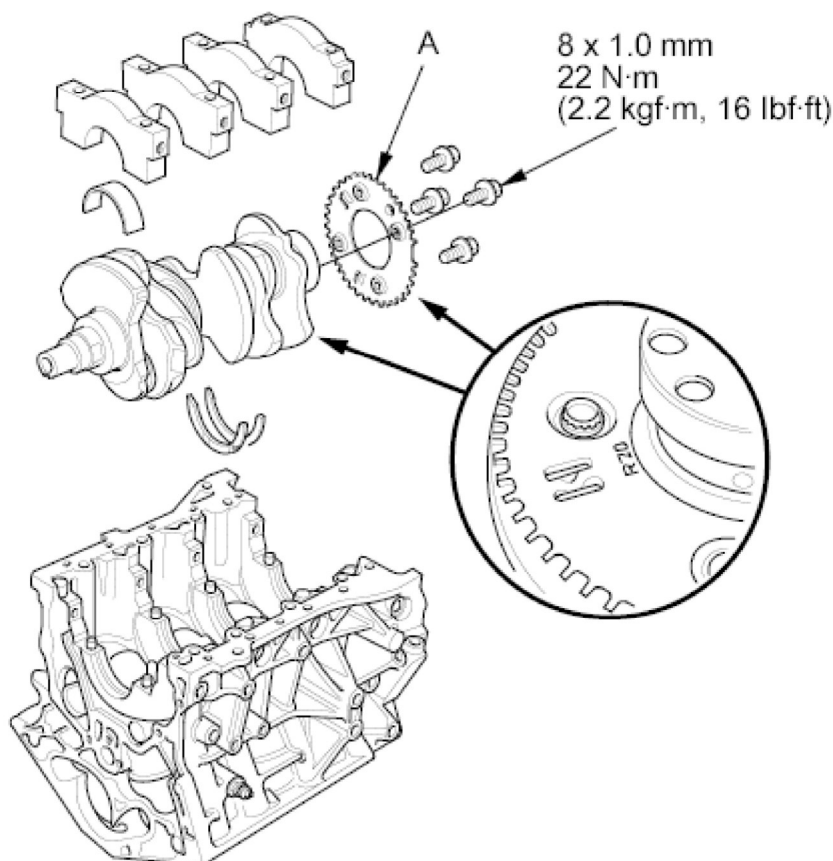


Fig. 73: Identifying CKP Pulse Plate With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the CKP pulse plate in the reverse order of removal.

OIL PAN INSTALLATION

1. Remove all of the old liquid gasket from the oil pan mating surfaces, the bolts, and the bolt holes.
2. Clean and dry the oil pan mating surfaces.
3. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the oil pan mating surface of the engine block. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

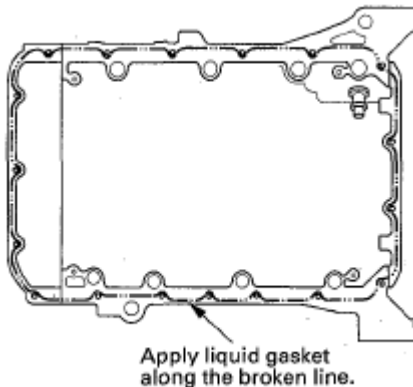


Fig. 74: Applying Liquid Gasket To Oil Pan Mating Surface Of Engine Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the oil pan on the engine block.
5. Tighten the bolts in three steps. In the final step, tighten all bolts, in sequence, to 12 N.m (1.2 kgf.m, 8.8 lbf.ft).

NOTE:

- Wait at least 30 minutes before filling the engine with oil.
- Do not run the engine for at least 3 hours after installing the oil pan.

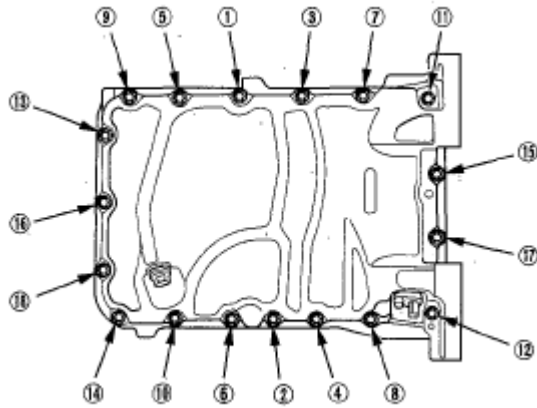


Fig. 75: Identifying Oil Pan Bolts In Sequence

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Tighten the four bolts (A) securing the transmission, then install the torque converter cover (B).

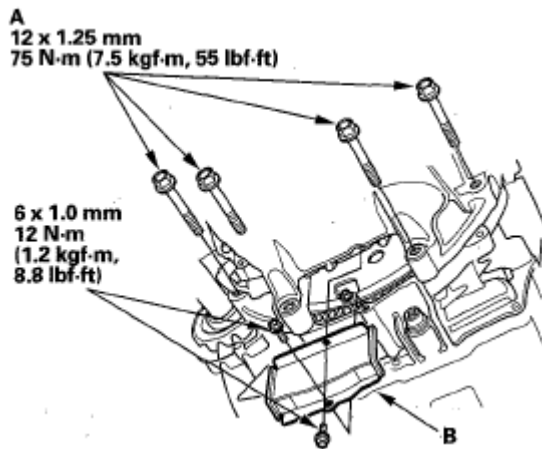


Fig. 76: Identifying Bolts And Torque Converter Cover With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. '08-09 models J35A7 engine: Connect the crankshaft position (CKP) sensor connector (A), then install the CKP sensor cover (B) and the bolt (C).

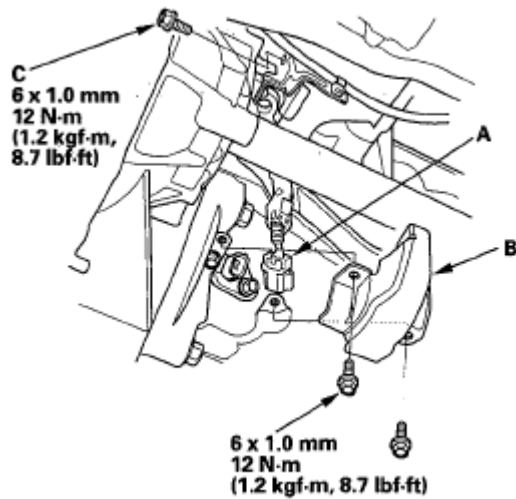


Fig. 77: Identifying Crankshaft Position (CKP) Sensor Connector, CKP Sensor Cover And Bolt With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Install the rear warm up three way catalytic converter (rear WU-TWC) bracket.

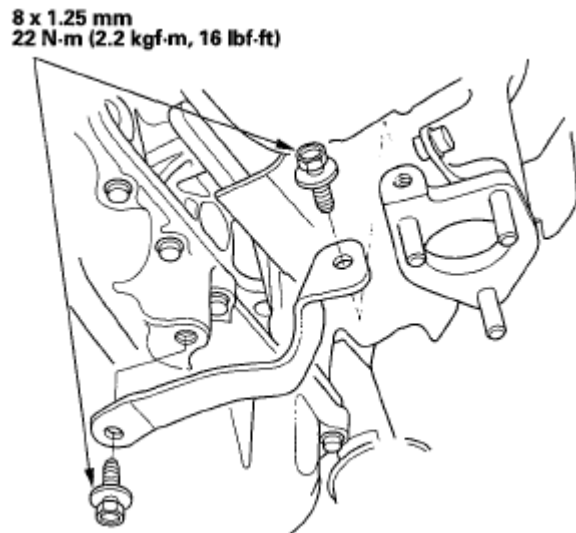


Fig. 78: Identifying Rear Warm Up Three Way Catalytic Converter (Rear WU-TWC) Bracket With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. If the engine is still in the vehicle, do the following steps.
10. Install exhaust pipe A using new gaskets and new self-locking nuts (see step 38 on **ENGINE INSTALLATION**).
11. Install the splash shield (see step 39 on **ENGINE INSTALLATION**).
12. Refill the engine with engine oil (see step 4 on **ENGINE OIL REPLACEMENT**).

PULLEY END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

Oil seal driver, 64 mm 070AD-RCAA100

1. Remove the crankshaft position (CKP) sensor or the timing belt stopper, the timing belt, and the timing belt drive pulley:
 - J35A6 engine (see [TIMING BELT DRIVE PULLEY REPLACEMENT](#))
 - '07 model J35A7 engine (see [TIMING BELT DRIVE PULLEY REPLACEMENT](#))
 - '08-09 models J35A7 engine (see [TIMING BELT DRIVE PULLEY REPLACEMENT](#))
2. Remove the pulley end crankshaft oil seal.
3. Clean and dry the crankshaft oil seal housing.
4. Apply a light coat of new engine oil to the lip of the crankshaft oil seal.
5. Using the oil seal driver, drive in the crankshaft oil seal until the oil seal driver bottoms against the oil pump. When the seal is in place, clean any excess grease off the crankshaft, and check that the oil seal lip is not distorted.

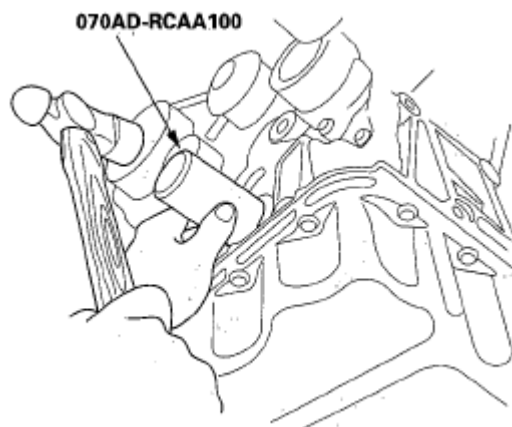


Fig. 79: Identifying Crankshaft Oil Seal

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install the timing belt drive pulley, the timing belt, and the CKP sensor or the timing belt stopper:
 - J35A6 engine (see [TIMING BELT DRIVE PULLEY REPLACEMENT](#))
 - '07 model J35A7 engine (see [TIMING BELT DRIVE PULLEY REPLACEMENT](#))
 - '08-09 models J35A7 engine (see [TIMING BELT DRIVE PULLEY REPLACEMENT](#))

TRANSMISSION END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

- Handle driver 07749-0010000

- Driver attachment, 106 mm 070AD-RCAA200
1. Remove the transmission (see **TRANSMISSION REMOVAL**) and the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
 2. Remove the transmission end crankshaft oil seal.
 3. Clean and dry the crankshaft oil seal housing.
 4. Apply a light coat of new engine oil around the crankshaft oil seal.
 5. Using the handle driver and the driver attachment, drive in the crankshaft oil seal until the driver attachment bottoms against the engine block end cover. Align the hole in the driver attachment with the pin on the crankshaft.

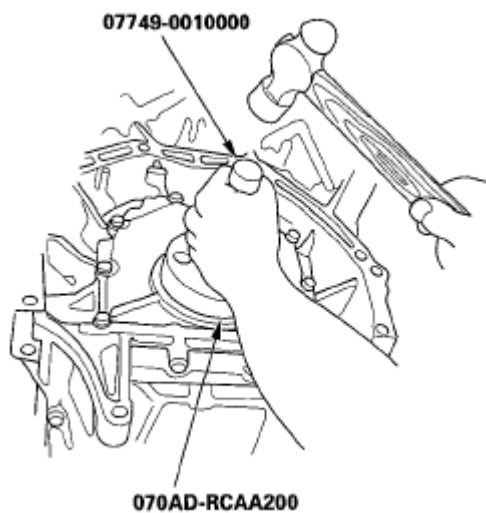


Fig. 80: Identifying Crankshaft Oil Seal

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Clean any excess grease off the crankshaft, and check that the oil seal lip is not distorted.
7. Install the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**), and the transmission (see **TRANSMISSION INSTALLATION**).

SEALING BOLT INSTALLATION

NOTE: When installing the sealing bolts, always use new washers.

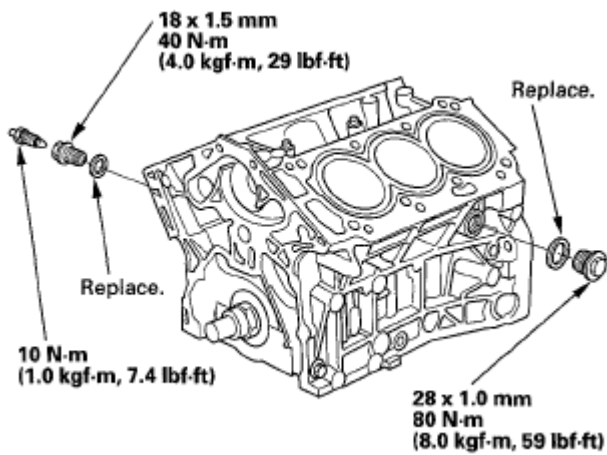


Fig. 81: Identifying Sealing Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

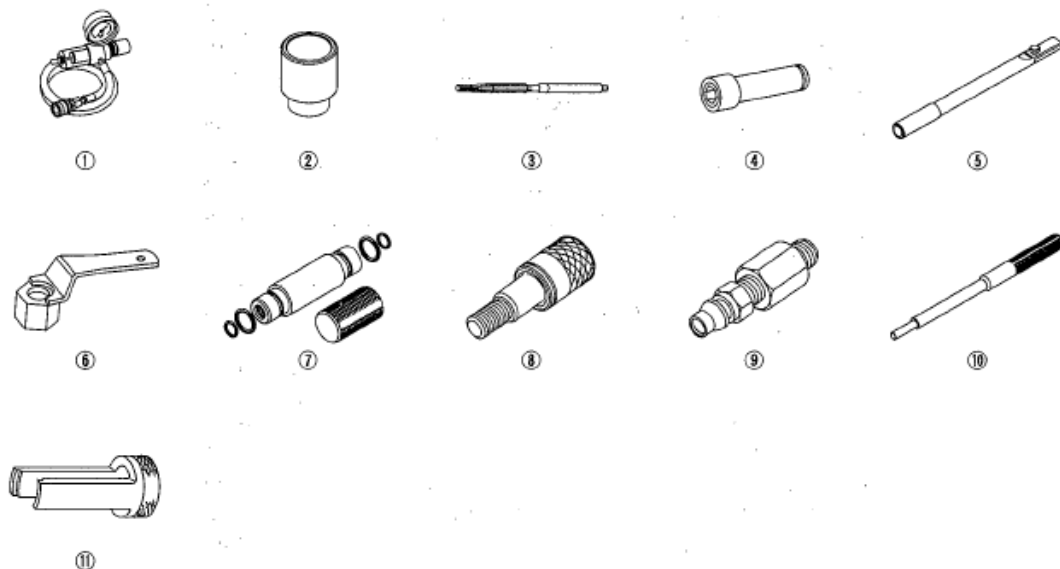
2007-10 ENGINE

Cylinder Head - Odyssey

CYLINDER HEAD (J35A6 ENGINE)

SPECIAL TOOLS

Ref. No.	Tool Number	Description	Qty
①	07AAJ-PNAA101	Air Pressure Regulator	1
②	07GAF-SD40330	Camshaft Oil Seal Driver	1
③	07HAH-PJ7A100	Valve Guide Reamer, 5.5 mm	1
④	07JAA-001020A	Socket, 19 mm	1
⑤	07JAB-001020B	Holder Handle	1
⑥	07MAB-PY3010A	Holder Attachment, 50 mm, Offset	1
⑦	07PAD-0010000	Stem Seal Driver	1
⑧	07PAF-0030100	Camshaft Oil Seal Driver	1
⑨	07VAJ-P8A020A	VTEC Air Stopper	1
⑩	070AJ-001A101	VTEC Air Adapter	1
⑪	07742-0010100	Valve Guide Driver, 5.5 mm	1
⑫	07757-PJ1010A	Valve Spring Compressor Attachment	1

**Fig. 1: Identifying Special Tools**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

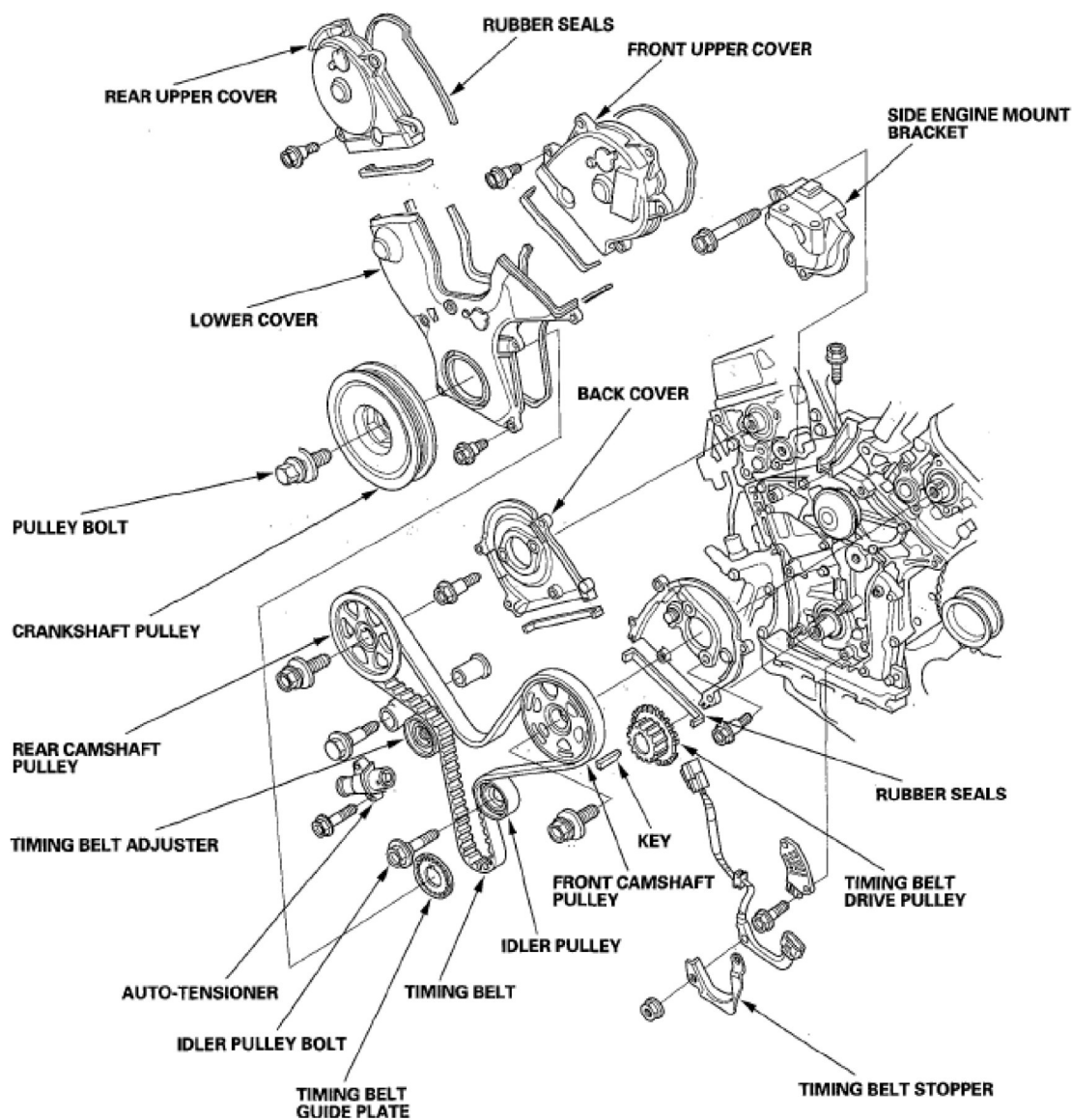


Fig. 2: Identifying Component Location Of Cylinder Head (1 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

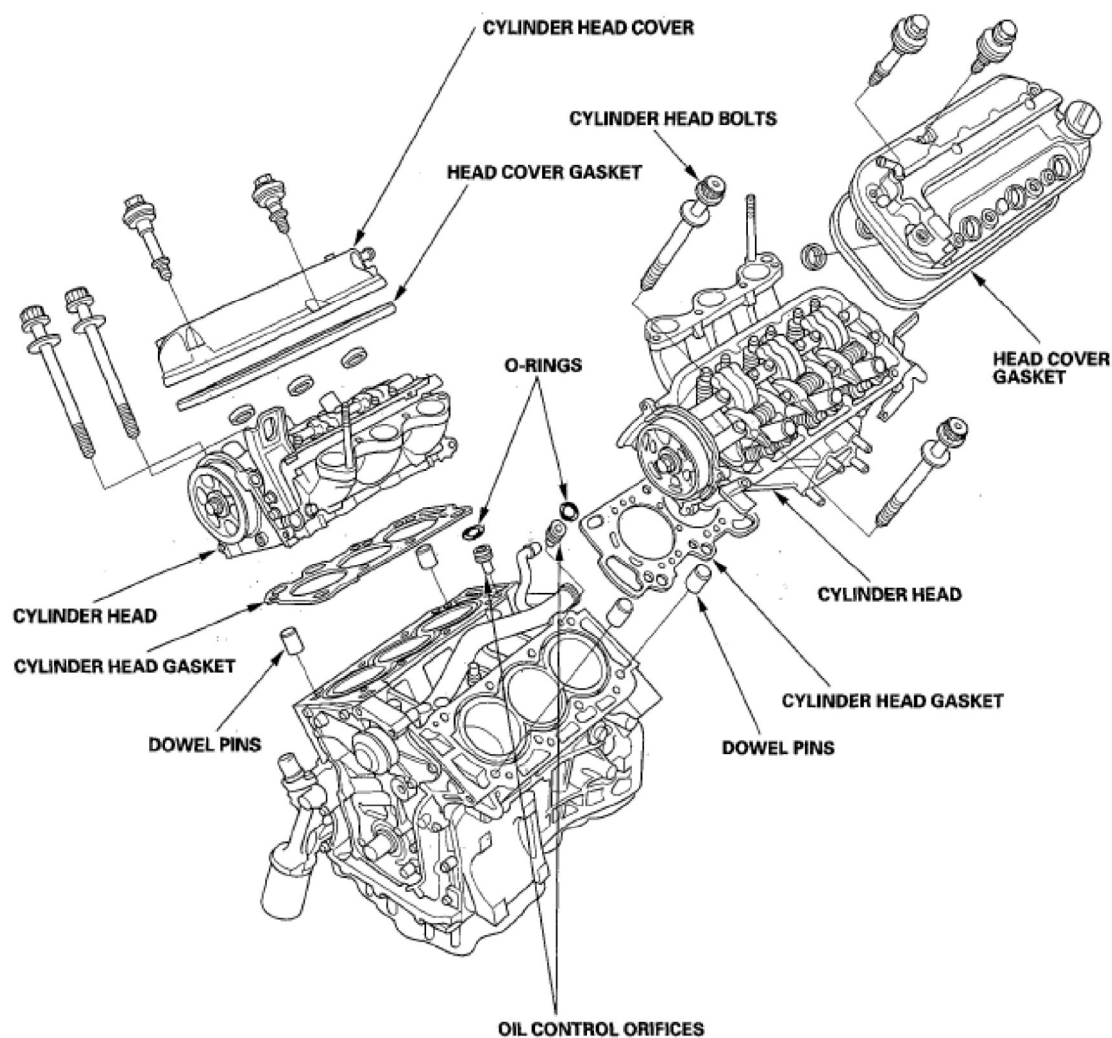


Fig. 3: Identifying Component Location Of Cylinder Head (2 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

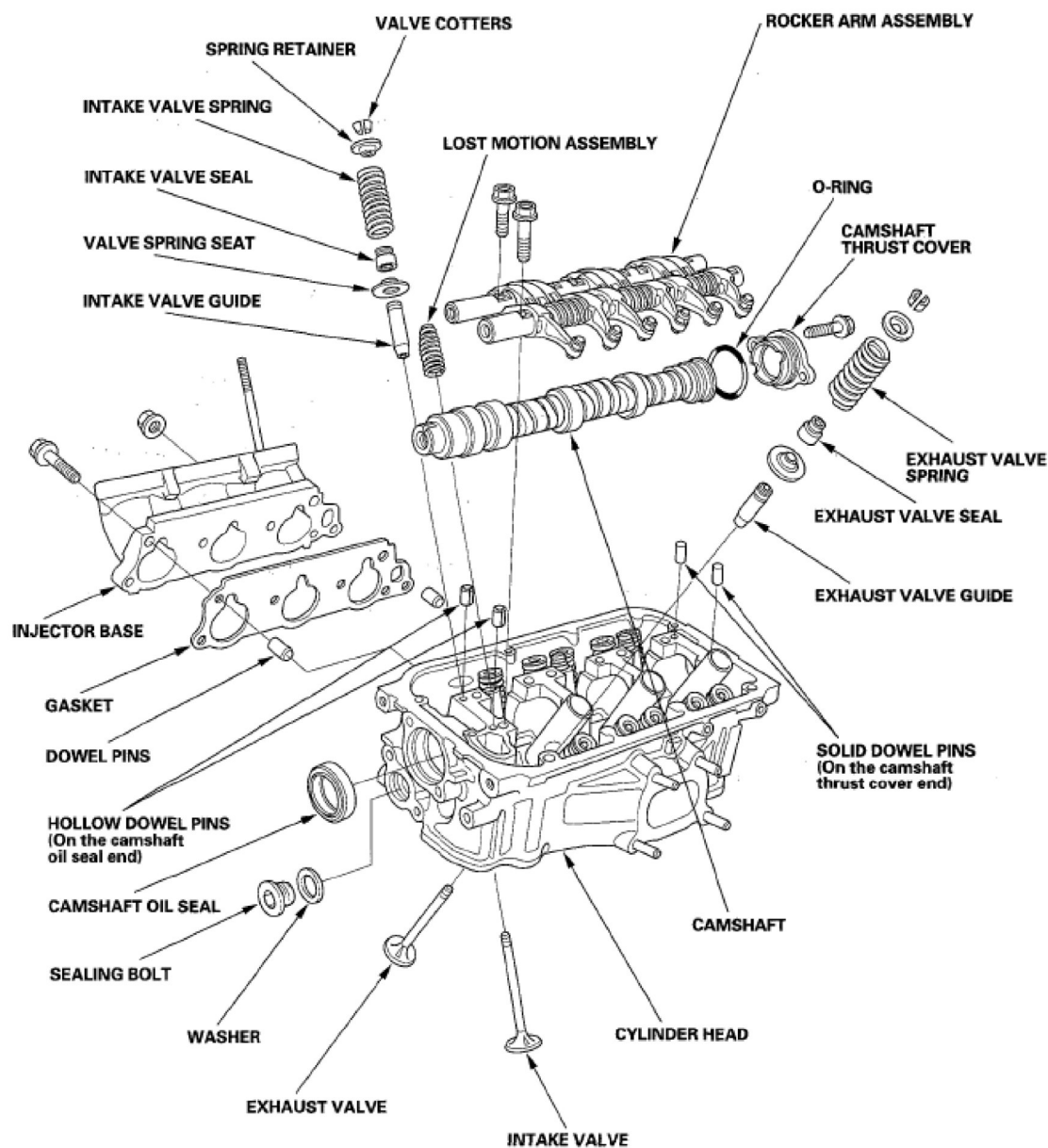


Fig. 4: Identifying Component Location Of Cylinder Head (3 Of 3)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

ENGINE COMPRESSION INSPECTION

NOTE: After the inspection, you must reset the powertrain control module (PCM). Otherwise, the PCM will continue to stop the fuel injectors from functioning.

1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Turn the ignition switch to LOCK (0).
3. Connect the Honda Diagnostic System (HDS) to the data link connector (DLC) (see step 2 **GENERAL**

TROUBLESHOOTING INFORMATION).

4. Turn the ignition switch to ON (II).
5. Make sure the HDS communicates with the vehicle and PCM. If it doesn't communicate, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING**).
6. Select PGM-FI, INSPECTION, then ALL INJECTORS OFF on the HDS.
7. Turn the ignition switch to LOCK (0).
8. Remove the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
9. Remove the six spark plugs.
10. Attach the compression gauge to a spark plug hole.

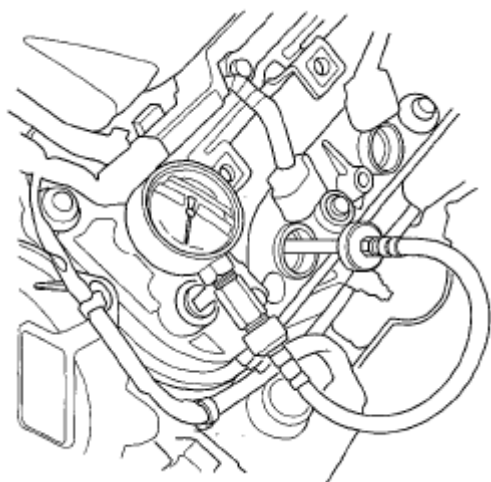


Fig. 5: Installing Compression Gauge To Spark Plug Hole
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Step on the accelerator pedal to open the throttle, then crank the engine with the starter motor, and measure the compression.

Compression Pressure: Above 930 kPa (9.5 kgf/cm² , 135 psi)

12. Measure the compression on the remaining cylinders.

Maximum Variation: Within 200 kPa (2.0 kgf/cm² , 28 psi)

13. If the compression is not within specifications, check the following items, then remeasure the compression.
 - Confirmation of cam timing
 - Damaged or worn valves and seats
 - Damaged cylinder head gasket
 - Damaged or worn piston rings
 - Damaged or worn piston and cylinder bore

14. Remove the compression gauge from the spark plug hole.
15. Install the six spark plugs.
16. Install the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
17. Select PCM reset (see **HDS CLEAR COMMAND**) to cancel the ALL INJECTORS OFF on the HDS.

VTEC ROCKER ARM TEST

Special Tools Required

- VTEC air stopper 07VAJ-P8A020A
- VTEC air adapter 070AJ-001A101
- Air pressure regulator 07AAJ-PNAA101

1. Start the engine and let it run for 5 minutes, then turn the ignition switch to LOCK (0).
2. Remove the intake manifold (see **REMOVAL**).
3. Remove the cylinder head covers (see **CYLINDER HEAD COVER REMOVAL**).
4. Set the No. 1 piston at top dead center (TDC) (see step 3 **VALVE CLEARANCE ADJUSTMENT**).
5. Push on the intake mid rocker arm (A) for the No. 1 cylinder. The mid rocker arm should move independently of the primary rocker arm (B) and the secondary rocker arm (C).
 - If the mid rocker arm moves freely, go to step 6.
 - If the intake mid rocker arm does not move, remove the mid, primary, and secondary intake rocker arms as an assembly, then check that the rocker arm pistons in the mid and primary rocker arms move smoothly. If any rocker arm needs replacing, replace the mid, primary, and secondary rocker arms as an assembly, then retest.

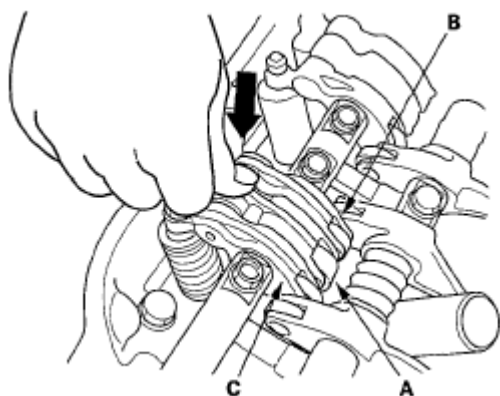


Fig. 6: Identifying Intake Mid Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Repeat step 5 on the remaining intake mid rocker arms with each piston at TDC. When all the mid rocker arms pass the test, go to step 7.
7. Check that the air pressure on the shop air compressor gauge indicates over 690 kPa (7.0 kgf/cm² , 100 psi).

8. Inspect the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
9. Remove the No. 1 and No. 6 intake rocker shaft mounting bolts, then install the VTEC air adapter and the VTEC air stopper, and connect the air pressure regulator as shown.

FRONT

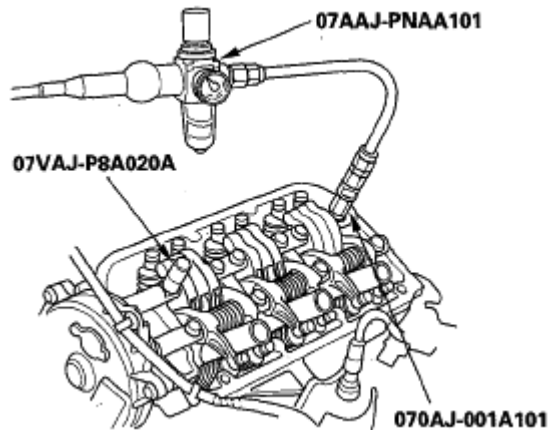


Fig. 7: Identifying Air Pressure Regulator - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

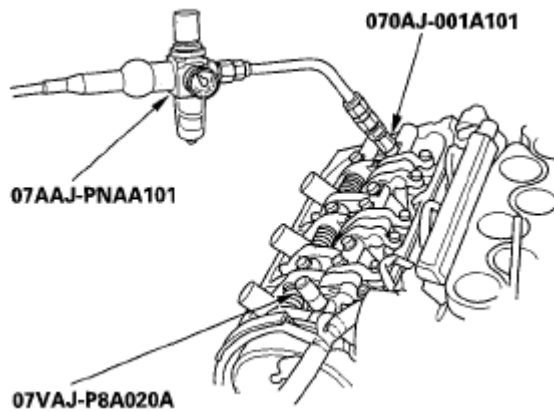


Fig. 8: Identifying Air Pressure Regulator - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Loosen the valve on the regulator, and apply the specified air pressure.

Specified Air Pressure: 440-540 kPa (4.5-5.5 kgf/cm² , 64-78 psi)

NOTE: If the rocker arm pistons do not move after applying air pressure, move the primary or secondary rocker arm up and down manually.

11. Make sure that the intake primary rocker arm (A) and the intake secondary rocker arm (B) are mechanically connected by the piston and that the mid rocker arm (C) does not move when pushed manually. If any intake mid rocker arm moves independently of the primary and the secondary rocker arms, replace the rocker arms as a set.

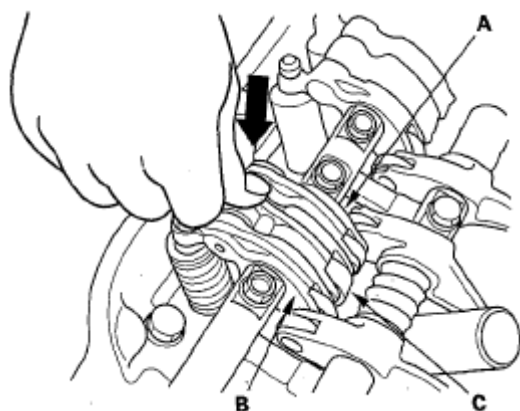


Fig. 9: Identifying Intake Primary Rocker Arm And Intake Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the air pressure regulator, the VTEC air adapter, and the VTEC air stopper.
13. Tighten the rocker shaft bolts to 24 N.m (2.4 kgf.m, 17 lbf.ft).
14. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**).
15. Install the intake manifold (see **INSTALLATION**).

VALVE CLEARANCE ADJUSTMENT

NOTE: Connect the Honda Diagnostic System (HDS) to the data link connector (DLC), and monitor the engine coolant temperature (ECT). Adjust the valves only when the cylinder head temperature is less than 100°F (38°C).

1. Remove the intake manifold (see **REMOVAL**).
2. Remove the cylinder head covers (see **CYLINDER HEAD COVER REMOVAL**).
3. Set the No. 1 piston at top dead center (TDC).

Align the pointer (A) on the front upper cover with the No. 1 piston TDC mark (B) on the front camshaft pulley.

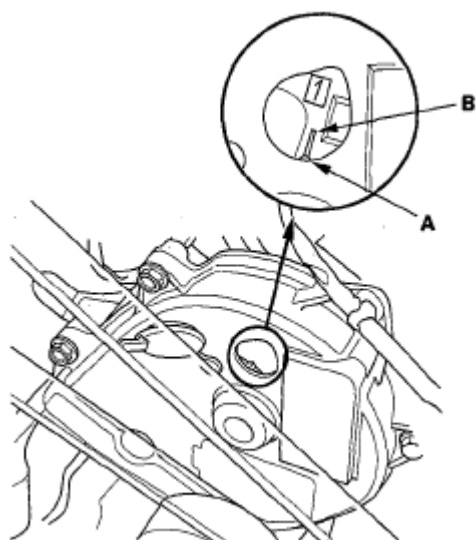


Fig. 10: Identifying No. 1 Piston At Top Dead Center (TDC)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Select the correct thickness feeler gauge for the valves you are going to check.

Valve Clearance

Intake: 0.20-0.24 mm (0.008-0.009 in.)

Exhaust: 0.28-0.32 mm (0.011-0.013 in.)

REAR

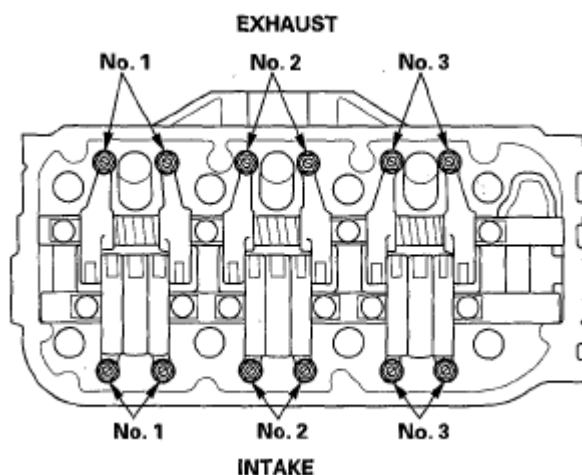


Fig. 11: Identifying Valve Clearance - Rear

Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

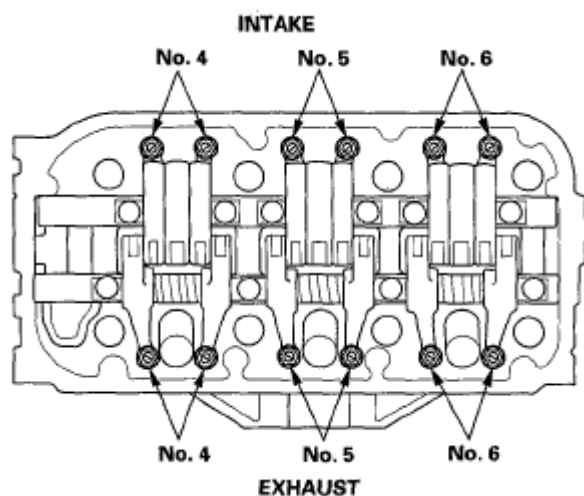


Fig. 12: Identifying Valve Clearance - Front

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Insert the feeler gauge (A) between the adjusting screw and the end of the valve stem on No. 1 cylinder and slide it back and forth; you should feel a slight amount of drag.

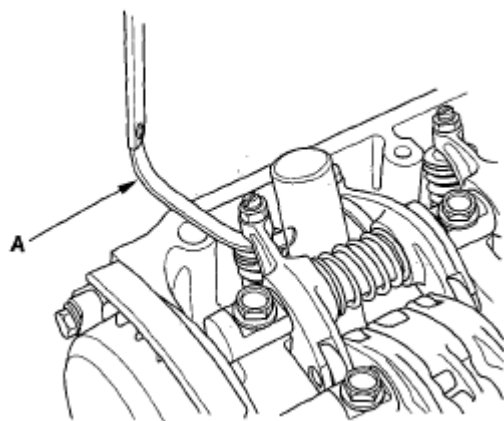


Fig. 13: Identifying Feeler Gauge Between Adjusting Screw And End Of Valve Stem

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If you feel too much or too little drag, loosen the locknut (A), and turn the adjusting screw (B) until the drag on the feeler gauge is correct.

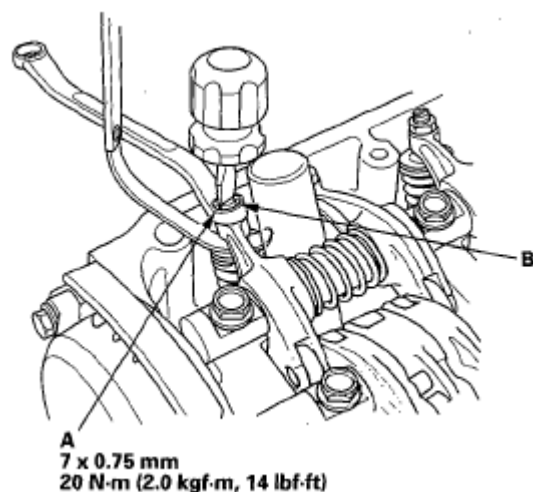


Fig. 14: Identifying Locknut With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. While holding the adjusting screw with the screw driver, tighten the locknut, then recheck the clearance. Repeat the adjustment, if necessary.
8. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 4 piston TDC mark (B) on the front camshaft pulley.

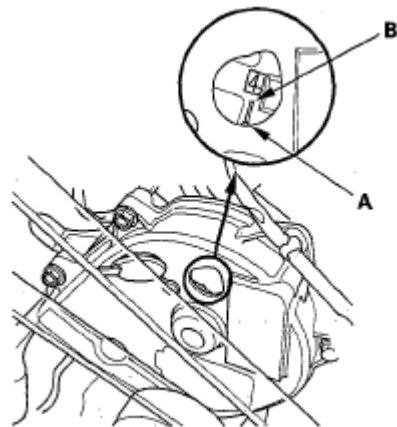


Fig. 15: Identifying Pointer On Front Upper Cover With No. 4 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Check and, if necessary, adjust the valve clearance on the No. 4 cylinder.
10. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 2 piston TDC mark (B) on the front camshaft pulley.

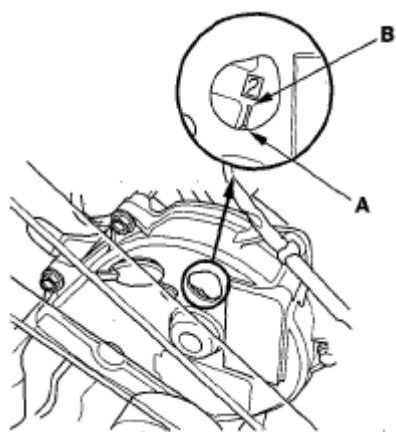


Fig. 16: Identifying Pointer On Front Upper Cover With No. 2 Piston TDC Mark On Front Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Check and, if necessary, adjust the valve clearance on the No. 2 cylinder.
12. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 5 piston TDC mark (B) on the front camshaft pulley.

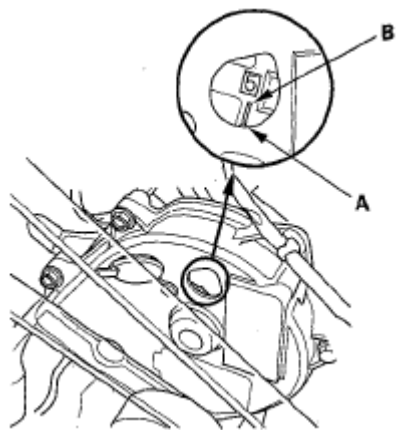


Fig. 17: Identifying Pointer On Front Upper Cover With No. 5 Piston TDC Mark On Front Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Check and, if necessary, adjust the valve clearance on the No. 5 cylinder.
14. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 3 piston TDC mark (B) on the front camshaft pulley.

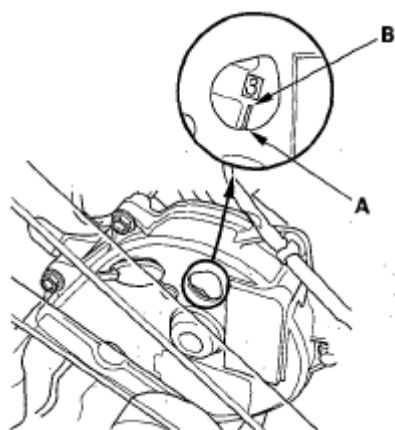


Fig. 18: Identifying Pointer On Front Upper Cover With No. 3 Piston TDC Mark On Front Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Check and, if necessary, adjust the valve clearance on the No. 3 cylinder.
16. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 6 piston TDC mark (B) on the front camshaft pulley.

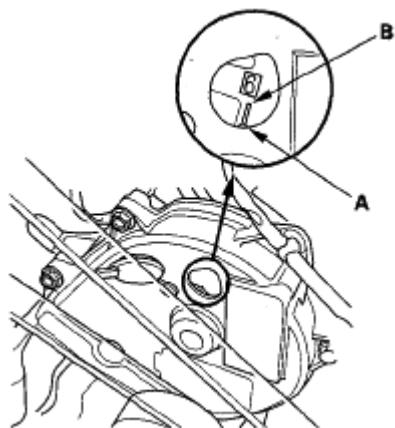


Fig. 19: Identifying Pointer On Front Upper Cover With No. 6 Piston TDC Mark On Front Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Check and, if necessary, adjust the valve clearance on the No. 6 cylinder.
18. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**).
19. Install the intake manifold (see **INSTALLATION**).

CRANKSHAFT PULLEY REMOVAL AND INSTALLATION

Special Tools Required

- Holder handle 07JAB-001020B

- Holder attachment, 50 mm, offset 07MAB-PY3010A
- Socket, 19 mm 07JAA-001020A, or a commercially available 19 mm socket

Removal

1. Remove the right front wheel.
2. Remove the splash shield.

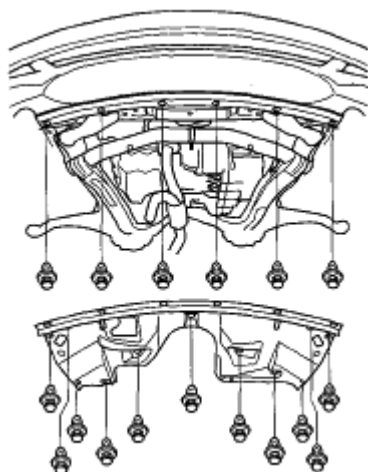


Fig. 20: Identifying Splash Shield With Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
4. Hold the pulley with the holder handle (A) and the holder attachment (B).

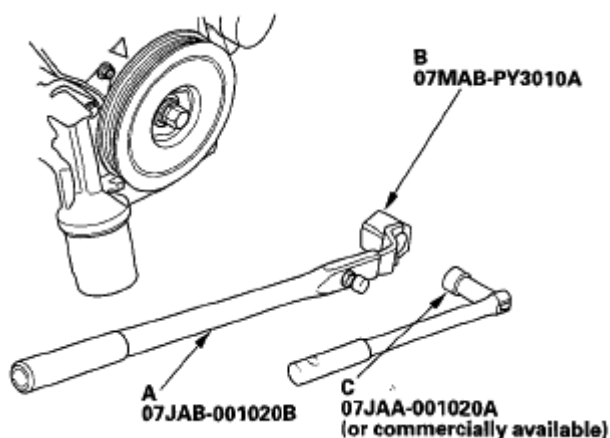


Fig. 21: Identifying Holder Handle And Holder Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the bolt with a heavy duty 19 mm socket (C) and a breaker bar, then remove the crankshaft pulley.

Installation

1. Remove any oil and clean the pulleys (A), the crankshaft (B), the bolt (C), and the washer (D). Lubricate with new engine oil as shown.

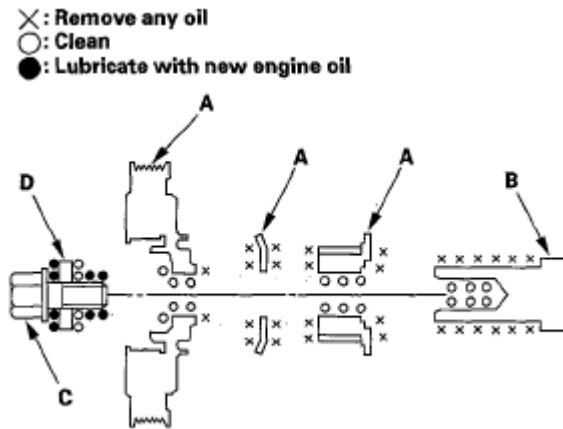


Fig. 22: Identifying Cleaning Pulleys, Crankshaft, Bolt, And Washer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the crankshaft pulley, then tighten the bolt. Do not use an impact wrench.
 1. Hold the pulley with the holder handle (A) and the holder attachment (B). Torque the bolt to 64 N.m (6.5 kgf.m, 47 lbf.ft) with a torque wrench and heavy duty 19 mm socket (C).
 2. Mark the bolt head (D) and the crankshaft pulley (E) as shown, then tighten the bolt an additional 60° (The mark on the bolt head line up with the mark on the crankshaft pulley).

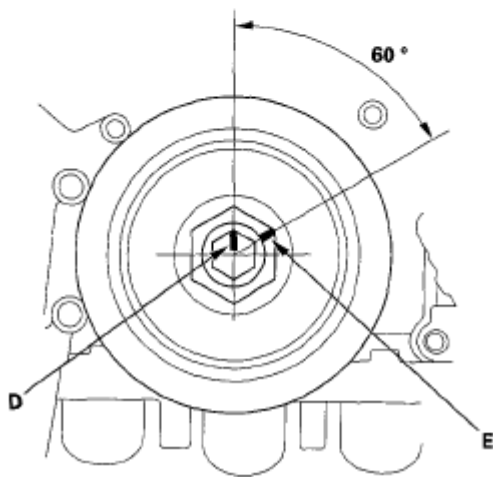
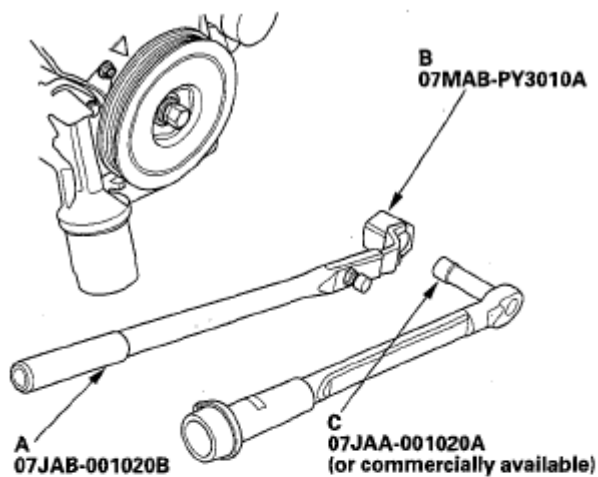


Fig. 23: Identifying Holder Handle And Holder Attachment
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
4. Install the splash shield.
5. Install the right front wheel.

TIMING BELT INSPECTION

1. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
2. Remove the front upper cover.

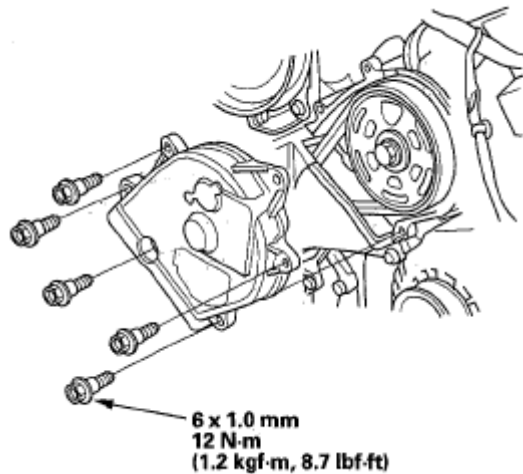


Fig. 24: Identifying Front Upper Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Inspect the timing belt for cracks and oil or coolant contamination. Replace the belt if it is cracked, or is contaminated with oil or coolant. Wipe off any oil or solvent that gets on the belt.

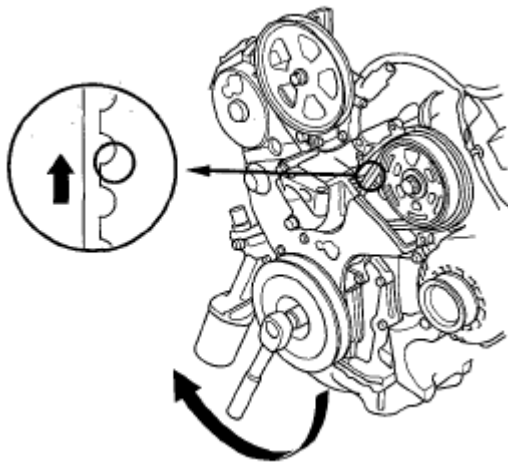


Fig. 25: Identifying Timing Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT REMOVAL

1. Turn the crankshaft so white mark (A) on the crankshaft pulley lines up with the pointer (B).

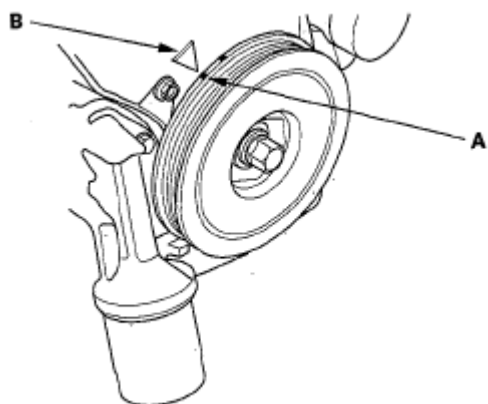


Fig. 26: Identifying Timing Mark On Crankshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Check that the No. 1 piston top dead center (TDC) mark (A) on the front camshaft pulley and the pointer (B) on the front upper cover are aligned.

NOTE: If the marks are not aligned, rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark.

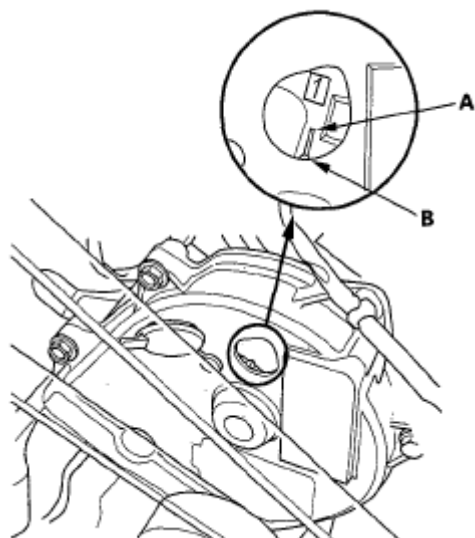


Fig. 27: Identifying No. 1 Piston Top Dead Center (TDC) Mark
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Raise the vehicle on the lift, then remove the right front wheel.
4. Remove the splash shield.

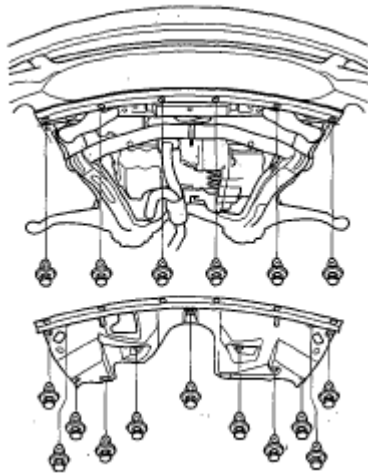


Fig. 28: Identifying Splash Shield

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
6. Support the engine with a jack and a wood block under the oil pan.
7. Remove the upper half of the side engine mount bracket.

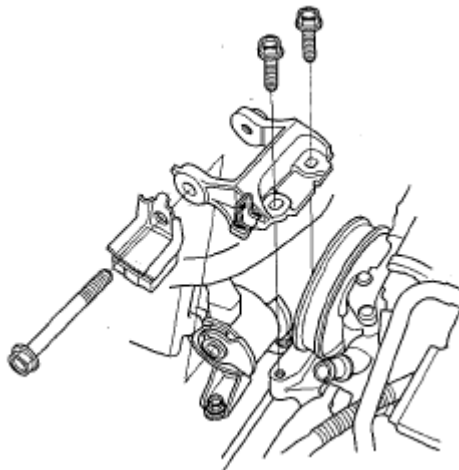


Fig. 29: Identifying Upper Half Of Side Engine Mount Bracket And Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**).
9. Remove the front upper cover (A) and the rear upper cover (B).

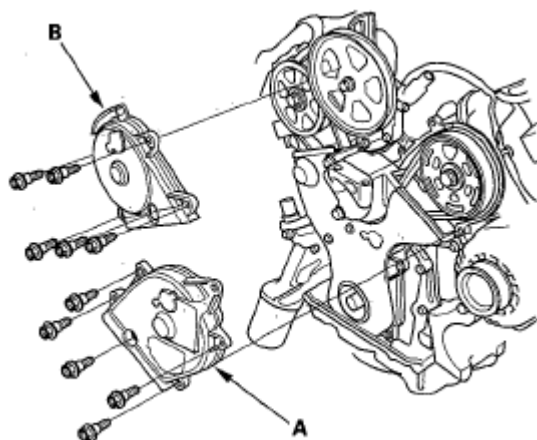


Fig. 30: Identifying Front Upper Cover And Rear Upper Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the lower cover.

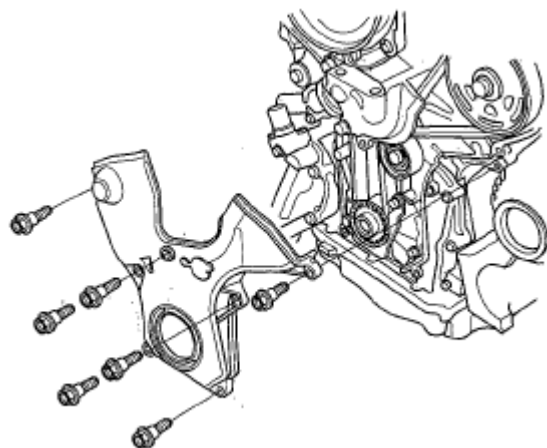
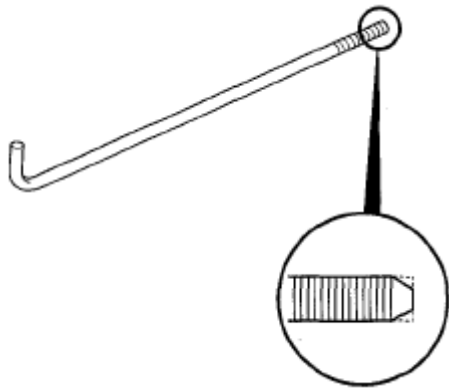


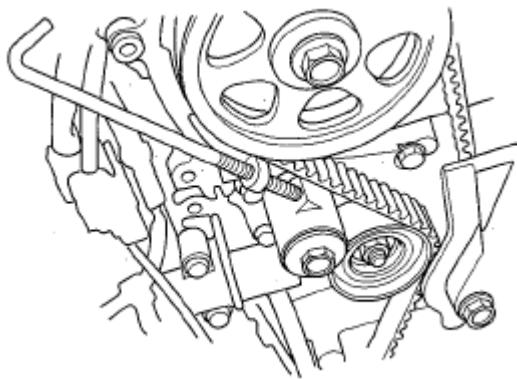
Fig. 31: Identifying Lower Cover And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove one of the battery clamp bolts from the battery tray, and grind the end of it as shown.

**Fig. 32: Identifying Battery Clamp Bolts**

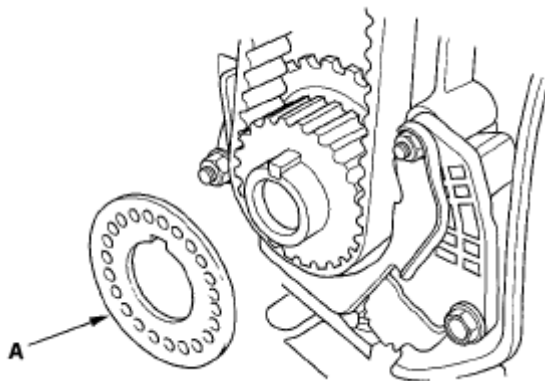
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Thread the battery clamp bolt in as shown to hold the timing belt adjuster in its current position. Tighten it by hand, do not use a wrench.

**Fig. 33: Identifying Battery Clamp Bolts**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the timing belt guide plate (A).

**Fig. 34: Identifying Timing Belt Guide Plate**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the lower half of the side engine mount bracket.

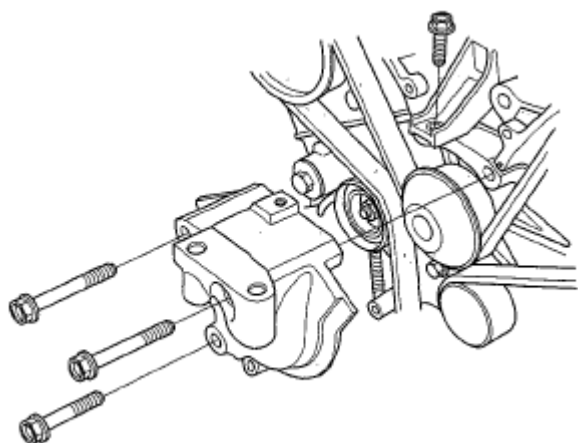


Fig. 35: Identifying Lower Half Of Side Engine Mount Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the idler pulley bolt (A) and the idler pulley (B), then remove the timing belt. Discard the idler pulley bolt.

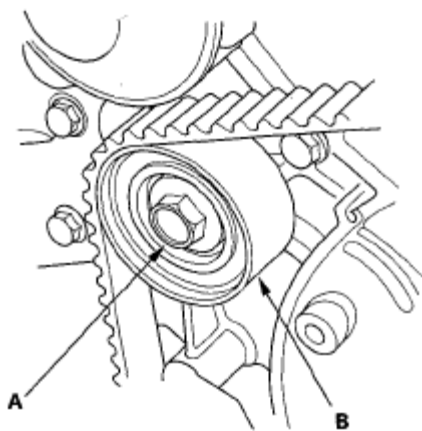


Fig. 36: Identifying Idler Pulley Bolt And Idler Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT INSTALLATION

NOTE: The following procedure is the installation procedure for a used timing belt. If you are installing a new belt, refer to **THE TIMING BELT REPLACEMENT procedure**.

1. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
2. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.

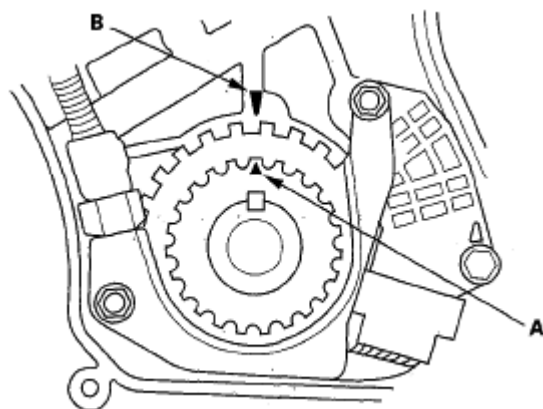


Fig. 37: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

FRONT

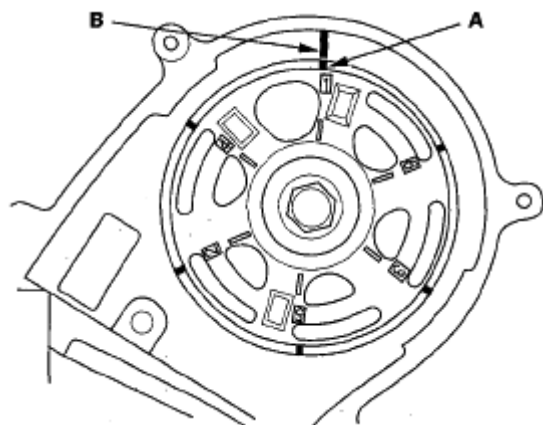


Fig. 38: Identifying TDC Marks On Camshaft Pulleys - Front

Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

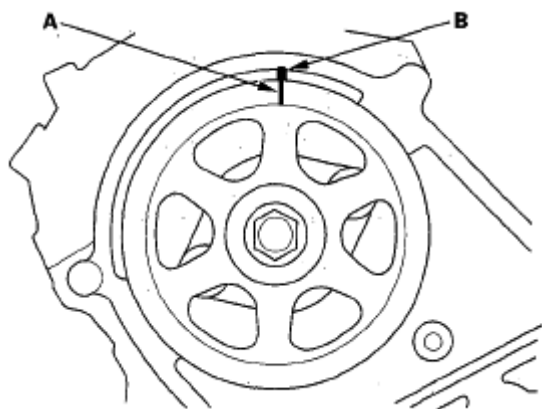


Fig. 39: Identifying TDC Marks On Camshaft Pulleys - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Loosely install the idler pulley with a new idler pulley bolt so the pulley can move but does not come off.
5. If the auto-tensioner has extended and the timing belt cannot be installed, do the **TIMING BELT REPLACEMENT** procedure .
6. Install the timing belt in a counterclockwise sequence starting with the drive pulley. Take care not to damage the timing belt during installation.
 1. Drive pulley (A)
 2. Idler pulley (B)
 3. Front camshaft pulley (C)
 4. Water pump pulley (D)
 5. Rear camshaft pulley (E)
 6. Adjusting pulley (F)

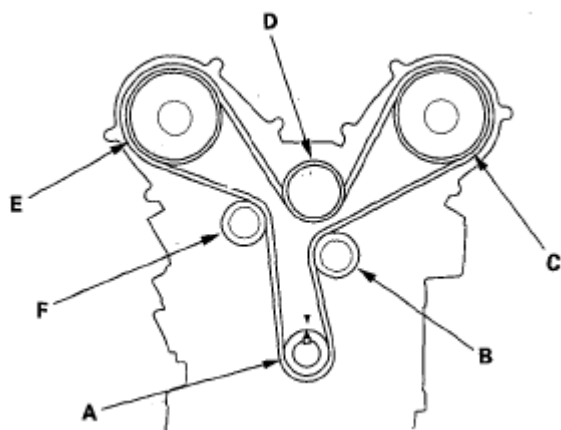


Fig. 40: Timing Belt Routing Diagram
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Tighten the idler pulley bolt.

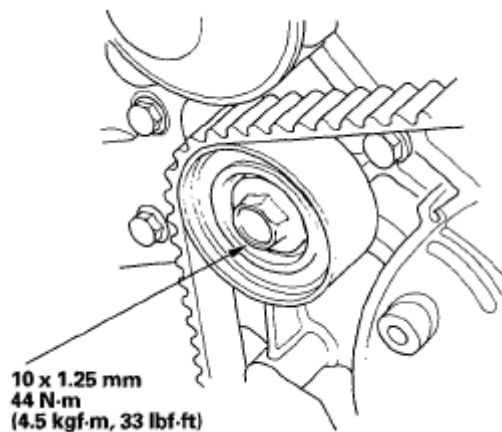


Fig. 41: Identifying Idler Pulley Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the battery clamp bolt from the back cover.

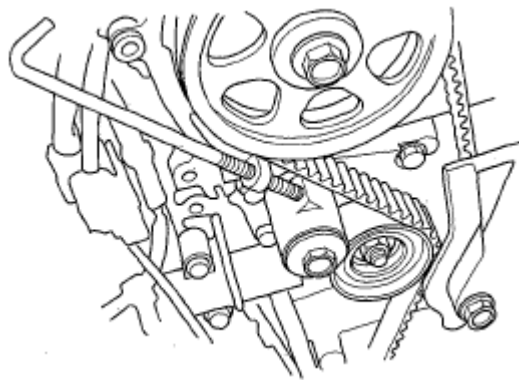


Fig. 42: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Install the lower half of the side engine mount bracket.

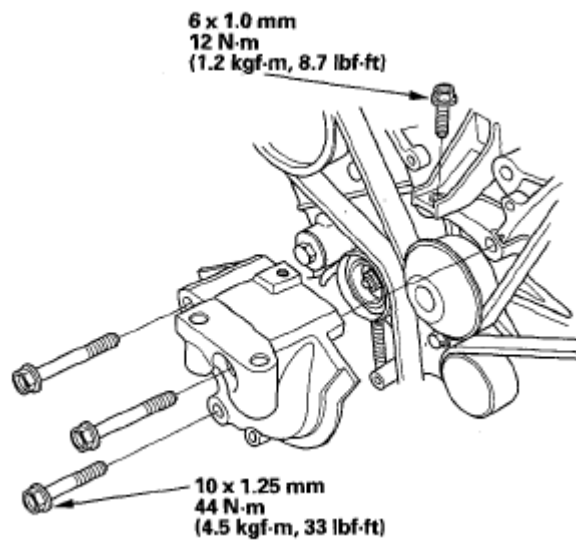


Fig. 43: Identifying Lower Half Of Side Engine Mount Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the timing belt guide plate as shown.

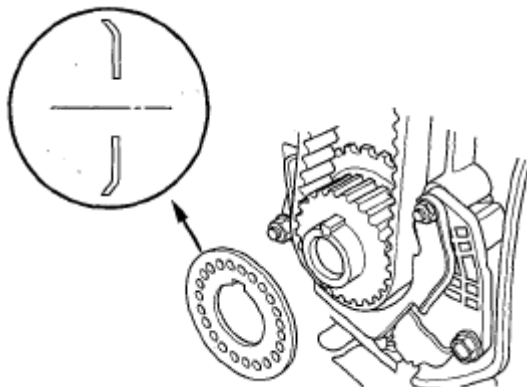


Fig. 44: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the lower cover.

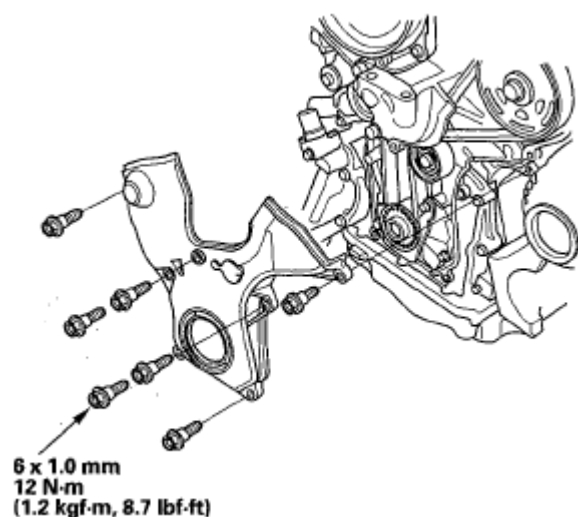


Fig. 45: Identifying Lower Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the front upper cover (A) and the rear upper cover (B).

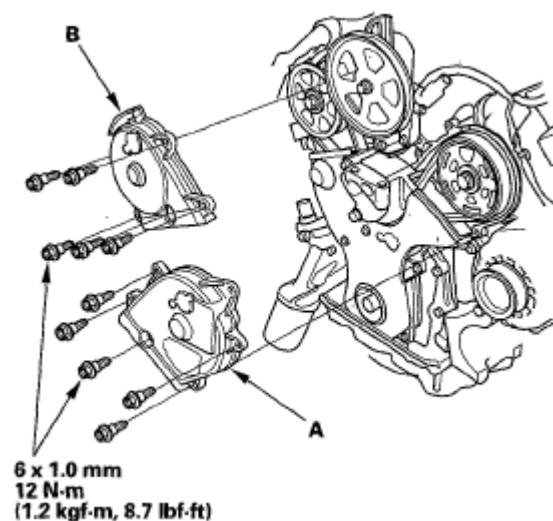


Fig. 46: Identifying Front Upper Cover And Rear Upper Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the crankshaft pulley (see **INSTALLATION**).
14. Rotate the crankshaft pulley six turns clockwise so the timing belt positions itself on the pulleys.
15. Turn the crankshaft pulley so its white mark (A) lines up with the pointer (B).

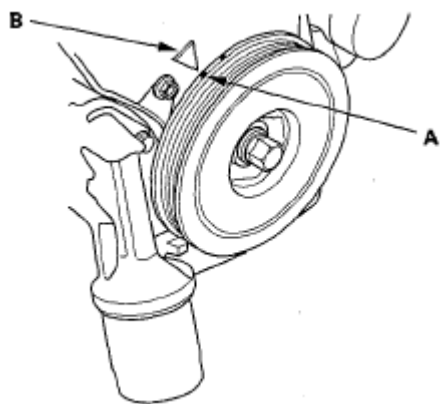


Fig. 47: Identifying Timing Mark On Crankshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Check the camshaft pulley marks.

NOTE: If the marks are not aligned, rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark.

- If the camshaft pulley marks are at TDC, go to step 17.
- If the camshaft pulley marks are not at TDC, remove the timing belt and repeat steps 2 through 16.

FRONT

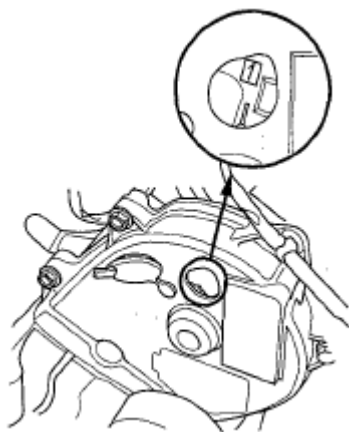


Fig. 48: Identifying Camshaft Pulley Marks - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

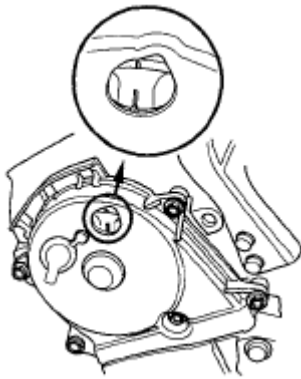


Fig. 49: Identifying Camshaft Pulley Marks - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Install the upper half of the side engine mount bracket, and tighten the new mounting bolts (A), then the mass damper mounting bolt (B).

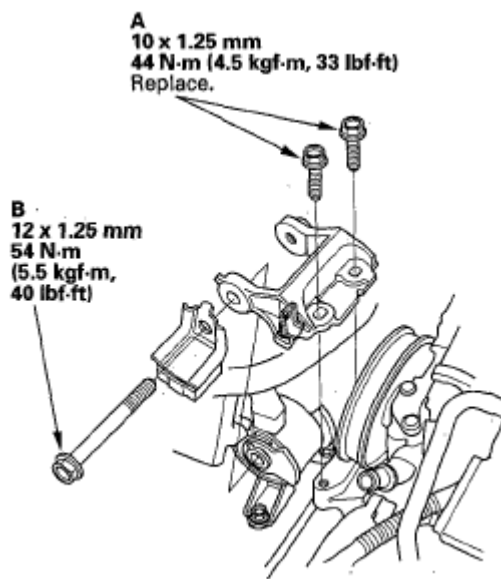


Fig. 50: Identifying Upper Half Of Side Engine Mount Bracket And Mounting Bolts With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
19. Install the splash shield.

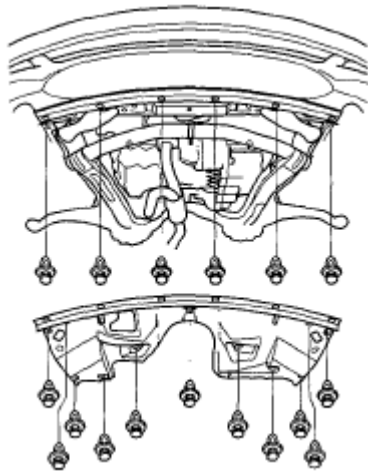


Fig. 51: Identifying Splash Shield

Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the right front wheel.
21. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

TIMING BELT REPLACEMENT

NOTE: The following procedure is for the installation of a new timing belt. If you are installing a used belt, refer to the **TIMING BELT INSTALLATION** procedure .

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
3. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.

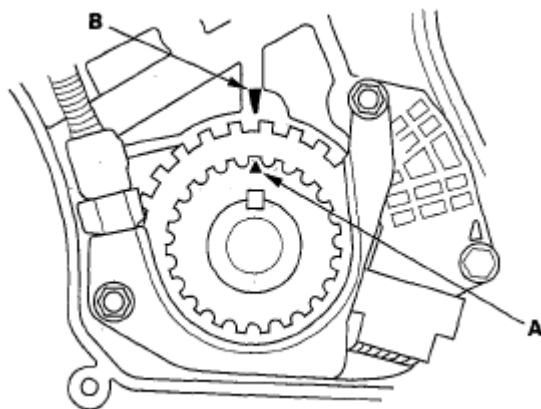


Fig. 52: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley With Oil Pump

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

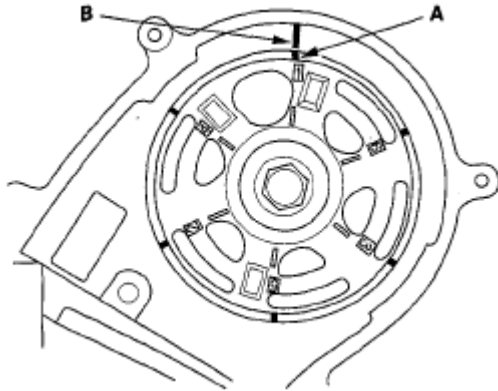
FRONT

Fig. 53: Identifying TDC Marks On Camshaft Pulleys - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

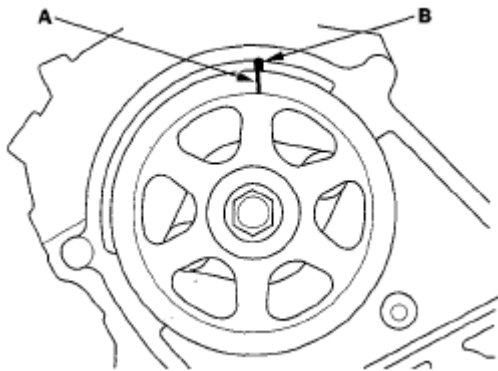
REAR

Fig. 54: Identifying TDC Marks On Camshaft Pulleys - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the battery clamp bolt from the back cover.
6. Remove the auto-tensioner.

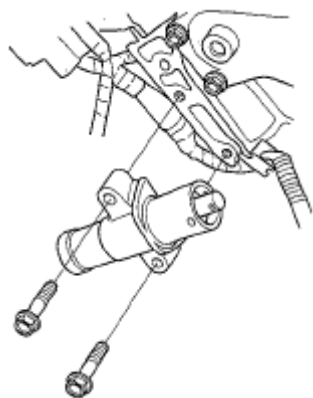


Fig. 55: Identifying Auto-Tensioner And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Align the holes on the rod and the housing of the auto-tensioner.

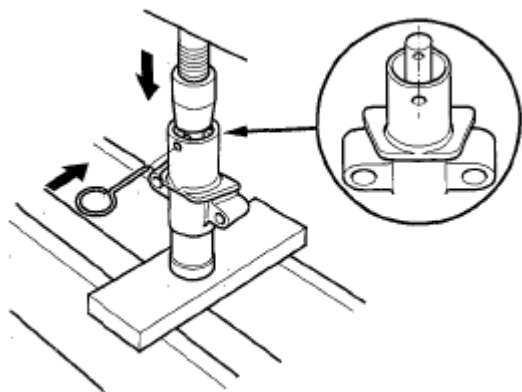


Fig. 56: Identifying Holes On Rod And Housing Of Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Use a hydraulic press to slowly compress the auto-tensioner. Insert a 2.0 mm (0.08 in.) pin through the housing and the rod.

NOTE: The compression pressure should not exceed 9,800 N (1,000 kgf, 2,200 lbf).

9. Install the auto-tensioner.

NOTE: Make sure the pin stays in place.

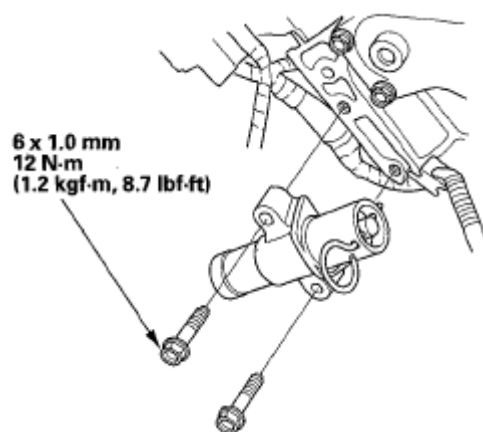


Fig. 57: Identifying Auto-Tensioner With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Thread the battery clamp bolt in as shown to hold the timing belt adjuster. Tighten it by hand; do not use a wrench.

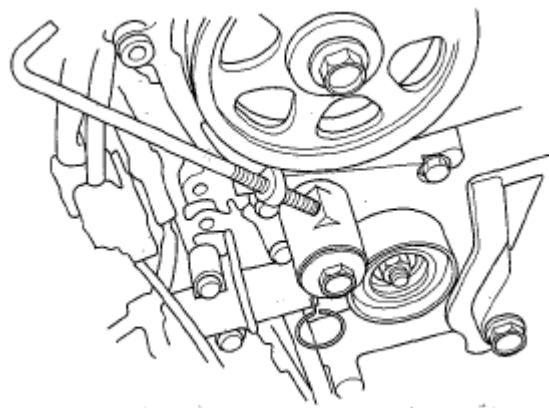


Fig. 58: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Loosely install the idler pulley with a new idler pulley bolt so the pulley can move but does not come off.
12. Install the timing belt in a counterclockwise sequence starting with the drive pulley.
 1. Drive pulley (A)
 2. Idler pulley (B)
 3. Front camshaft pulley (C)
 4. Water pump pulley (D)
 5. Rear camshaft pulley (E)
 6. Adjusting pulley (F)

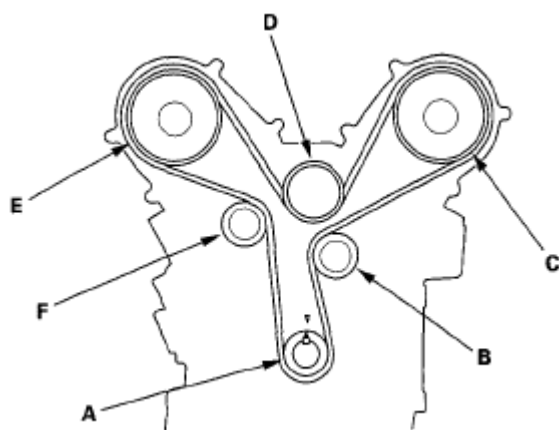


Fig. 59: Timing Belt Routing Diagram

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Tighten the idler pulley bolt.

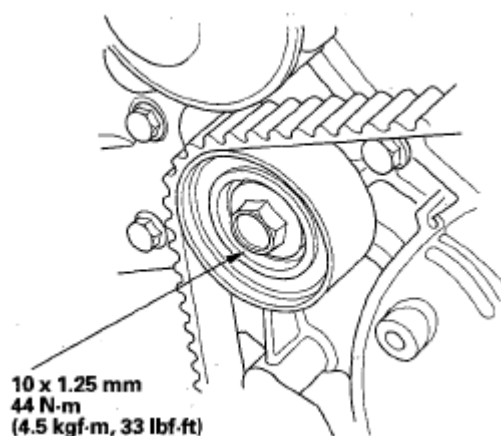


Fig. 60: Identifying Idler Pulley Bolt With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the pin from the auto-tensioner.

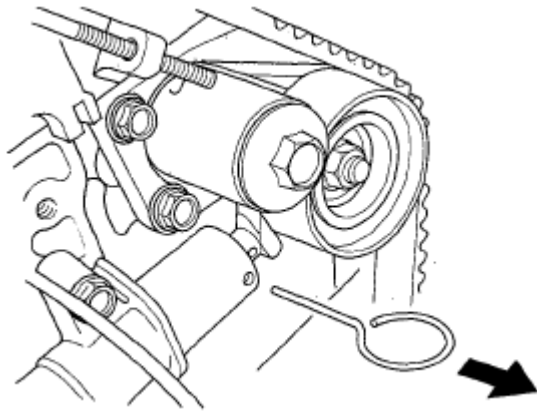


Fig. 61: Identifying Auto-Tensioner Pin
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the battery clamp bolt from the back cover.
16. Install the lower half of the side engine mount bracket.

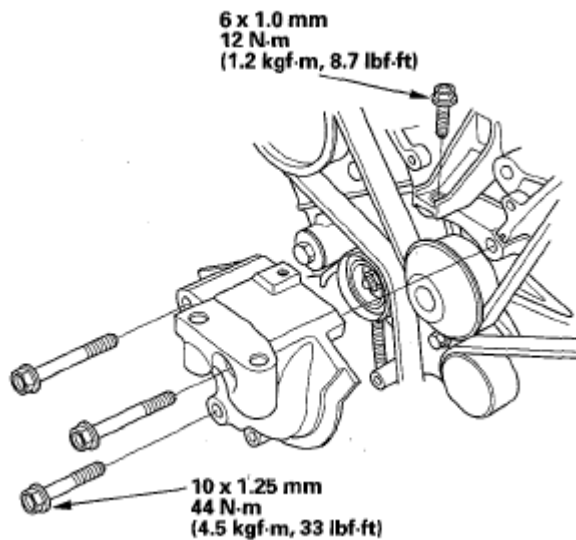


Fig. 62: Identifying Lower Half Of Side Engine Mount Bracket With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Install the timing belt guide plate as shown.

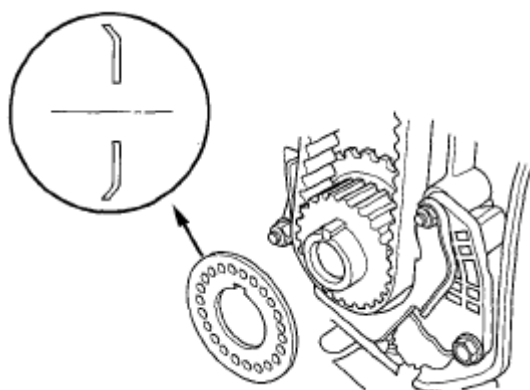


Fig. 63: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the lower cover.

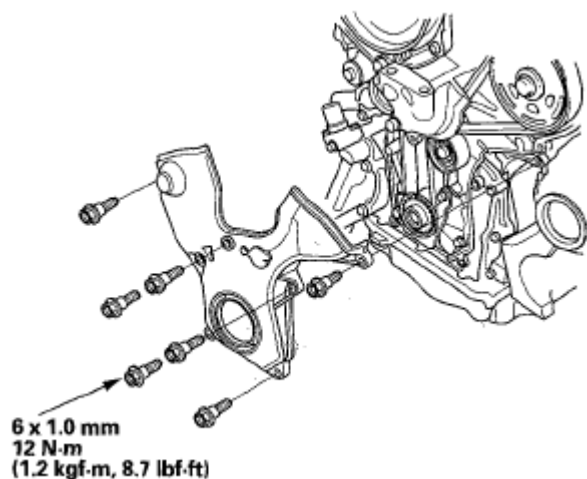


Fig. 64: Identifying Lower Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the front upper cover (A) and the rear upper cover (B).

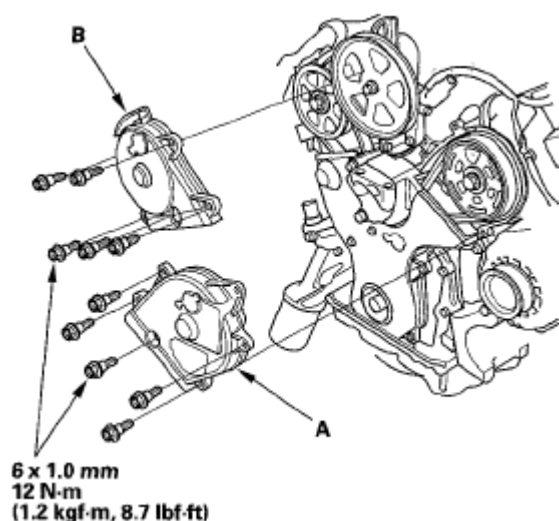


Fig. 65: Identifying Front Upper Cover And Rear Upper Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the crankshaft pulley (see **INSTALLATION**).
21. Rotate the crankshaft pulley six turns clockwise so the timing belt positions itself on the pulleys.
22. Turn the crankshaft pulley so its white mark (A) lines up with the pointer (B).

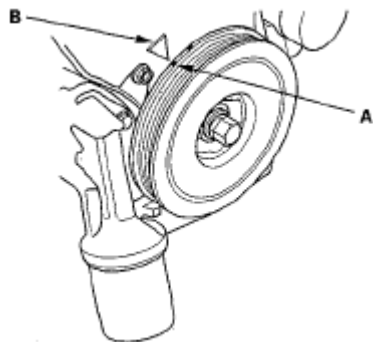


Fig. 66: Identifying Timing Mark On Crankshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Check the camshaft pulley marks.

NOTE: If the marks are not aligned, rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark.

- If the camshaft pulley marks are at TDC, go to step 24.
- If the camshaft pulley marks are not at TDC, remove the timing belt and repeat steps 3 through 22.

FRONT

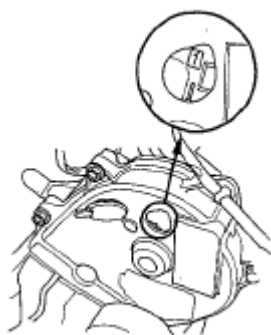


Fig. 67: Identifying Camshaft Pulley Marks - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

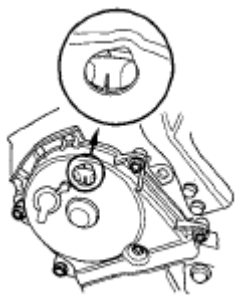


Fig. 68: Identifying Camshaft Pulley Marks - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Install the upper half of the side engine mount bracket, and tighten the new mounting bolts (A), then the mass damper mounting bolt (B).

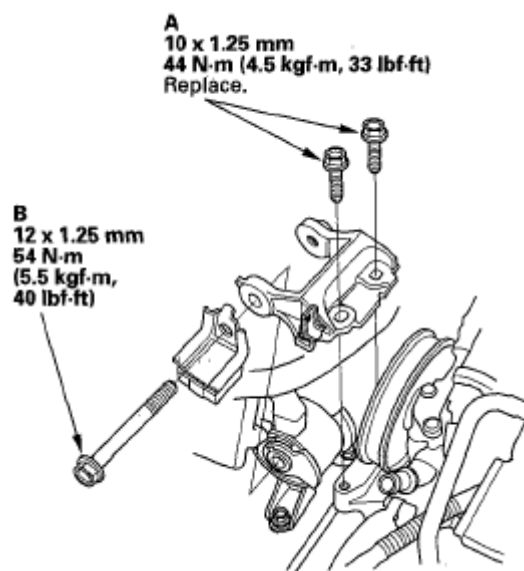
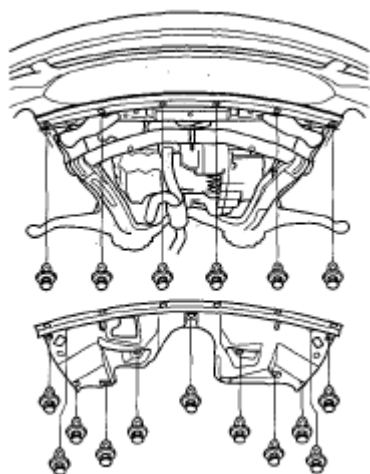


Fig. 69: Identifying Upper Half Of Side Engine Mount Bracket And Mounting Bolts With Torque Specifications**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

25. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
26. Install the splash shield.

**Fig. 70: Identifying Splash Shield And Bolts****Courtesy of AMERICAN HONDA MOTOR CO., INC.**

27. Install the right front wheel.
28. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

TIMING BELT ADJUSTER REPLACEMENT

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Remove the battery clamp bolt from the back cover.
3. Remove the auto-tensioner.
4. Remove the bolt (A), then remove the timing belt adjuster (B) and the collar (C).

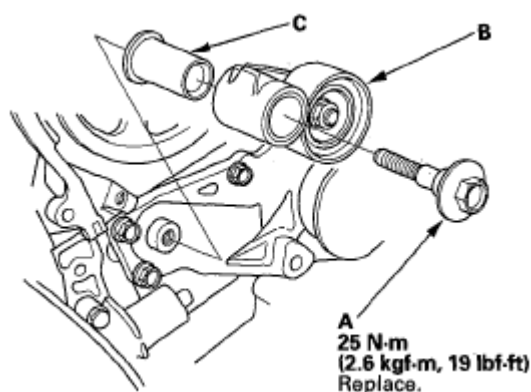


Fig. 71: Identifying Timing Belt Adjuster And Collar With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the timing belt adjuster in the reverse order of removal.
6. Install the timing belt (see **TIMING BELT INSTALLATION**).

TIMING BELT DRIVE PULLEY REPLACEMENT

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Remove the crankshaft position (CKP) sensor (see **CKP SENSOR REPLACEMENT**).
3. Remove the timing belt drive pulley (A) and the key (B).

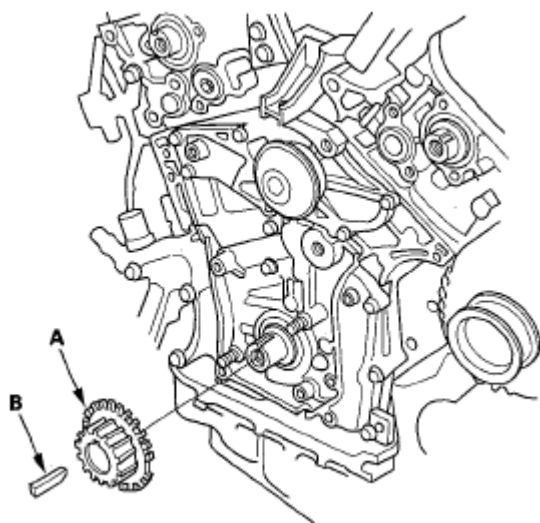


Fig. 72: Identifying Timing Belt Drive Pulley And Key
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Inspect the timing belt pulley and the key for damage. If it is cracked or damaged, replace the timing belt drive pulley.
5. Install the new timing belt drive pulley and the key.
6. Install the CKP sensor (see **CKP SENSOR REPLACEMENT**).

7. Install the timing belt (see **TIMING BELT INSTALLATION**).
8. Do the CKP pattern clear/CKP pattern learn procedure **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

CYLINDER HEAD COVER REMOVAL

1. Remove the intake manifold (see **REMOVAL**).
2. Remove the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
3. Remove the dipstick.

Front Culinder Head Cover

4. Remove the two bolts (A) securing the harness holder, and remove the harness clamp (B).

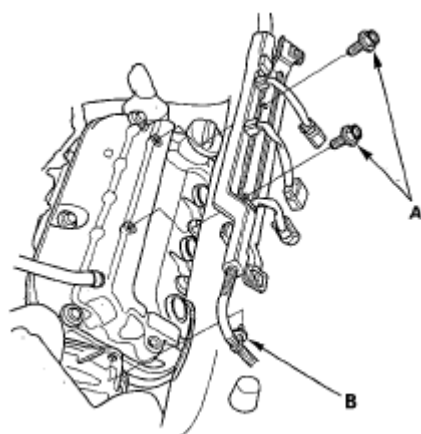


Fig. 73: Identifying Harness Clamp And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rear Culinder Head Cover

5. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
6. Remove the power steering pump (see step 5 **CYLINDER HEAD REMOVAL**) with the hoses connected.
7. Remove the harness holder mounting bolts (A), and the engine ground cable bolt (B).

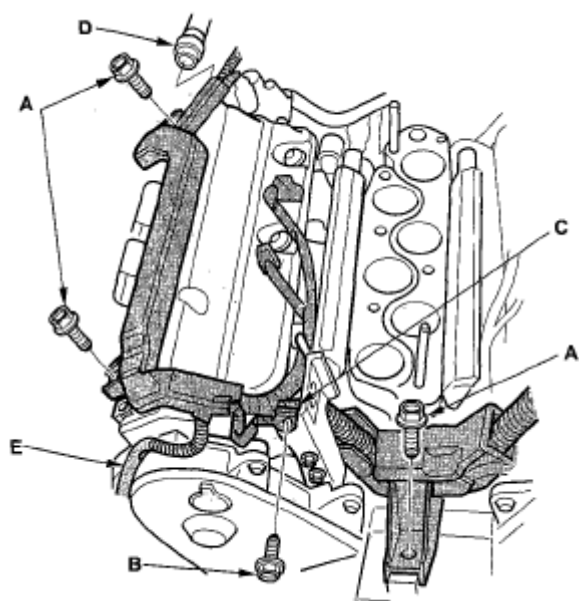


Fig. 74: Identifying Harness Holder Mounting Bolts And Engine Ground Cable Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Disconnect the injector connectors (C) and the two harness clips (D).
9. Remove the engine ground cable (C) and the breather hose (D).
10. Remove the harness (E) from the rear upper cover.
11. Remove the cylinder head cover.

FRONT

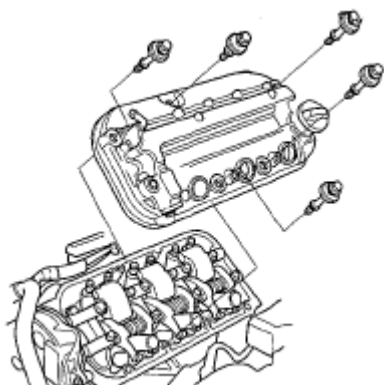


Fig. 75: Identifying Cylinder Head Cover - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

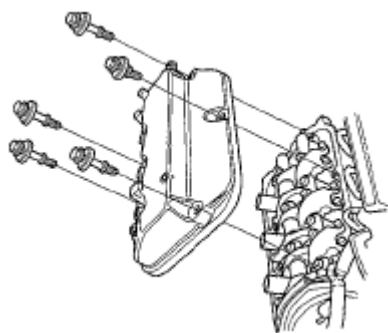


Fig. 76: Identifying Cylinder Head Cover - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HEAD COVER INSTALLATION

1. Check the spark plug seals for damage. If any seal is damaged, replace it.
2. Thoroughly clean the head cover gasket and the groove of the cylinder cover.
3. Install the head cover gasket (A) in the groove of the cylinder head cover (B). Make sure the head cover gasket is seated securely.

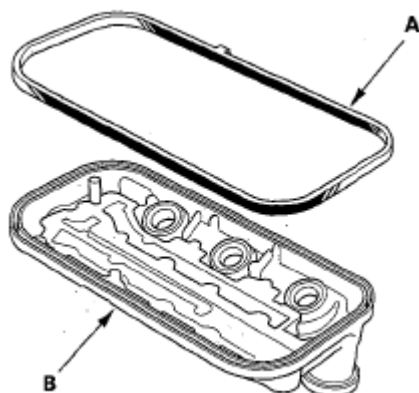


Fig. 77: Identifying Head Cover Gasket And Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Clean the head cover contacting surfaces with a shop towel.
5. Set the spark plug seals (A) on the spark plug tubes, and install the cylinder head cover (B).

FRONT

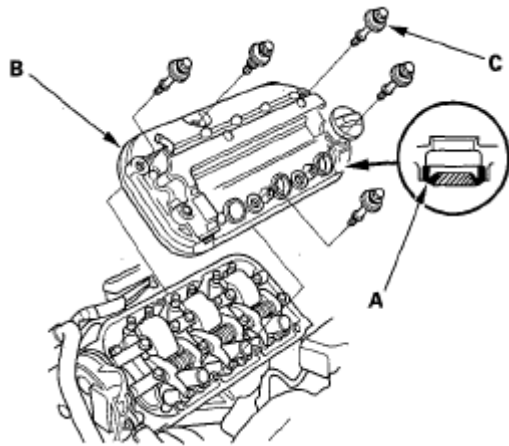


Fig. 78: Identifying Cylinder Head Cover And Spark Plug Seals - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

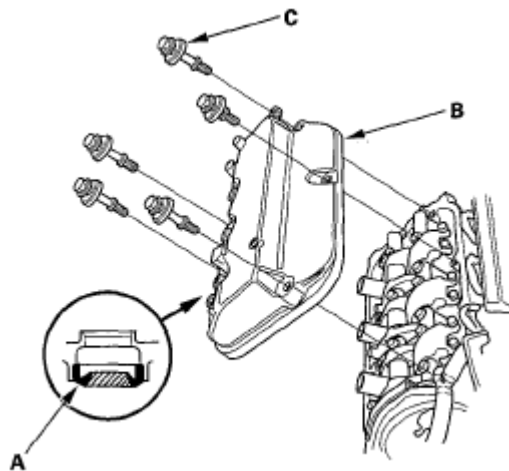


Fig. 79: Identifying Cylinder Head Cover And Spark Plug Seals - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Inspect the spark plug seals for damage.
7. Inspect the cover washers (C). Replace any washer that is damaged or deteriorated.
8. Tighten the bolts in three steps. In the final step tighten all bolts, in sequence, 12 N.m (1.2 kgf.m, 8.7 lbf.ft).

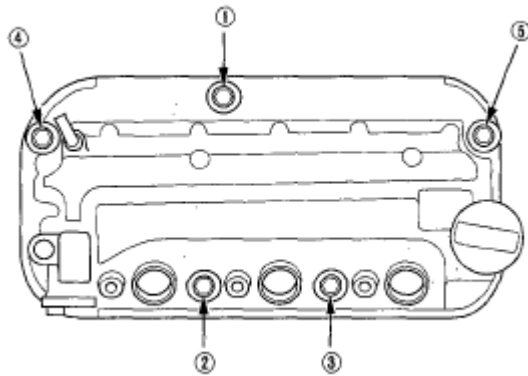


Fig. 80: Identifying Bolts Tightening Sequence Of Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Front Cylinder Head Cover

9. Tighten the two bolts (A) securing the harness holder and install the harness clamp (B).

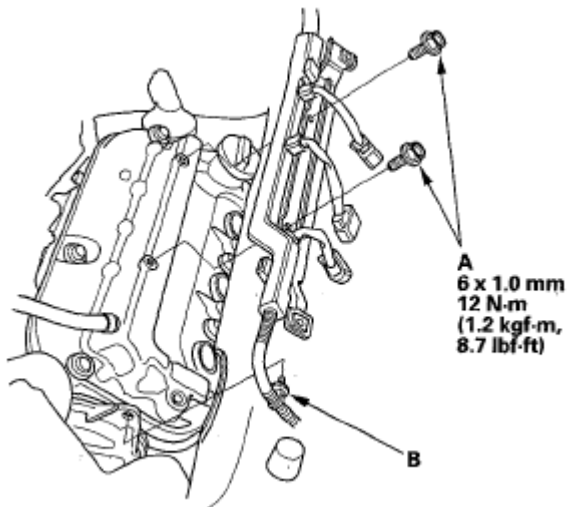


Fig. 81: Identifying Harness Clamp And Bolts With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the dipstick.

Rear Cylinder Head Cover

11. Tighten the harness holder mounting bolts (A).

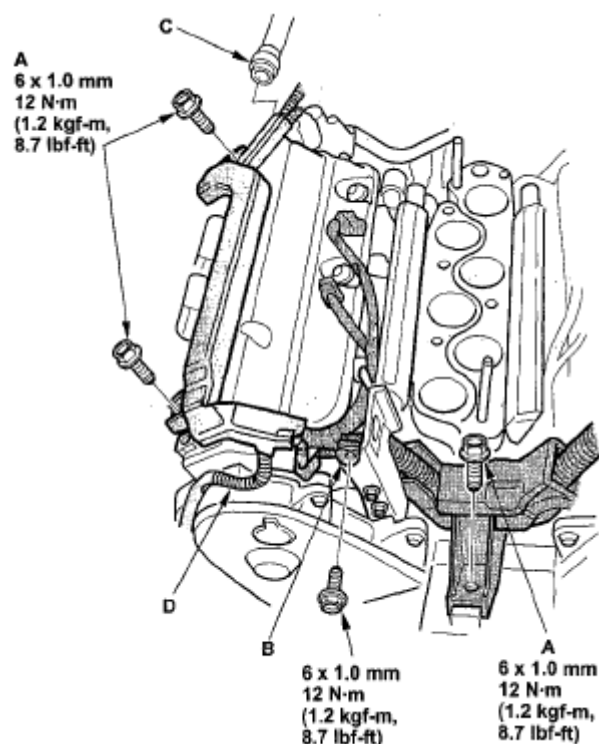


Fig. 82: Identifying Harness Holder Mounting Bolts With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the engine ground cable (B) and the breather hose (C), then install the harness (D) to the upper cover.
13. Reconnect the three injector connectors (E) and the two harness clips (F).
14. Install the power steering pump (P/S) pump and the P/S hose bracket (see **CAMSHAFT OIL SEAL INSTALLATION - IN CAR**).
15. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
16. Install the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
17. Install the intake manifold (see **INSTALLATION**).

CYLINDER HEAD REMOVAL

NOTE:

- Use fender covers to avoid damaging painted surfaces.
- To avoid damaging the wires and terminals, unplug the wiring connectors carefully while holding the connector portion.
- Connect the Honda Diagnostic System (HDS) to the data link connector (DLC), and monitor the engine coolant temperature (ECT). To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 100°F (38°C) before loosening the cylinder head bolts.
- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.

1. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING**).
2. Do the battery terminal disconnection procedure (see).
3. Drain the engine coolant (see **COOLANT CHECK**).
4. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
5. Remove the power steering (P/S) pump (A) and the bolt (B) securing the P/S hose bracket.

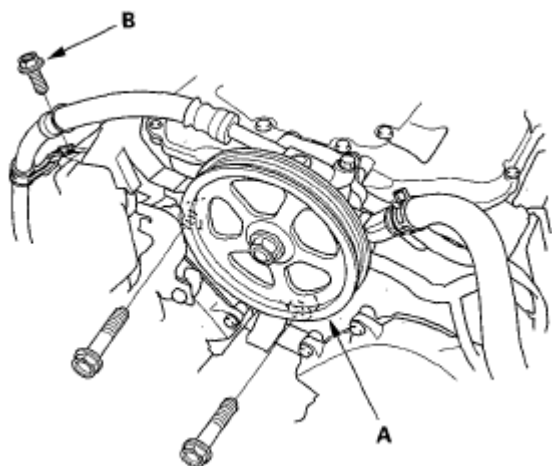


Fig. 83: Identifying Power Steering Pump And Bolt
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the alternator:
 - '07 model (see **REMOVAL ('07 MODEL)**)
 - '08-09 model (see **REMOVAL ('08-09 MODEL)**)
7. Remove the intake manifold (see **REMOVAL**).
8. Remove the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
9. Remove the timing belt (see **TIMING BELT REMOVAL**).
10. Disconnect the following engine wire harness connectors and wire harness clamps from the cylinder head:
 - Six injector connectors
 - Engine coolant temperature (ECT) sensor 1 connector
 - Engine coolant temperature (ECT) sensor 2 connector
 - Camshaft position (CMP) sensor connector
 - Crankshaft position (CKP) sensor connector
 - Exhaust gas recirculation (EGR) valve connector
 - Rocker arm oil control solenoid connector
 - Rocker arm oil pressure switch connector
 - Oil pressure switch connector
 - Two air fuel ratio (A/F) sensor connectors
 - Two secondary heated oxygen sensor (secondary HO2S) connectors

11. Remove the front warm up three way catalytic converter (front WU-TWC) (see **FRONT**) and the rear warm up three way catalytic converter (rear WU-TWC) (see **REAR**).
12. Remove the quick-connect fitting cover (A), then disconnect the fuel feed hose (B) (see **FUEL LINE/QUICK-CONNECT FITTING REMOVAL**).

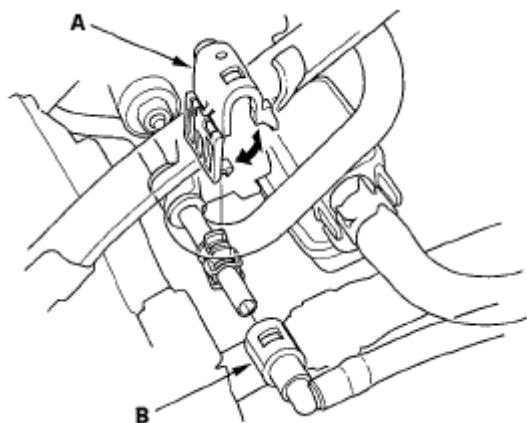


Fig. 84: Identifying Quick-Connect Fitting Cover And Fuel Feed Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the evaporative emission (EVAP) canister purge joint (A) with bracket.

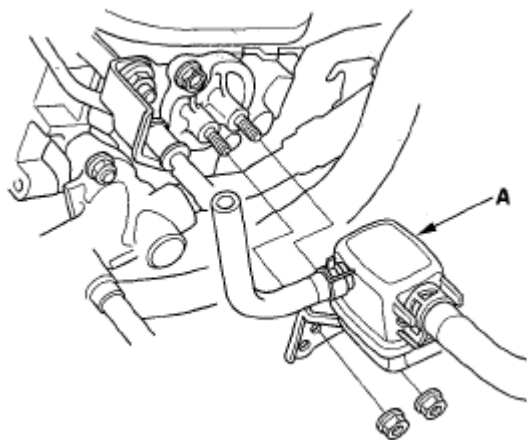


Fig. 85: Identifying Evaporative Emission Canister Purge Joint With Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the connector bracket from the front cylinder head.

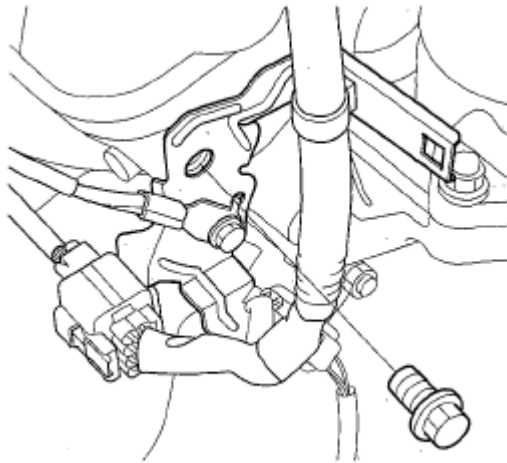


Fig. 86: Identifying Harness Bracket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the harness bracket from the rear cylinder head.

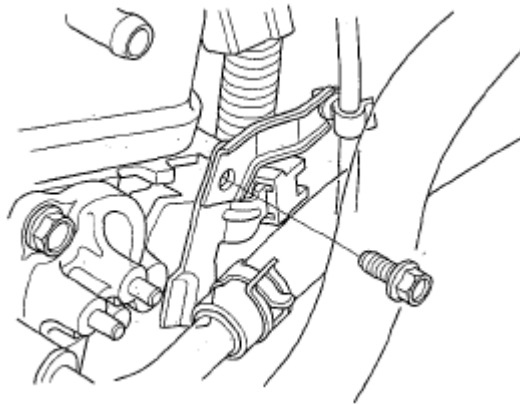


Fig. 87: Identifying Harness Clamp Bracket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Remove the injector base (see **INJECTOR BASE REMOVAL AND INSTALLATION**).
17. Remove the water passage (see **WATER PASSAGE REPLACEMENT**).
18. Remove the front and rear camshaft pulleys (A) and the front and rear back covers (B).

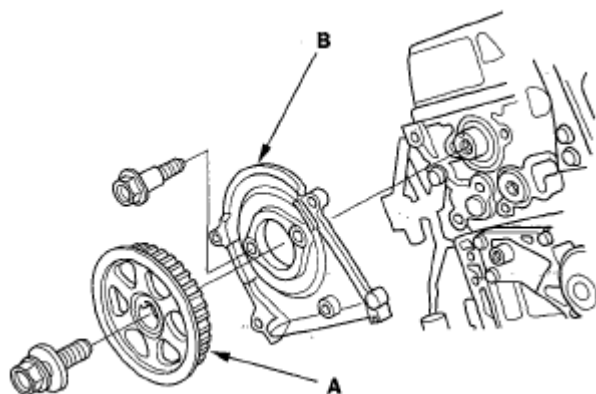


Fig. 88: Identifying Front And Rear Camshaft Pulleys And Front And Rear Back Covers
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Remove the cylinder head covers (see **CYLINDER HEAD COVER REMOVAL**).
20. Remove the cylinder head bolts. To prevent warpage, loosen the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

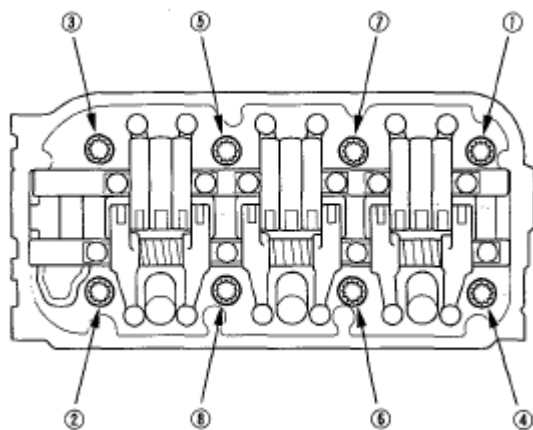


Fig. 89: Identifying Cylinder Head Bolts Removing Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Remove the cylinder heads.

CAMSHAFT REPLACEMENT

Front

1. Do the battery removal procedure (see (see **BATTERY REMOVAL AND INSTALLATION**)).
2. Drain the engine coolant (see **COOLANT CHECK**).
3. Disconnect the upper radiator hose.

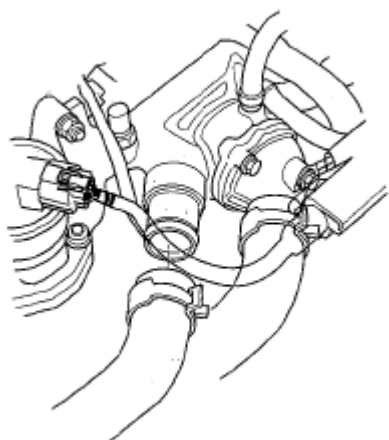


Fig. 90: Identifying Upper Radiator Hose

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the exhaust gas recirculation (EGR) valve (see **EGR VALVE REPLACEMENT**).
5. Remove the stud bolts (A).

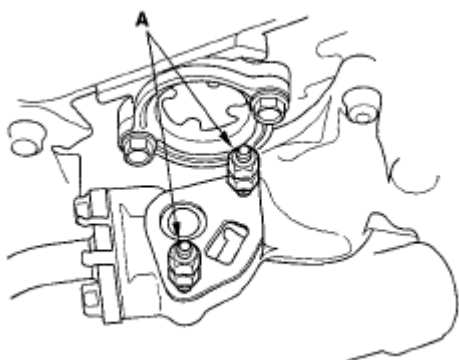


Fig. 91: Identifying Stud Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the timing belt (see **TIMING BELT REMOVAL**).
7. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
8. Remove the front camshaft pulley.
9. Remove the thrust cover (A), then remove the camshaft (B).

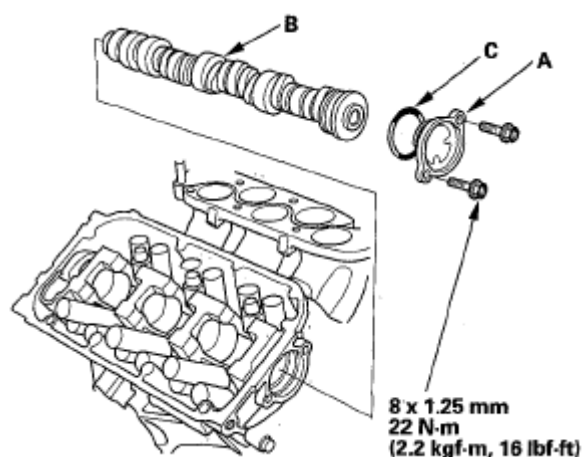


Fig. 92: Identifying Thrust Cover And Camshaft With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the camshaft in the reverse order of removal. Always use a new O-ring (C). Apply new engine oil to the journals and the cam lobes.
11. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the front camshaft pulley (see step 11 **CYLINDER HEAD INSTALLATION**).
12. Install the rocker arm assembly, then tighten the mounting bolts (see step 9 **CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION**).
13. Install the timing belt (see **TIMING BELT INSTALLATION**).
14. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
15. Install the EGR valve stud bolts, then install the EGR valve.
16. Connect the upper radiator hose.
17. Do the battery installation procedure (see **BATTERY REMOVAL AND INSTALLATION**).
18. Fill the radiator with engine coolant and bleed the air out from the system (see step 8 **THERMOSTAT REPLACEMENT**).
19. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

Rear

1. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING**).
2. Remove the air cleaner assembly (see **AIR CLEANER REMOVAL/INSTALLATION**).
3. Remove the quick-connect fitting cover (A), then disconnect the feed hose (B) (see **FUEL LINE/QUICK-CONNECT FITTING REMOVAL**).

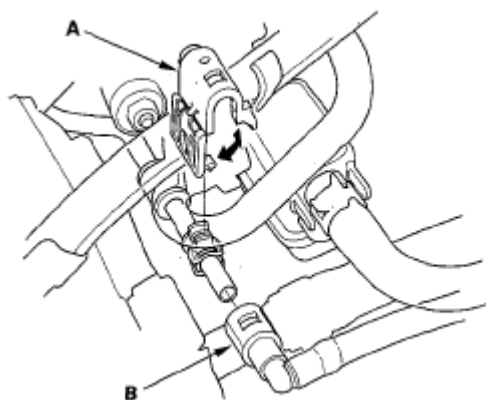


Fig. 93: Identifying Quick-Connect Fitting Cover And Feed Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the brake lines from the master cylinder (see **MASTER CYLINDER REPLACEMENT**).
5. Remove the evaporative emission (EVAP) canister purge joint (A) with bracket.

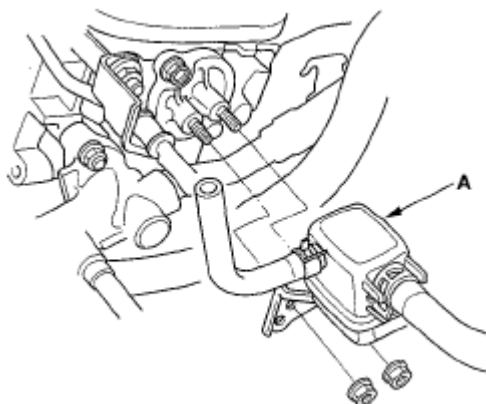


Fig. 94: Identifying Evaporative Emission Canister Purge Joint With Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the timing belt (see **TIMING BELT REMOVAL**).
7. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
8. Remove the rear camshaft pulley.
9. Remove the thrust cover (A), then remove the camshaft (B).

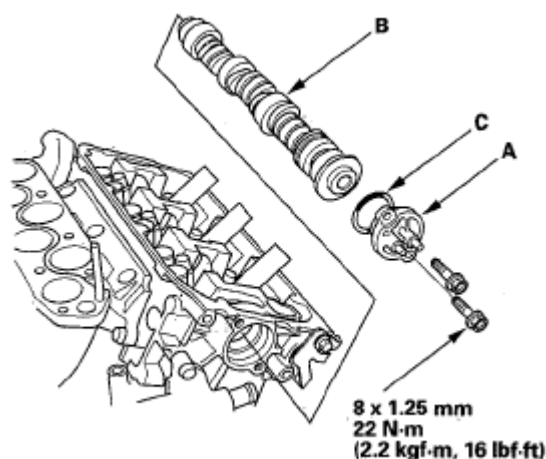


Fig. 95: Identifying Thrust Cover And Camshaft With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the camshaft in the reverse order of removal. Always use a new O-ring (C). Apply new engine oil to the journals and the cam lobes.
11. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the rear camshaft pulley (see step 11 **CYLINDER HEAD INSTALLATION**).
12. Install the rocker arm assembly, then tighten the mounting bolts (see step 9 **CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION**).
13. Install the timing belt (see **TIMING BELT INSTALLATION**).
14. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
15. Install the EVAP canister purge joint with bracket.
16. Install the brake lines (see **MASTER CYLINDER REPLACEMENT**) and do the brake system bleeding procedure (see **BRAKE SYSTEM BLEEDING**).
17. Connect the fuel feed hose (see **FUEL LINE/QUICK-CONNECT FITTING INSTALLATION**), then install the quick-connect fitting cover.
18. Install the air cleaner assembly (see **AIR CLEANER REMOVAL/INSTALLATION**).
19. Inspect for fuel leaks. Turn the ignition switch to ON (II) (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation three times, then check for fuel leakage at any point in the fuel line.
20. Do the CPK pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

CYLINDER HEAD INSPECTION FOR WARPAGE

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
2. Inspect the camshaft (see **CAMSHAFT INSPECTION**).
3. Check the cylinder head for warpage. Measure along the edges, and three ways across the center.
 - 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 the cylinder head.

- Maximum resurface limit is 0.2 mm (0.008 in.) based on a height of 121 mm (4.76 in.).

Cylinder Head Height

Standard (New): 120.95-121.05 mm (4.762-4.766 in.)

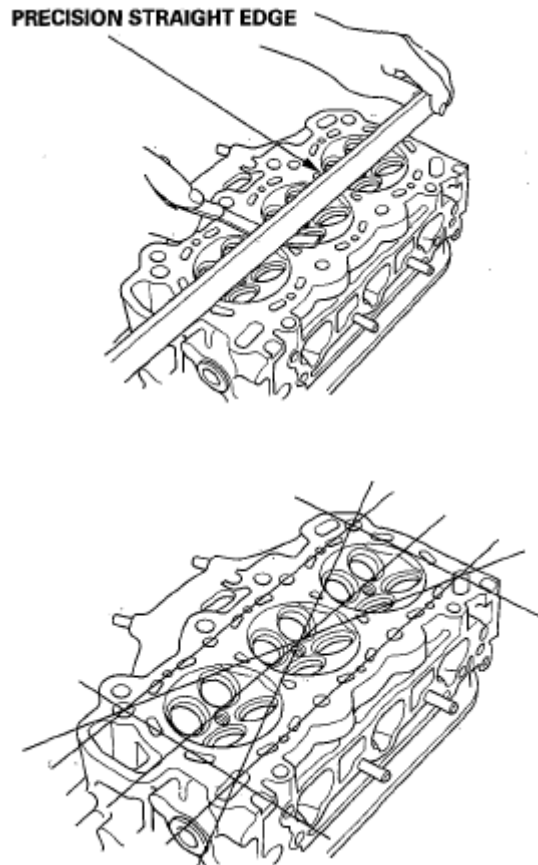
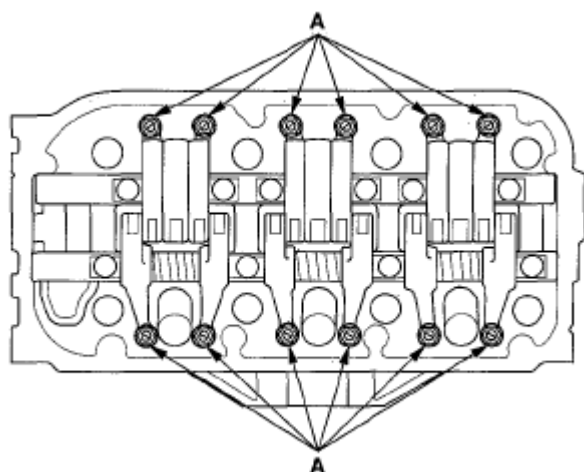


Fig. 96: Identifying Correct Position For Measuring Cylinder Head Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

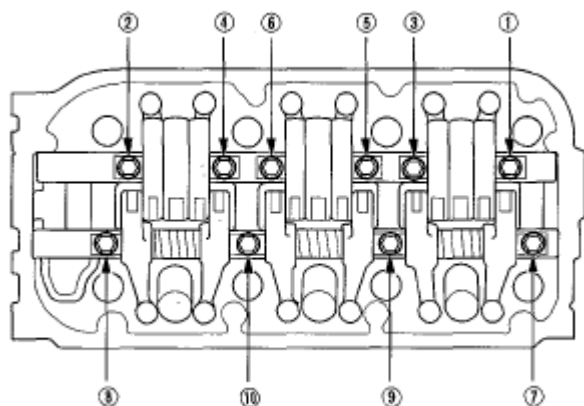
ROCKER ARM ASSEMBLY REMOVAL

1. Remove the intake manifold (see **REMOVAL**).
2. Remove the cylinder head cover (see **CYLINDER HEAD COVER REMOVAL**).
3. Loosen the locknuts and the adjusting screws (A).

**Fig. 97: Identifying Adjusting Screws**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the bolts and the rocker arm assembly.
1. Loosen the rocker shaft mounting bolts in sequence two turns at a time, to prevent damaging the valves or the rocker arm assembly.
2. When removing the rocker arm assembly, do not remove the rocker shaft mounting bolts. The bolts will keep the springs and the rocker arms on the shafts.

**Fig. 98: Identifying Rocker Shaft Mounting Bolts Removing Sequence**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**NOTE:**

- Identify parts as they are removed so they can be reinstalled in their original locations.
- Inspect the rocker shafts and the rocker arms (see **ROCKER ARM AND SHAFT INSPECTION**).
- If reused, the rocker arms must be installed in their original locations.

- When removing or installing the rocker arm assembly, do not remove the rocker shaft mounting bolts. The bolts will keep the springs and the rocker arms on the shaft.
- Bundle the intake rocker arms with rubber bands to keep them together as a set.
- Prior to reassembling, clean all the parts in solvent, dry them and apply new engine oil to any contact points.
- When replacing the intake rocker arm assembly, remove the fastening hardware from the new intake rocker arm assembly.

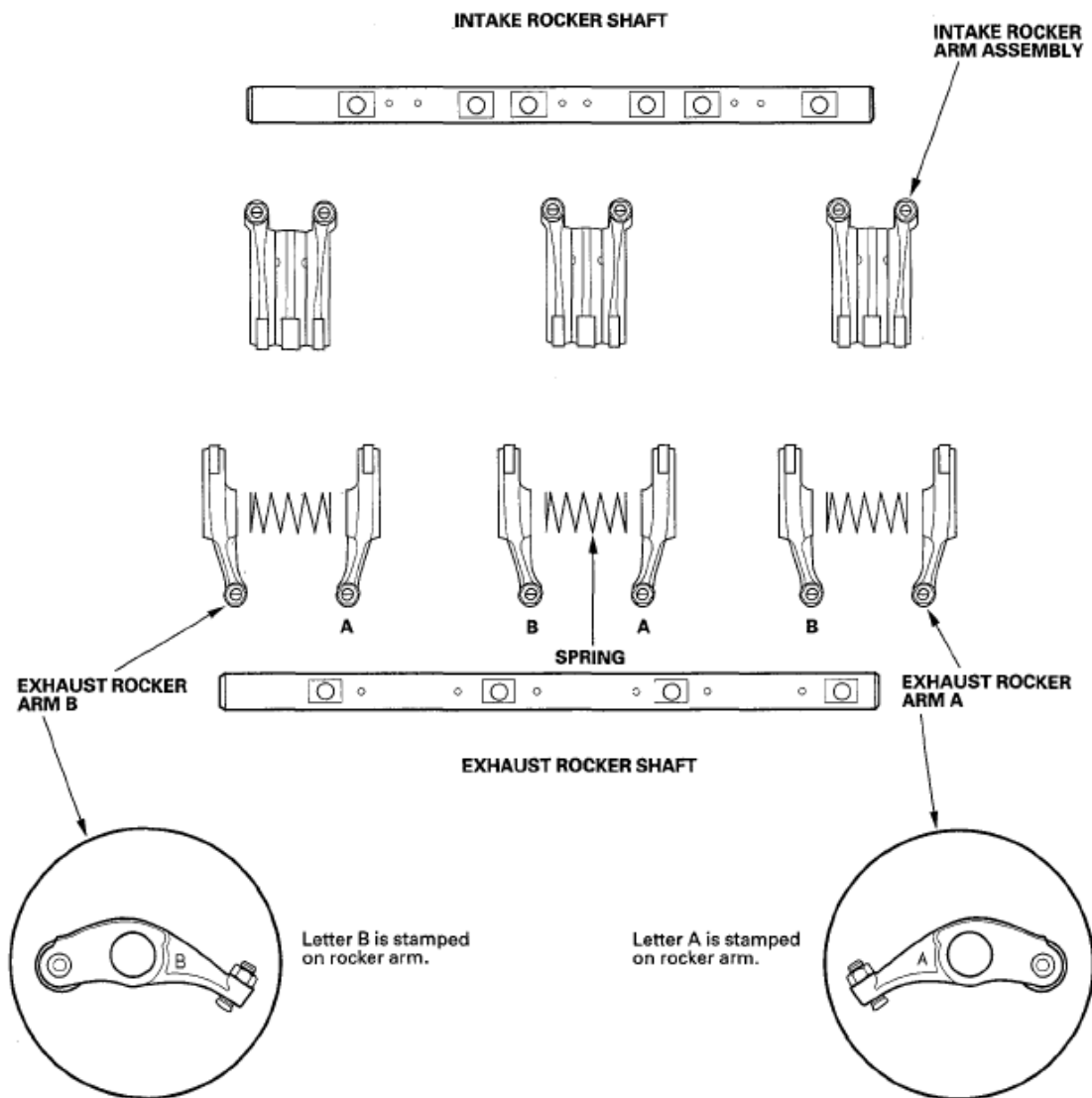


Fig. 99: Identifying Rocker Arm And Shaft Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT INSPECTION

1. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
2. Disassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
3. Measure the diameter of the shaft at the first rocker location.

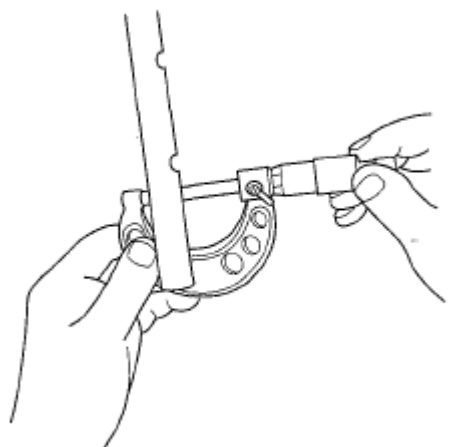


Fig. 100: Identifying Diameter Of Shaft

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Zero the gauge (A) to the shaft diameter.

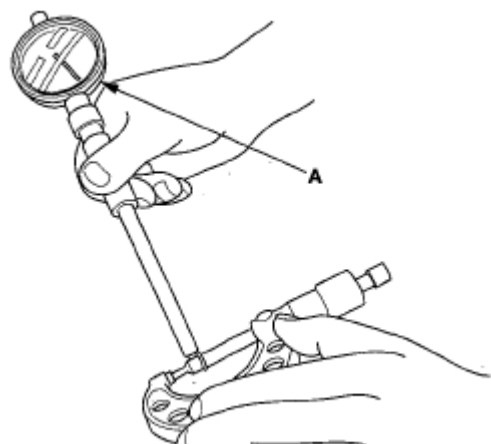


Fig. 101: Identifying Gauge At Zero To Shaft Diameter

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the inside diameter of the rocker arm, and check it for an out-of-round condition.

Intake Rocker Arm-to-Shaft Clearance

Standard (New): 0.026-0.067 mm (0.0010-0.0026 in.)

Service Limit: 0.067 mm (0.0026 in.)

Exhaust Rocker Arm-to-Shaft Clearance

Standard (New): 0.026-0.077 mm (0.0010-0.0030 in.)

Service Limit: 0.077 mm (0.0030 in.)

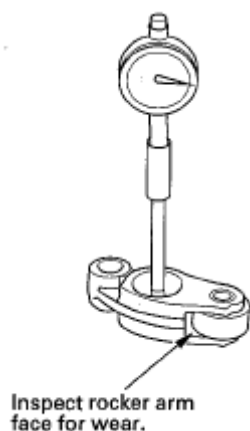


Fig. 102: Identifying Inside Diameter Of Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Repeat for all rockers and both shafts. If the clearance is over the limit, replace the rocker shaft and all over-tolerance rocker arms. If any intake rocker arm needs replacement, replace all three rocker arms in that set (primary, mid, and secondary).

VTEC Rocker Arms

7. Inspect the rocker arm pistons (A). Push them manually. If they do not move smoothly, replace the rocker arm set.

NOTE:

- Apply new engine oil to the rocker arm pistons when reassembling.
- When reassembling the primary rocker arm (B), carefully apply air pressure to the oil passage of the rocker arm.

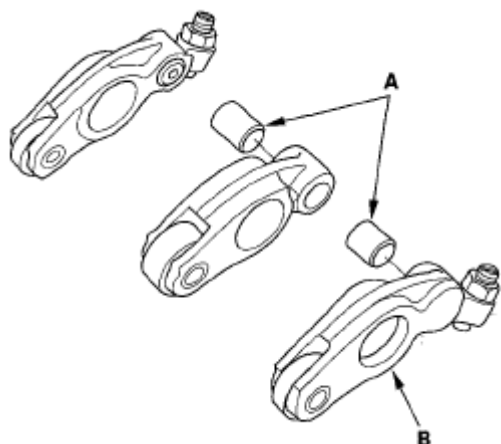


Fig. 103: Identifying Rocker Arm Pistons

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
9. Install the rocker arm assembly (see **CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION**).

CAMSHAFT INSPECTION

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
2. Disassembly the rocker arm assembly (see **Rocker Arm and Shaft Disassembly/Reassembly**).
3. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
4. Put the rocker shafts on the cylinder head, then tighten the bolts to the specified torque.

NOTE: Apply new engine oil to the threads and flange of the exhaust rocker shaft mounting bolts.

Specified Torque

8 x 1.25 mm: 24 N.m (2.4 kgf.m, 17 lbf.ft)

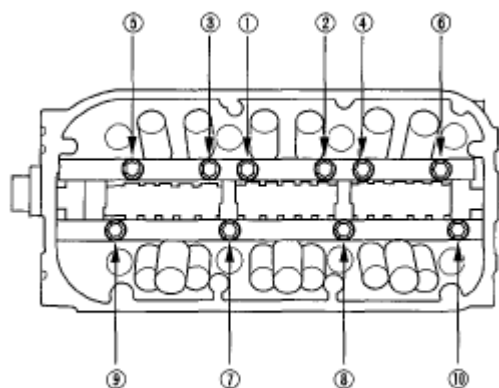


Fig. 104: Identifying Tightening Sequence Of Exhaust Rocker Shaft Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Seat the camshaft by pushing it toward the rear of the cylinder head.
6. Zero the dial indicator against the end of the camshaft. Push the camshaft back and forth and read the end play. If the end play is beyond the service limit, replace the thrust cover and recheck. If it is still beyond the service limit, replace the camshaft.

Camshaft End Play

Standard (New): 0.05-0.20 mm (0.002-0.008 in.)

Service Limit: 0.20 mm (0.008 in.)

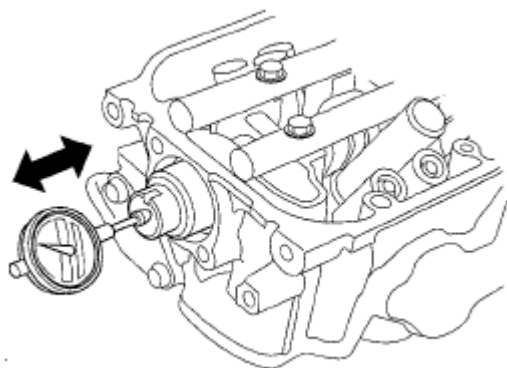


Fig. 105: Identifying Camshaft End Play
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the camshaft thrust cover (A), then pull out the camshaft (B).

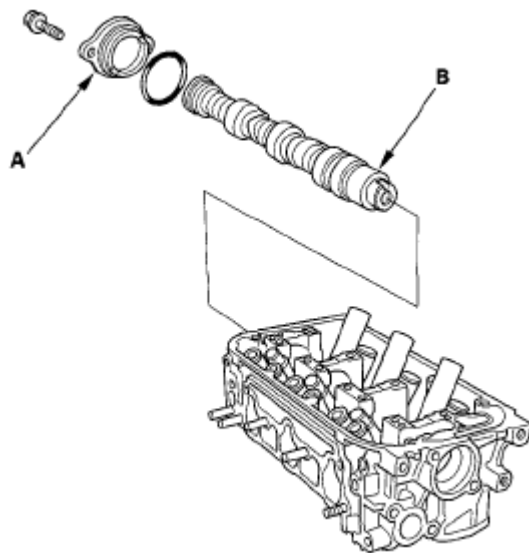


Fig. 106: Identifying Camshaft Thrust Cover And Camshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Wipe the camshaft clean, then inspect the lift ramps. Replace the camshaft if any lobes are pitted, scored, or excessively worn.
9. Measure the diameter of each camshaft journal.

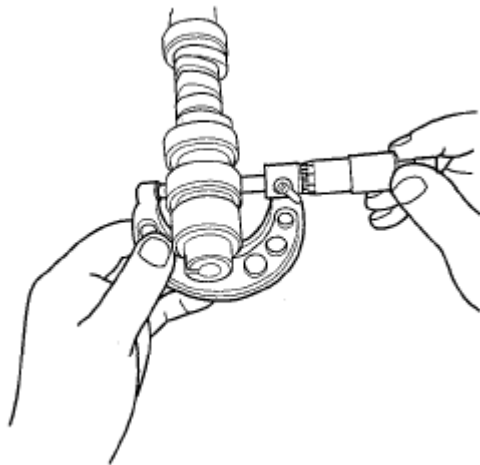


Fig. 107: Identifying Diameter Of Camshaft Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Zero the gauge to the journal diameter.

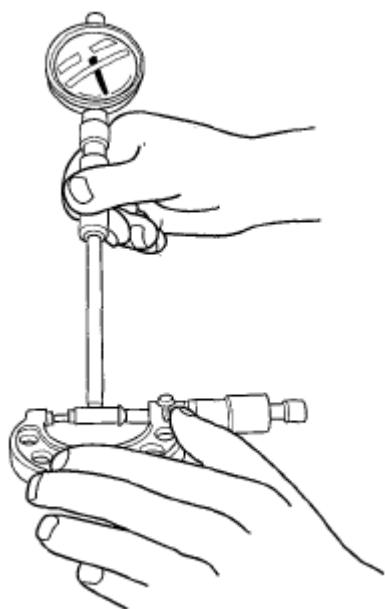


Fig. 108: Identifying Zero Gauge To Journal Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Clean the camshaft bearing surfaces in the cylinder head. Measure the inside diameter of each camshaft bearing surface, and check for an out-of-round condition.
 - If the camshaft-to-holder clearance is within limits, go to step 13.
 - If the camshaft-to-holder clearance is beyond the service limit and the camshaft has been replaced, replace the cylinder head.
 - If the camshaft-to-holder clearance is beyond the service limit and the camshaft has not been replaced, go to step 12.

Camshaft-to-Holder Oil Clearance

Standard (New): 0.050-0.089 mm (0.0020-0.0035 in.)

Service Limit: 0.15 mm (0.006 in.)

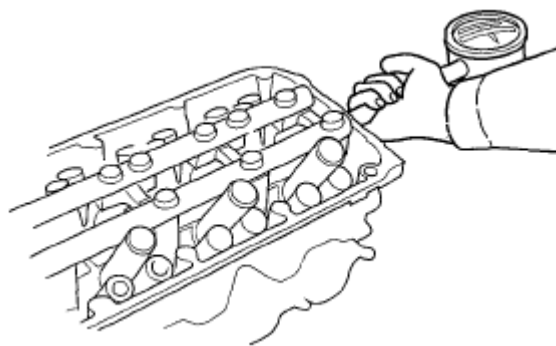


Fig. 109: Identifying Camshaft-To-Holder Oil Clearance

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Check total runout with the camshaft supported on V-blocks.
 - If the total runout of the camshaft is within the service limit, replace the cylinder head.
 - If the total runout is beyond the service limit, replace the camshaft and recheck the oil clearance. If the oil clearance is still out of tolerance, replace the cylinder head.

Camshaft Total Runout

Standard (New): 0.03 mm (0.001 in.) max.

Service Limit: 0.04 mm (0.002 in.)

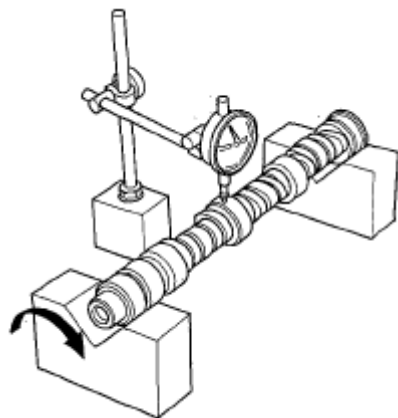


Fig. 110: Identifying Camshaft Total Runout

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Measure cam lobe height.

Cam Lobe Height Standard (New):

CAM LOBE HEIGHT SPECIFICATION

	INTAKE	EXHAUST
PRI	35.041 mm (1.3796 in.)	36.326 mm (1.4302 in.)
MID	36.445 mm (1.4348 in.)	
SEC	35.284 mm (1.3891 in.)	

PRI: Primary

IN: Intake

MID: Mid

EX: Exhaust

SEC: Secondary

T/B: Timing Belt

FRONT

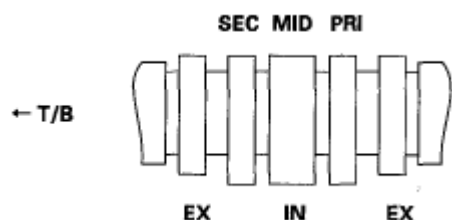


Fig. 111: Identifying Cam Lobe Height - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

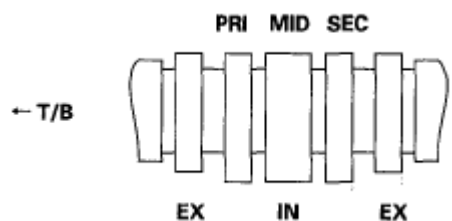


Fig. 112: Identifying Cam Lobe Height - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

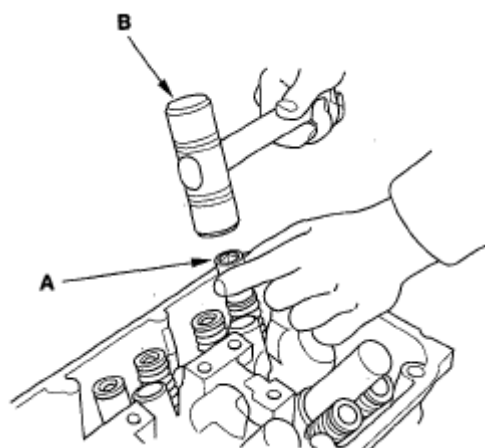
VALVE, SPRING, AND VALVE SEAL REMOVAL

Special Tools Required

Valve spring compressor attachment 07757-PJ1010A

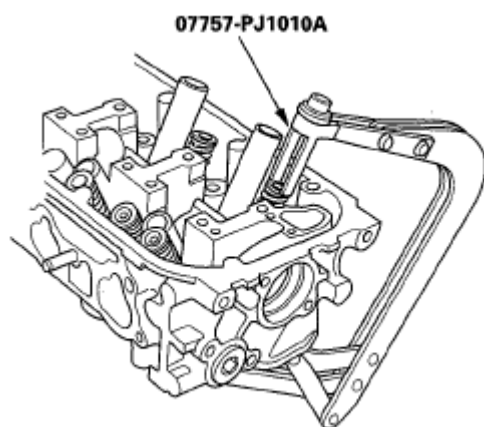
Identify the valves and the valve springs as they are removed so that each item can be reinstalled in its original position.

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
2. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
3. Using an appropriate-sized socket (A) and a plastic mallet (B), lightly tap the spring retainer to loosen the valve cotters.

**Fig. 113: Identifying Spring Retainer**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the valve spring compressor attachment and valve spring compressor. Compress the spring and remove the valve cotter.

**Fig. 114: Identifying Spring**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the valve spring compressor and the valve spring compressor attachment, then remove the spring retainer, the valve spring, and the valve
6. Install the valve guide seal remover (A).

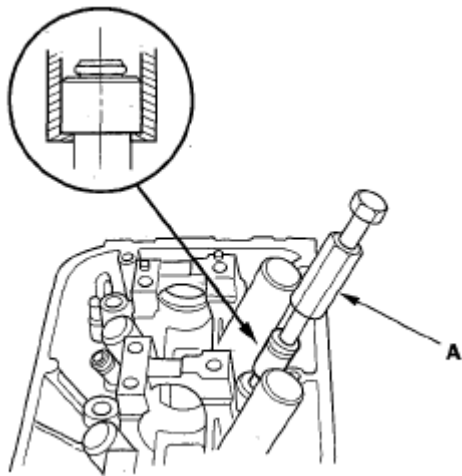


Fig. 115: Identifying Valve Guide Seal Remover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve seal.

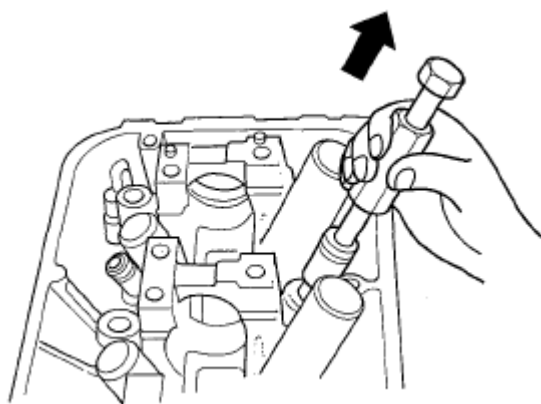


Fig. 116: Identifying Valve Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the valve spring seat .

VALVE INSPECTION

1. Remove the valves (see **VALVE, SPRING, AND VALVE SEAL REMOVAL**).
2. Measure the valve in these areas.

Intake Valve Dimensions

A Standard (New): 34.90-35.10 mm (1.374-1.382 in.)

B Standard (New): 115.70-116.30 mm (4.555-4.579 in.)

C Standard (New): 5.485-5.495 mm (0.2159-0.2163 in.)

C Service Limit: 5.455 mm (0.2148 in.)

Exhaust Valve Dimensions

A Standard (New): 29.90-30.10 mm (1.177-1.185 in.)

B Standard (New): 113.90-114.50 mm (4.484-4.508 in.)

C Standard (New): 5.450-5.460 mm (0.2146-0.2150 in.)

C Service Limit: 5.420 mm (0.2134 in.)

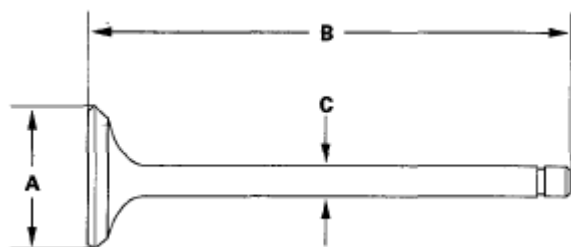


Fig. 117: Identifying Valve Dimension

Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE STEM-TO-GUIDE CLEARANCE INSPECTION

1. Remove the valves (see **VALVE, SPRING, AND VALVE SEAL REMOVAL**).
2. Slide the valve out of its guide about 10 mm (0.39 in.), then measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).
 - If the measurement exceeds the service limit, recheck it using a new valve.
 - If the measurement is now within the service limit, reassemble using a new valve.
 - If the measurement with a new valve still exceeds the service limit, go to step 3.

Intake Valve Stem-to-Guide Clearance

Standard (New): 0.04-0.09 mm (0.002-0.004 in.)

Service Limit: 0.16 mm (0.006 in.)

Exhaust Valve Stem-to-Guide Clearance

Standard (New): 0.11-0.16 mm (0.004-0.006 in.)

Service Limit: 0.22 mm (0.009 in.)

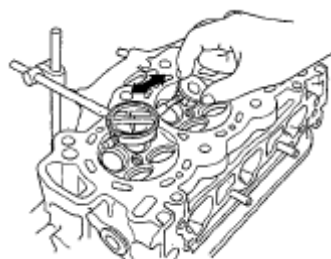


Fig. 118: Identifying Valve Stem-To-Guide Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Subtract the valve stem O.D. (measured with a micrometer) from the valve guide I.D. (measured with an inside micrometer or a ball gauge).

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): 0.020-0.045 mm (0.0008-0.0018 in.)

Service Limit: 0.08 mm (0.003 in.)

Exhaust Valve Stem-to-Guide Clearance

Standard (New): 0.055-0.080 mm (0.0022-0.0031 in.)

Service Limit: 0.11 mm (0.004 in.)

VALVE GUIDE REPLACEMENT

Special Tools Required

- Valve guide driver, 5.5 mm 07742-0010100
 - Valve guide reamer, 5.5 mm 07HAH-PJ7A100
1. Inspect the valve stem-to-guide clearance (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**).
 2. As illustrated, use a commercially available air-impact valve guide driver (A) modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using the valve guide driver and a conventional hammer.

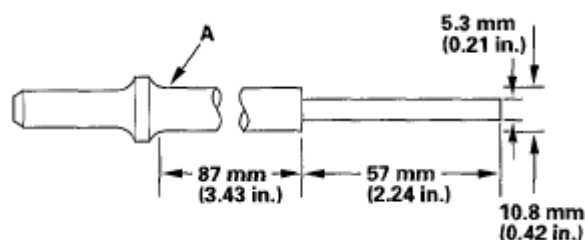


Fig. 119: Identifying Valve Guide Driver Dimension
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Select the proper replacement guides, and chill them in the freezer section of a refrigerator for about an hour.
4. Use a hot plate or oven to evenly heat the cylinder head to 300°F (150°C). Monitor the temperature with a cooking thermometer. Do not get the head hotter than 300°F (150°C); excessive heat may loosen the valve seats.

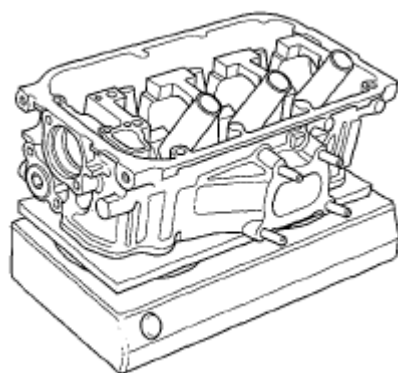


Fig. 120: Identifying Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.1 in.) towards the combustion chamber. This will knock off some of the carbon and make removal easier. Hold the air hammer directly in line with the valve guide to prevent damaging the driver. Wear safety goggles or a face shield.
6. Turn the head over, and drive the guide out toward the camshaft side of the head.

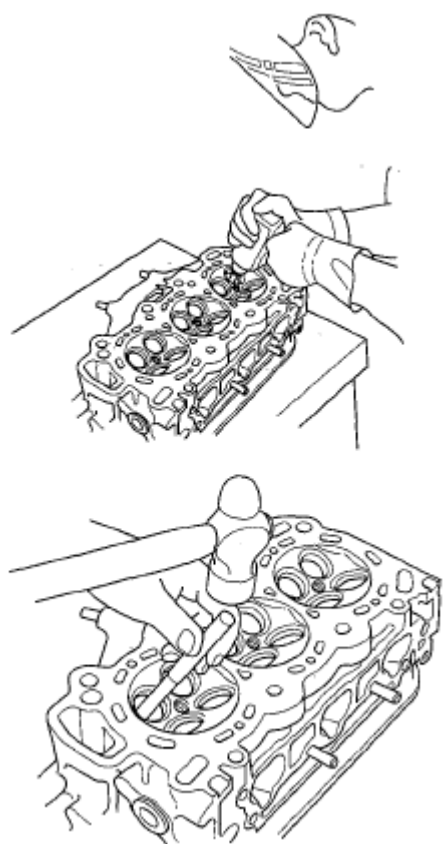


Fig. 121: Identifying Valve Guide

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. If a valve guide still won't move, drill it out with a 8 mm (5/16 in.) bit, then try again.

NOTE: Drill guides only in extreme cases; you could damage the cylinder head if the guide breaks.

8. Take out the new guide(s) from the freezer, one at a time, as you need them.
9. Apply a thin coat of new engine oil to the outside of the new valve guide. Install the guide from the camshaft side of the head; use the valve guide driver to drive the guide to the specified installed height (A) of the guide (B). If you have all 12 guides to do, you may have to reheat the head.

Valve Guide Installed Height

Intake: 21.20-22.20 mm (0.835-0.874 in.)

Exhaust: 20.60-21.60 mm (0.811-0.850 in.)

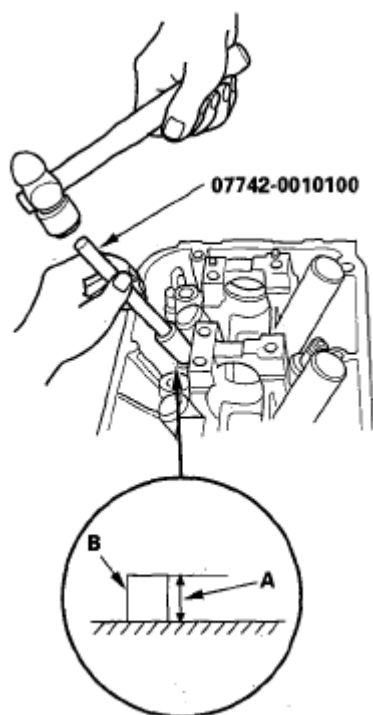


Fig. 122: Identifying Valve Guide Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Coat both the reamer and the valve guide with cutting oil.
11. Rotate the reamer clockwise the full length of the valve guide bore.

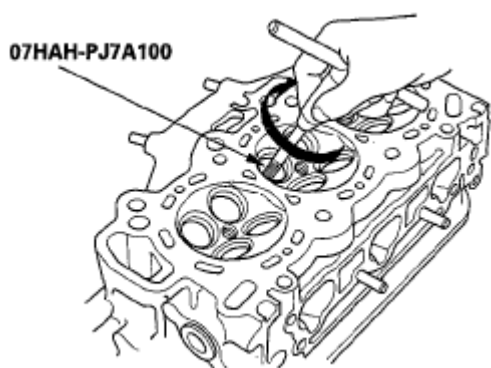
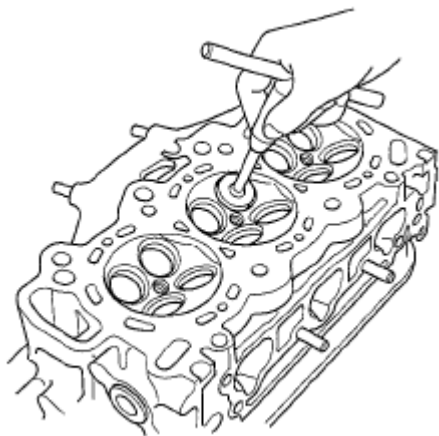


Fig. 123: Identifying Valve Guide
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Continue to rotate the reamer clockwise while drawing it from the bore.
13. Thoroughly wash the guide in detergent and water to remove any cutting residue.
14. Check the clearance with a valve (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**). Verify that a valve slides in the intake and exhaust valve guides without sticking.
15. Inspect the valve seating. If necessary renew the valve seat using a valve seat cutter (see **VALVE SEAT**

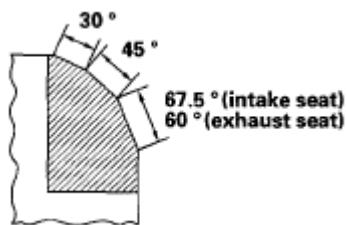
RECONDITIONING).**VALVE SEAT RECONDITIONING**

1. Inspect valve stem-to-guide clearance (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**). If the valve guides are worn, replace them (see **VALVE GUIDE REPLACEMENT**) before cutting the valve seats.
2. Renew the valve seats in the cylinder head using a valve seat cutter.

**Fig. 124: Identifying Valve Seat**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.
4. Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 67.5° cutter (intake seat) or the 60° cutter (exhaust seat). Check the width of the seat and adjust accordingly.

**Fig. 125: Identifying Valve Seat Cutting Angles**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

Valve Seat Width

Standard (New): 1.25-1.55 mm (0.049-0.061 in.)

Service Limit: 2.00 mm (0.079 in.)

6. After resurfacing the seat, inspect it for even valve seating. Apply Prussian Blue compound (A) to the valve face. Insert the valve in its original location in the head, then lift it and snap it closed against the seat several times.

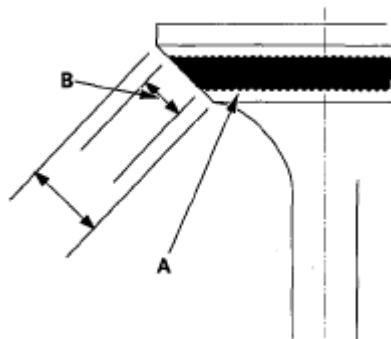


Fig. 126: Identifying Actual Valve Seating Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. The actual valve seating surface (B), 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 67.5° cutter (intake seat) or the 60° cutter (exhaust seat) 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.

8. Insert the intake and exhaust valves in the head, and measure the valve stem installed height (A).

Intake Valve Stem Installed Height

Standard (New): 46.75-47.55 mm (1.841-1.872 in.)

Service Limit: 47.80 mm (1.882 in.)

Exhaust Valve Stem Installed Height

Standard (New): 46.68-47.48 mm (1.838-1.869 in.)

Service Limit: 47.73 mm (1.879 in.)

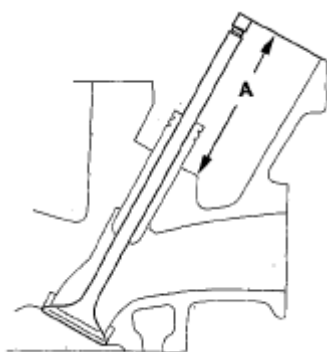


Fig. 127: Identifying Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

VALVE, SPRING, AND VALVE SEAL INSTALLATION

Special Tools Required

- Stem seal driver 07PAD-0010000
 - Valve spring compressor attachment 07757-PJ1010A
1. Coat the valve stems with new engine oil. Install the valves in the valve guides.
 2. Check that the valves move up and down smoothly.
 3. Install the spring seats on the cylinder head.
 4. Install the new valve seals (A) using the stem seal driver (B).

NOTE: Exhaust valve seals (C) have a black spring (D) and intake valve seals (E) have a white spring (F); they are not interchangeable.

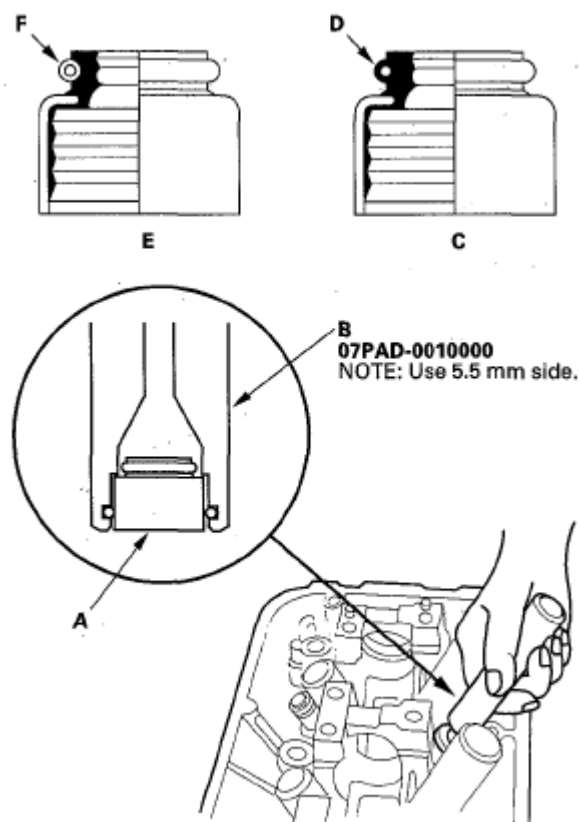


Fig. 128: Identifying Valve Seals Using Stem Seal Driver
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the valve spring and the spring retainer. Place the end of the valve spring with closely wound coils toward the cylinder head.
6. Install the valve spring compressor attachment and the valve spring compressor. Compress the spring and install the valve cotters.

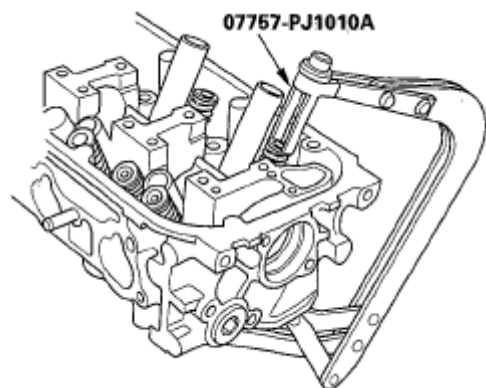


Fig. 129: Identifying Valve Cotters
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve spring compressor and the valve spring compressor attachment.

8. Lightly tap the end of each valve stem two or three times with a plastic mallet (A) to ensure proper seating of the valve and valve cotters. Tap the valve stem only along its axis so you do not bend the stem.



Fig. 130: Identifying End Of Valve Stem

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION

1. Apply a light coat of new engine oil around the camshaft oil seal.
2. Gently tap the new camshaft oil seal (A) into the cylinder head.
 1. Tap the camshaft oil seal in squarely.
 2. Install the oil seal about 0.5-1.5 mm (0.02-0.06 in.) below the surface of the cylinder head.

FRONT

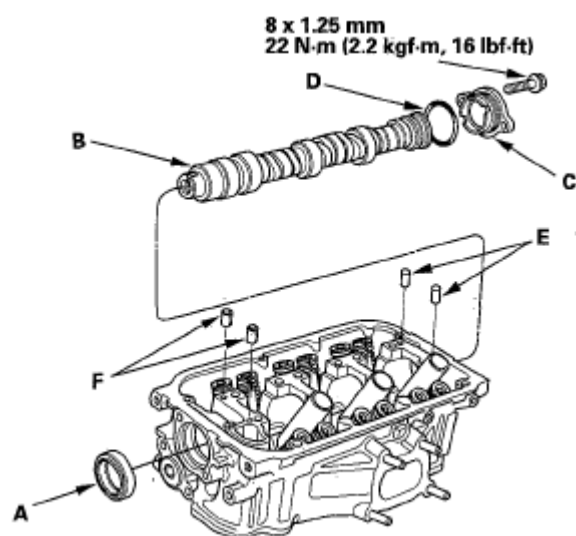


Fig. 131: Identifying Camshaft, Rocker Arm Assembly, Camshaft Seal And Pulley - Front With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

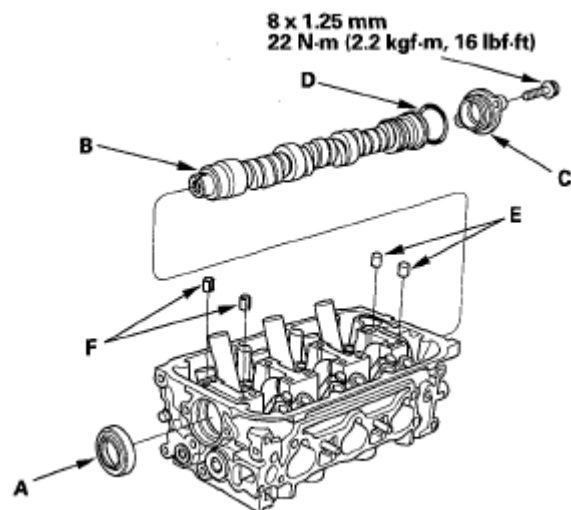


Fig. 132: Identifying Camshaft, Rocker Arm Assembly, Camshaft Seal And Pulley - Rear With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Insert the camshaft (B) into the cylinder head, then install the camshaft thrust cover (C). Always use a new O-ring (D). Apply new engine oil to the journals and cam lobes.
4. Check that the oil seal lips are not distorted.
5. Install the solid dowel pins (E) and the hollow dowel pins (F).
6. Loosen the valve adjusting screws.
7. If the rocker arm assembly is disassembled, reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
8. Set the rocker arm assembly in place, and loosely install the bolts. Make sure the rocker arms are properly positioned on the valve stems.
9. Tighten each bolt two turns at a time in the sequence shown to ensure that the rockers do not bind on the valves.

NOTE: Apply new engine oil to the threads and flange of the exhaust rocker shaft mounting bolts.

Specified Torque

8 x 1.25 mm: 24 N.m (2.4 kgf.m, 17 lbf.ft)

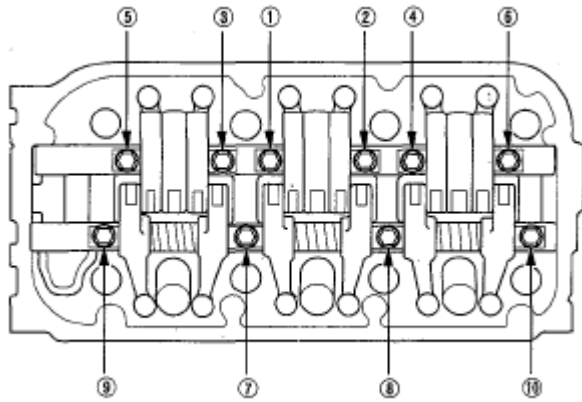


Fig. 133: Identifying Tightening Sequence Of Exhaust Rocker Shaft Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the injector base (A). Always use a new gasket (B).

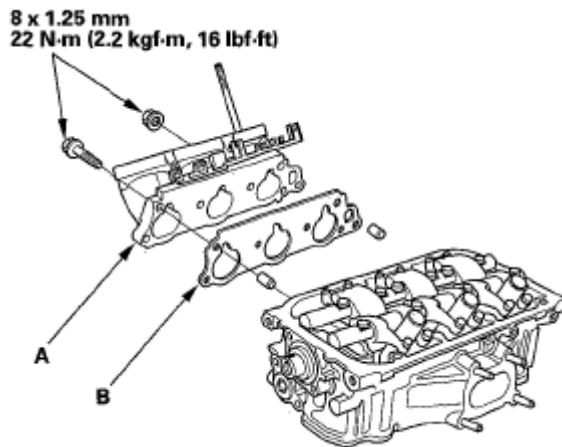


Fig. 134: Identifying Injector Base And Gasket With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Apply new engine oil to the threads of the camshaft pulley mounting bolt (A). Install the back cover (B), then install the camshaft pulley (C).

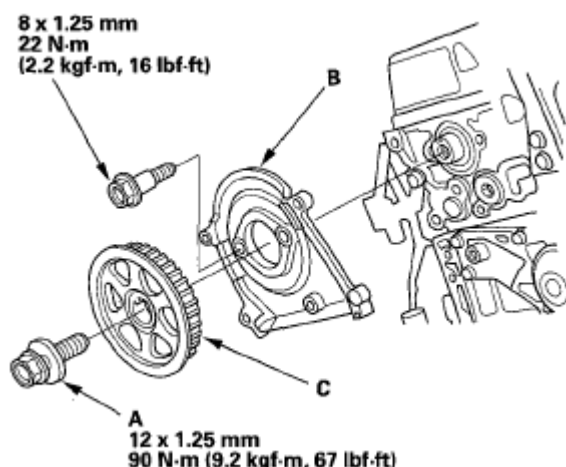


Fig. 135: Identifying Camshaft Pulley Mounting Bolt, Back Cover And Camshaft Pulley With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Set the camshaft pulleys to top dead center (TDC) before bolting them onto the engine block (see step 6 **CYLINDER HEAD INSTALLATION**).

CYLINDER HEAD INSTALLATION

1. Clean the cylinder head and the engine block surface.
2. Clean and install the oil control orifices (A) with new O-rings (B).

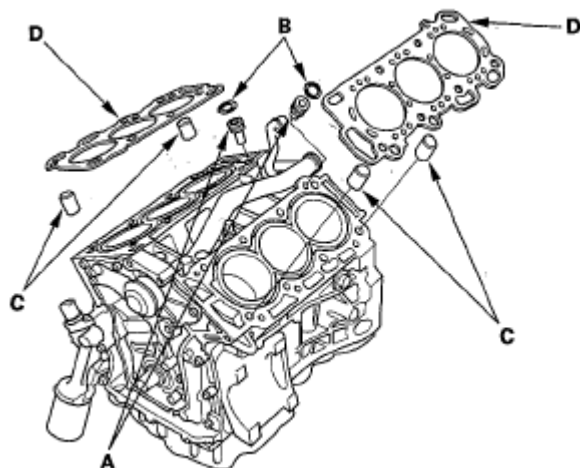


Fig. 136: Identifying Oil Control Orifices And Dowel Pins

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the dowel pins (C) and the new cylinder head gaskets (D).
4. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
5. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.

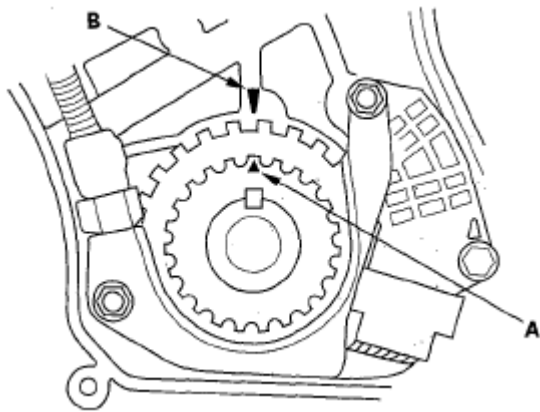


Fig. 137: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

FRONT

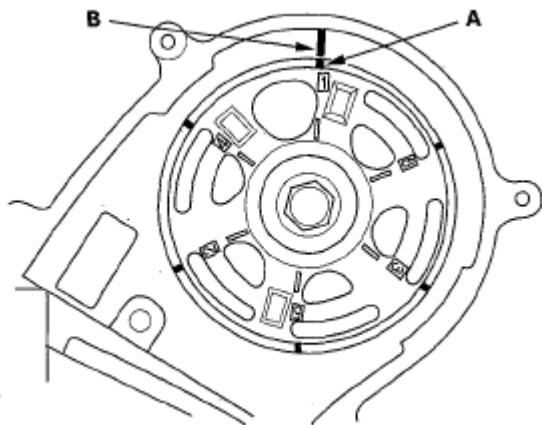


Fig. 138: Identifying TDC Marks On Camshaft Pulleys - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

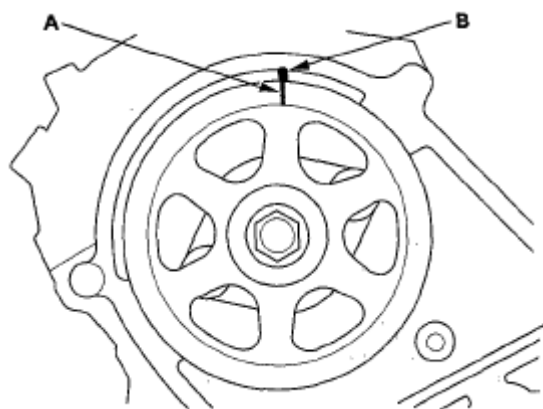


Fig. 139: Identifying TDC Marks On Camshaft Pulleys - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install the cylinder head onto the engine block.
8. Measure the diameter of each cylinder head bolt at point A and point B.

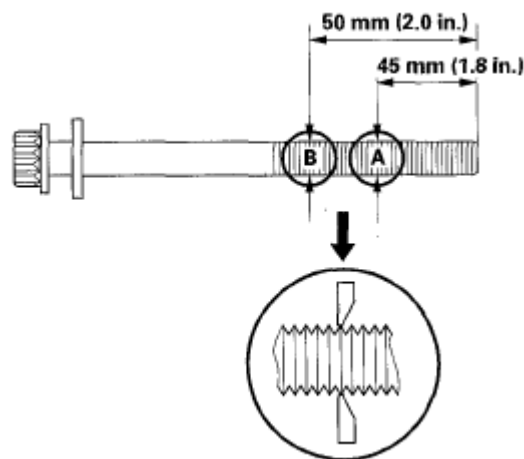


Fig. 140: Identifying Diameter Of Cylinder Head Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. If either diameter is less than 11.3 mm (0.44 in.), replace the cylinder head bolt.
10. Apply new engine oil to the threads and under the bolt heads of all cylinder head bolts.
11. Tighten the cylinder head bolts in sequence to 29 N.m (3.0 kgf.m, 22 lbf.ft). Using a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and do not overtighten. If a bolt makes any noise while you are torquing it, loosen the bolt and retorque it from the first step.

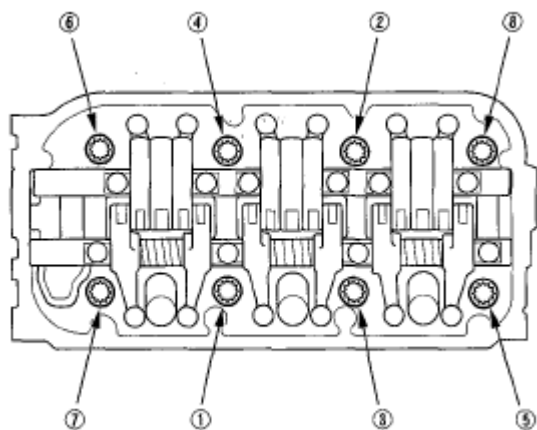


Fig. 141: Identifying Tightening Sequence Of Cylinder Head Bolts
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. After torquing, tighten all cylinder head bolts in two steps (90° per step). If you are using a new cylinder head bolt, tighten the bolt an extra 90°.

NOTE: Remove the cylinder head bolt if you tightened it beyond the specified angle, and go back to step 8 of the procedure. Do not loosen it back to the specified angle.

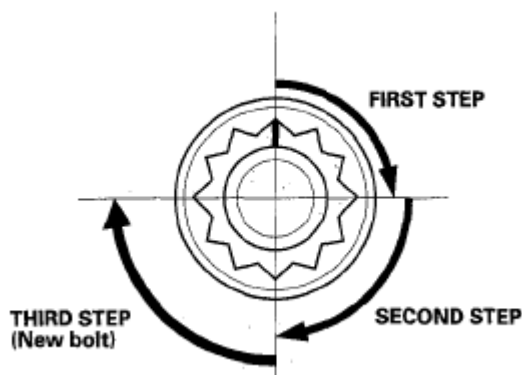


Fig. 142: Identifying Cylinder Head Bolts Tightening Steps
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the timing belt (see **TIMING BELT INSTALLATION**).
14. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
15. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**).
16. Install the water passage (see **WATER PASSAGE REPLACEMENT**).
17. Install the injector bases **INJECTOR BASE REMOVAL AND INSTALLATION**).
18. Install the connector bracket to the front cylinder head.

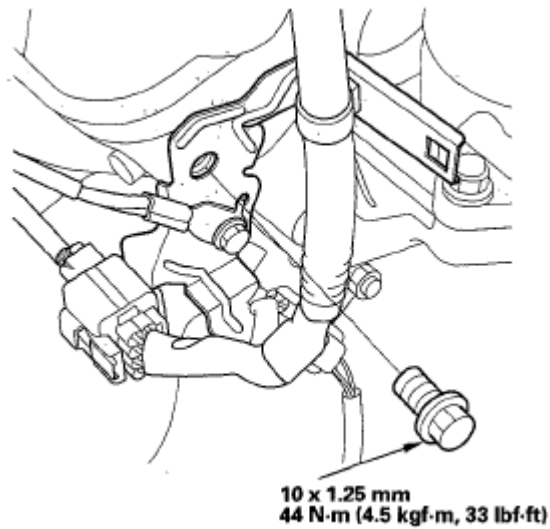


Fig. 143: Identifying Connector Bracket Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the harness clamp bracket to the rear cylinder head.

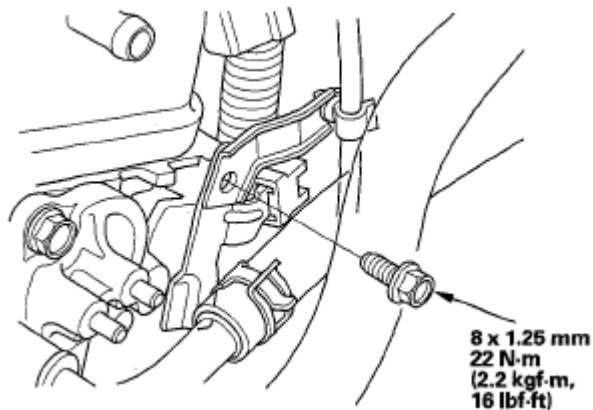


Fig. 144: Identifying Harness Clamp Bracket Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the evaporative emission (EVAP) canister purge joint (A) with bracket

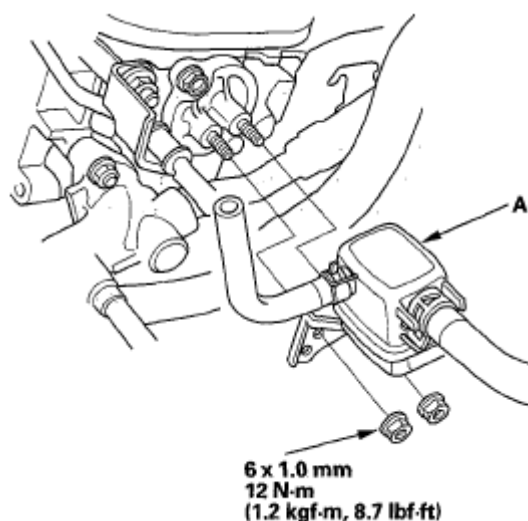


Fig. 145: Identifying Evaporative Emission With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Connect the fuel feed hose (A) (see **FUEL LINE/QUICK-CONNECT FITTING INSTALLATION**), then install the quick-connect fitting cover (B).

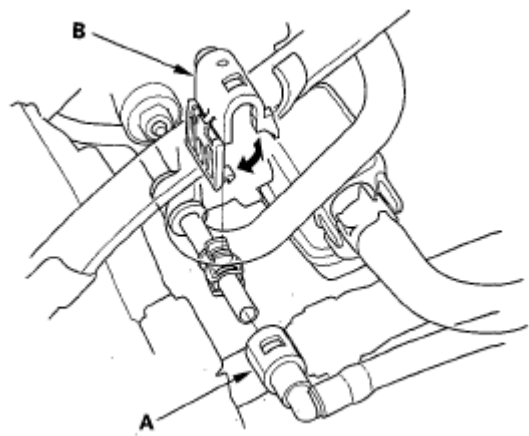


Fig. 146: Identifying Fuel Feed Hose And Quick-Connect Fitting Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Install the front warm up three way catalytic converter (front WU-TWC) (see **FRONT**) and the rear warm up three way catalytic converter (rear WU-TWC) (see **REAR**).
23. Connect the following engine wire harness connectors, and install the wire harness clamps to the cylinder head:
- Six injector connector
 - Engine coolant temperature (ECT) sensor 1 connector
 - Engine coolant temperature (ECT) sensor 2 connector
 - Camshaft position (CMP) sensor connector
 - Crankshaft position (CKP) sensor connector

- Exhaust gas recirculation (EGR) valve connector
 - Rocker arm oil control solenoid connector
 - Rocker arm oil pressure switch connector
 - Oil pressure switch connector
 - Two air fuel ratio (A/F) sensor connectors
 - Two secondary heated oxygen sensor (secondary HO2S) connectors
24. Install the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
 25. Install the intake manifold (see **INSTALLATION**).
 26. Install the alternator:
 - '07 model (see **INSTALLATION ('07 MODEL)**)
 - '08-09 model (see **INSTALLATION ('08-09 MODEL)**)
 27. Install the power steering (P/S) pump (A) and the power steering hose bracket (B).

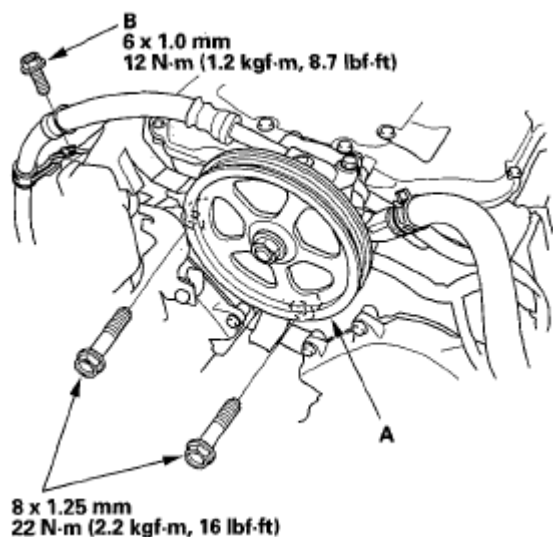


Fig. 147: Identifying Power Steering Pump And Power Steering Hose Bracket With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

28. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
29. Do the battery terminal reconnection procedure (see **BATTERY TERMINAL DISCONNECTION AND RECONNECTION**).
30. After installation, check that all tubes, hoses and connectors are installed correctly.
31. Inspect for fuel leaks. Turn the ignition switch to ON (II) (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation three times, then check for fuel leakage at any point in the fuel line.
32. Refill the radiator with engine coolant, and bleed air from the cooling system with the heater valve open (see step 8 **THERMOSTAT REPLACEMENT**).
33. Do the powertrain control module (PCM) idle learn procedure (see **PCM IDLE LEARN**).

PROCEDURE).

34. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).
35. Inspect the idle speed (see **IDLE SPEED INSPECTION**).
36. Inspect the ignition timing (see **IGNITION TIMING INSPECTION**).

CAMSHAFT OIL SEAL INSTALLATION - IN CAR**Special Tools Required**

Camshaft oil seal driver 07GAF-SD40330

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Remove the camshaft pulley and back cover (see step 18 **CAMSHAFT REPLACEMENT**).
3. Remove the camshaft oil seal.
4. Dry the camshaft oil seal housing.
5. Apply a light coat of multipurpose grease to the lip of the camshaft oil seal.
6. Using the camshaft oil seal driver (A), a washer (B), and a 12 x 75 x 1.25 mm bolt (C), press in the camshaft oil seal (D) about 0.5-1.5 mm (0.02-0.06 in.) below the surface of the cylinder head.

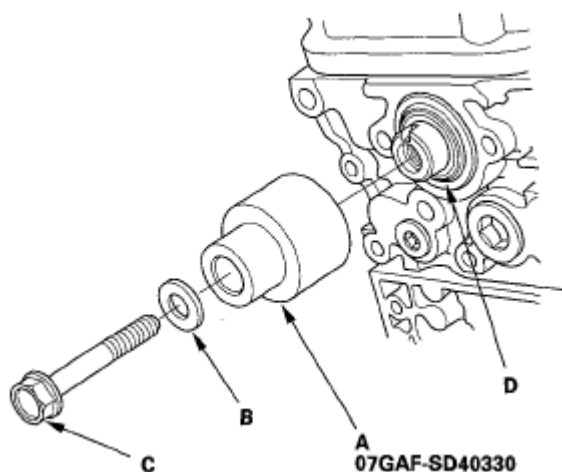


Fig. 148: Identifying Camshaft Oil Seal Driver And Camshaft Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Apply new engine oil to the threads of the camshaft pulley mounting bolt. Install the back cover, then install the camshaft pulley (see step 11 **CYLINDER HEAD INSTALLATION**).
8. Install the timing belt (see **TIMING BELT INSTALLATION**).

SEALING BOLT INSTALLATION

NOTE: When installing the sealing bolt (A), always use a new washer (B).

FRONT

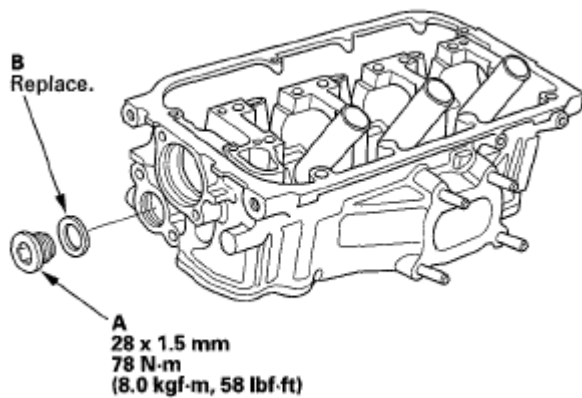


Fig. 149: Identifying Sealing Bolt - Front With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

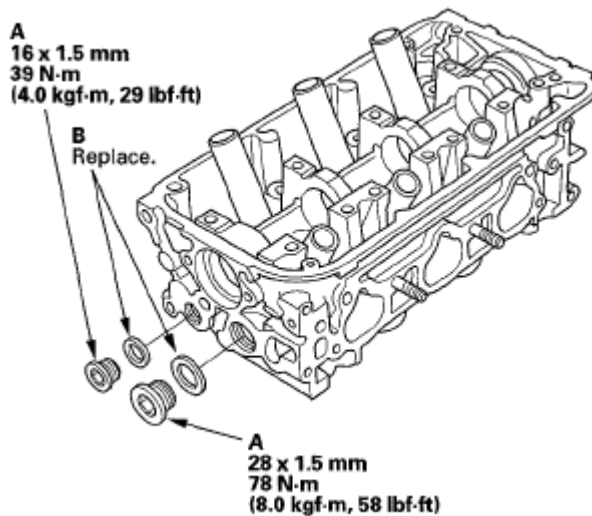


Fig. 150: Identifying Sealing Bolt - Rear With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HEAD ('07 MODEL J35A7 ENGINE)

SPECIAL TOOLS

2010 Honda Odyssey EX

2007-10 ENGINE Cylinder Head - Odyssey

Ref. No.	Tool Number	Description	Qty
①	07AAJ-PNAA101	Air Pressure Regulator	1
②	07AAJ-RYPA100	VCM Air Adapter	1
③	07GAF-SD40330	Camshaft Oil Seal Driver	1
④	07HAH-PJ7A100	Valve Guide Reamer, 5.5 mm	1
⑤	07JAA-001020A	Socket, 19 mm	1
⑥	07JAB-001020B	Holder Handle	1
⑦	07MAB-PY3010A	Holder Attachment, 50 mm, Offset	1
⑧	07PAD-0010000	Stem Seal Driver	1
⑨	07742-0010100	Valve Guide Driver, 5.5 mm	1
⑩	07757-PJ1010A	Valve Spring Compressor Attachment	1

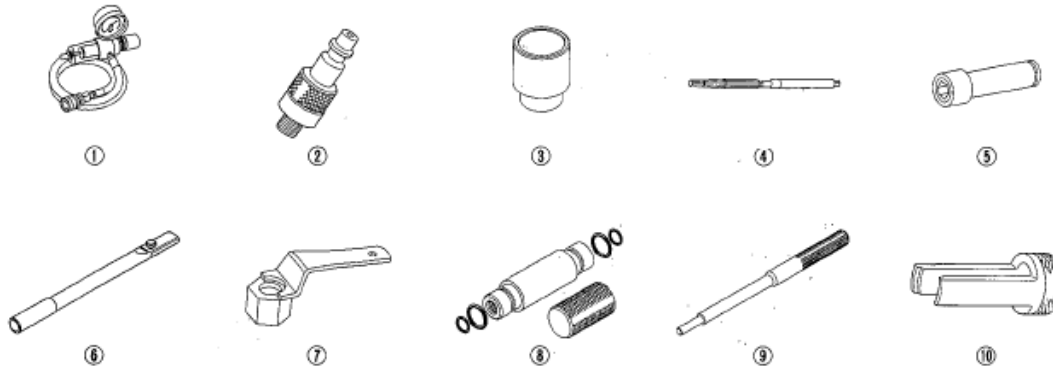


Fig. 151: Identifying Special Tools

Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

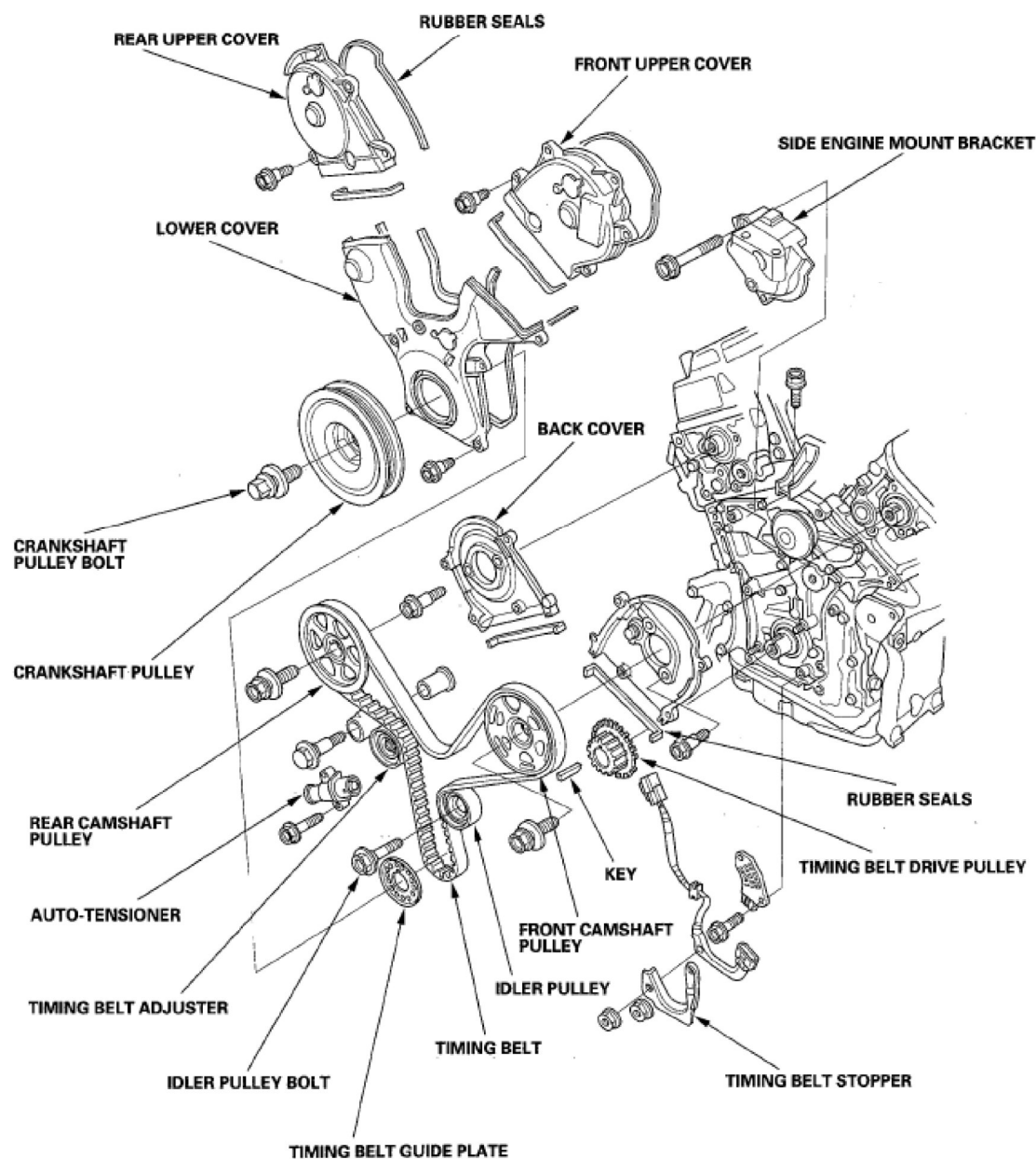


Fig. 152: Identifying Cylinder Head Component Location (1 Of 2)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

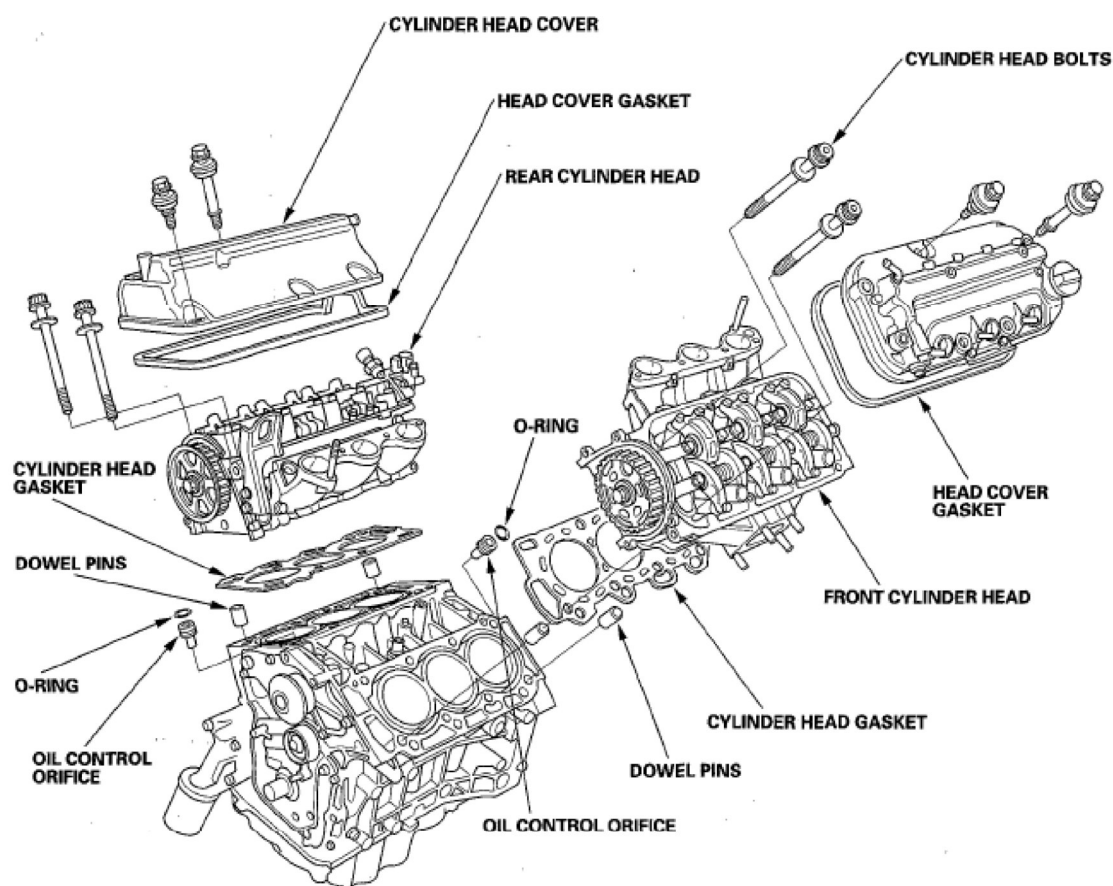


Fig. 153: Identifying Cylinder Head Component Location (2 Of 2)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

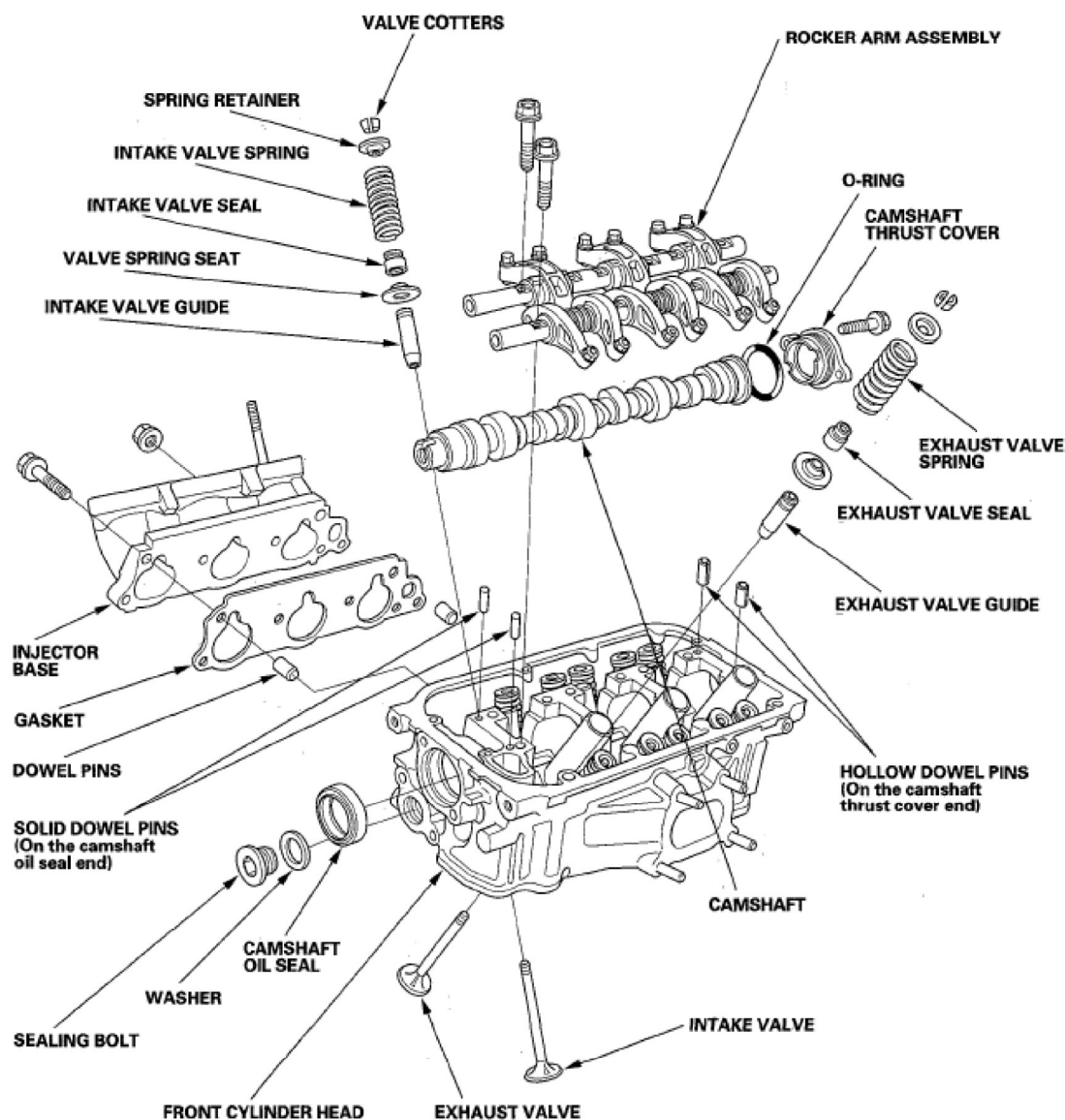


Fig. 154: Identifying Cylinder Head Component - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

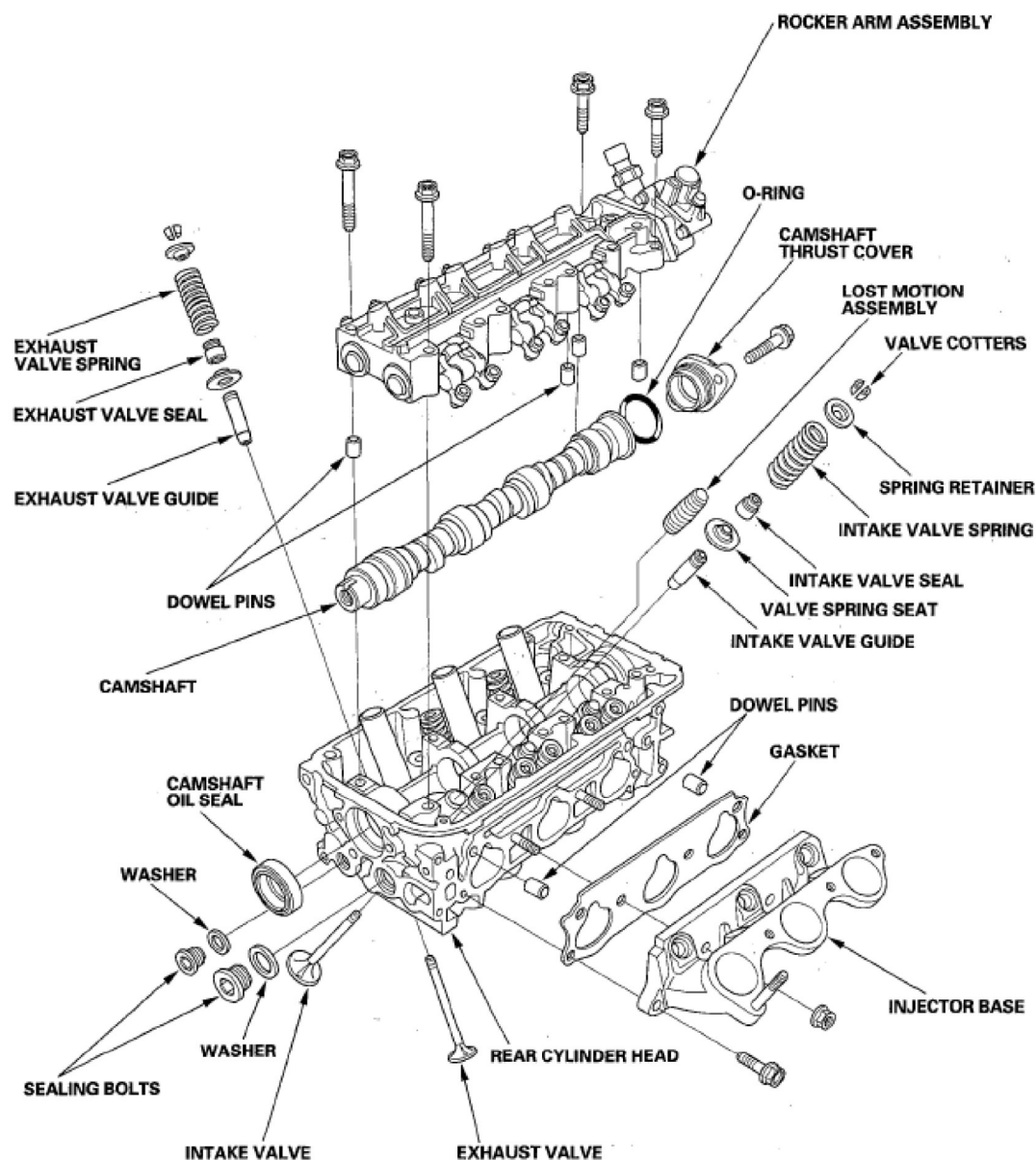


Fig. 155: Identifying Cylinder Head Component - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ENGINE COMPRESSION INSPECTION

NOTE: After the inspection, you must reset the powertrain control module (PCM). Otherwise, the PCM will continue to stop the fuel injectors from functioning.

1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Turn the ignition switch to LOCK (0).
3. Connect the Honda Diagnostic System (HDS) to the data link connector (DLC) (see step 2 **GENERAL**

TROUBLESHOOTING INFORMATION).

4. Turn the ignition switch to ON (II).
5. Make sure the HDS communicates with the vehicle and the PCM. If it doesn't communicate, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING**).
6. Select PGM-FI, INSPECTION, then ALL INJECTORS OFF on the HDS.
7. Turn the ignition switch to LOCK (0).
8. Remove the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
9. Remove the six spark plugs.
10. Attach the compression gauge to a spark plug hole.

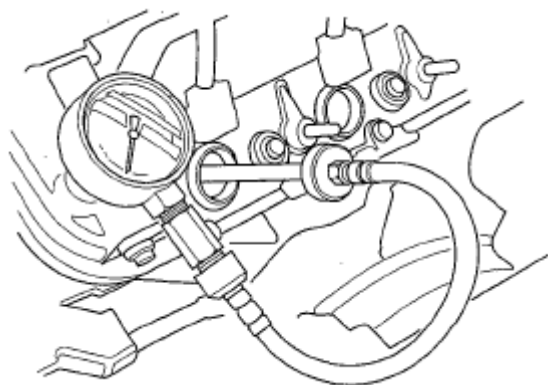


Fig. 156: Installing Compression Gauge To Spark Plug Hole
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Step on the accelerator pedal to open the throttle, then crank the engine with the starter motor, and measure the compression.

Compression Pressure: Above 930 kPa (9.5 kgf/cm² , 135 psi)

12. Measure the compression on the remaining cylinders.

Maximum Variation: Within 200 kPa (2.0 kgf/cm² , 28 psi)

13. If the compression is not within specifications, check the following items, then remeasure the compression.
 - Confirmation of cam timing
 - Damaged or worn valves and seats
 - Damaged cylinder head gaskets
 - Damaged or worn piston rings
 - Damaged or worn piston and cylinder bore
14. Remove the compression gauge from the spark plug hole.
15. Install the six spark plugs.

16. Install the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
17. Select PCM reset (see **PCM RESET**) to cancel the ALL INJECTORS OFF on the HDS.

VARIABLE CYLINDER MANAGEMENT ROCKER ARM TEST

Special Tools Required

- Air pressure regulator 07AAJ-PNAA101
 - VCM air adapter 07AAJ-RYPA100
1. Start the engine and let it run for 5 minutes, then turn the ignition switch to LOCK (0).
 2. Remove the intake manifold (see **REMOVAL**).
 3. Remove the rear cylinder head cover (see **CYLINDER HEAD COVER INSTALLATION**).
 4. Set the No. 1 piston at top dead center (TDC) (see step 3 **VALVE CLEARANCE ADJUSTMENT**).
 5. Push on the intake secondary rocker arm (C) for the No. 1 cylinder. Make sure that the intake primary rocker arm A and the intake primary rocker arm B are mechanically connected by the rocker arm pistons and that the intake secondary rocker arm does not move when pushed manually.
 - If the intake secondary rocker arm moves independently, remove the intake primary rocker arm A, intake primary rocker arm B, and intake secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any intake rocker arm needs replacing, replace the primary and the secondary rocker arms as an assembly, then retest.
 - If the intake secondary rocker arm does not move independently, go to step 6.

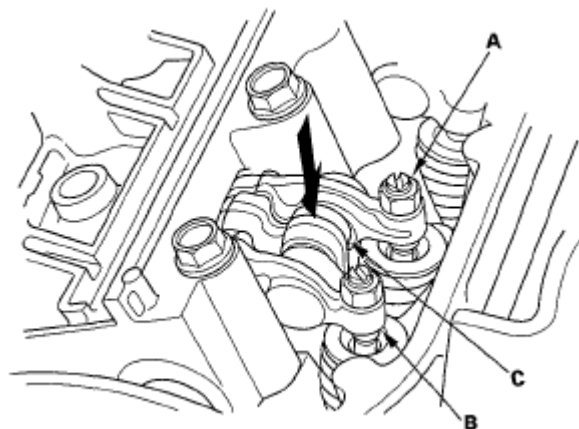


Fig. 157: Identifying Intake Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Push on the exhaust secondary rocker arms (A) for the No. 1 cylinder. Make sure that the exhaust primary rocker arm (B) is mechanically connected by the pistons and that the exhaust secondary rocker arm does not move when pushed manually. Check visually with a mirror (C).
 - If the exhaust secondary rocker arm moves independently, remove the exhaust primary rocker arm and the exhaust secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any exhaust rocker arm needs replacing, replace the primary and the secondary

rocker arms as an assembly, then retest.

- If the exhaust secondary rocker arm does not move independently, go to step 7.

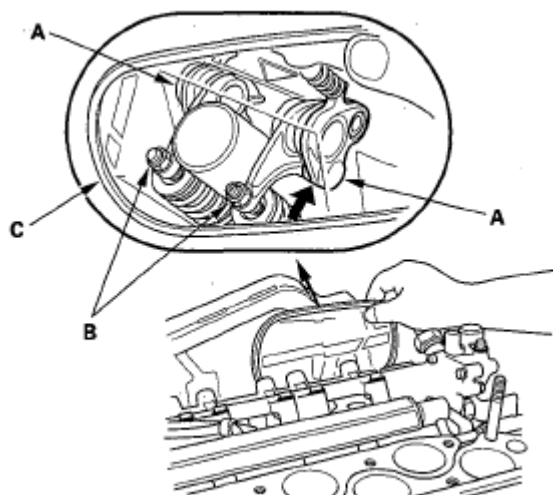


Fig. 158: Identifying Exhaust Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. If repeat steps 5 and 6 for No. 2 and No. 3 cylinders with each piston at TDC. When the rocker arms pass the test, go to step 8.
8. Check that the air pressure on the shop air compressor gauge indicates over 200 kPa (2.0 kgf/cm², 28 psi).
9. Inspect the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
10. Set the No. 1 piston at TDC (see step 3 **VALVE CLEARANCE ADJUSTMENT**).
11. Install the VCM air adapter (A) to the inspection hole (B), then connect the air pressure regulator (C).

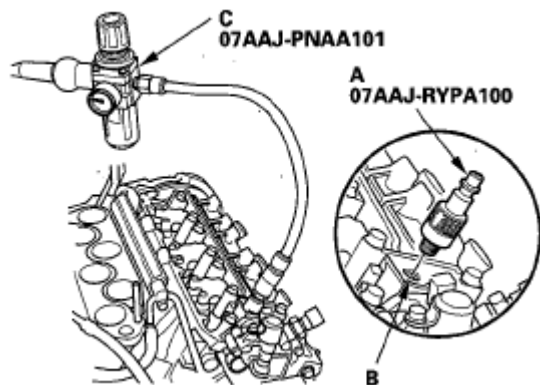


Fig. 159: Identifying Air Pressure Regulator
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Loosen the valve on the regulator, and apply the specified air pressure.

Specified Air Pressure: 200 kPa (2.0 kgf/cm² , 28 psi)

13. With the specified air pressure applied, push on the intake secondary rocker arm (C) for the No. 1 cylinder. The intake secondary rocker arm should move independently of the intake primary rocker arm A and the intake primary rocker arm B.
- If the intake secondary rocker arm does not move independently, remove the intake primary rocker arm A, intake primary rocker arm B, and intake secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any intake rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, then retest.
 - If the intake secondary rocker arm moves independently, go to step 14.

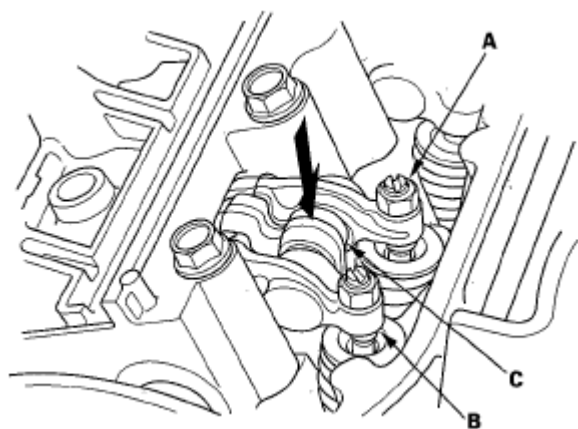


Fig. 160: Identifying Intake Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. With the specified air pressure applied, push on the exhaust secondary rocker arms (A) for the No. 1 cylinder. The exhaust secondary rocker arm should move independently of the exhaust primary rocker arm (B). Check visually with a mirror (C).
- If the exhaust secondary rocker arm does not move independently, remove the exhaust primary rocker arm and the exhaust secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any exhaust rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, then retest.
 - If the exhaust secondary rocker arm moves independently, go to step 15.

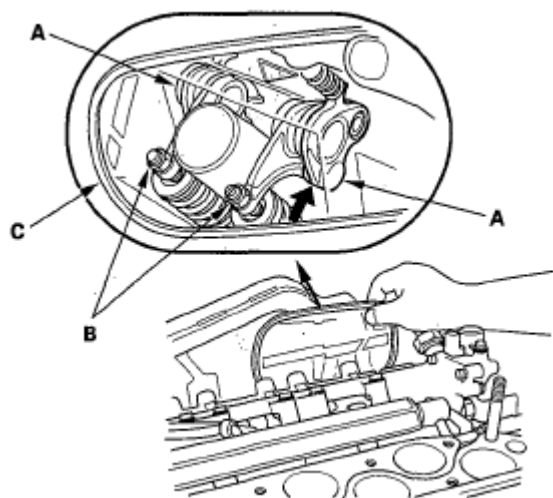


Fig. 161: Identifying Exhaust Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. If repeat steps 13 and 14 for No. 2 and No. 3 cylinders with each piston at TDC. When the rocker arms pass the test, go to step 16.
16. Remove the air pressure regulator and the VCM air adapter.
17. Install the rear cylinder head cover (see **REAR**).

VALVE CLEARANCE ADJUSTMENT

NOTE: Connect the Honda Diagnostic System (HDS) to the data link connector (DLC), and monitor the engine coolant temperature (ECT). Adjust the valves only when the cylinder head temperature is less than 100°F (38°C).

1. Remove the intake manifold (see **REMOVAL**).
2. Remove the cylinder head covers (see **CYLINDER HEAD COVER REMOVAL**).
3. Set the No. 1 piston at top dead center (TDC). Align the pointer (A) on the front upper cover with the No. 1 piston TDC mark (B) on the front camshaft pulley.

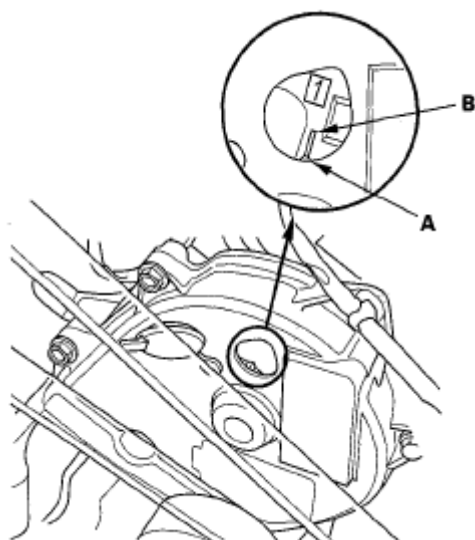


Fig. 162: Identifying Front Upper Cover With No. 1 Piston TDC Mark
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Select the correct thickness feeler gauge for the valves you are going to check.

Valve Clearance

Intake: 0.20-0.24 mm (0.008-0.009 in.)

Exhaust: 0.28-0.32 mm (0.011-0.013 in.)

REAR

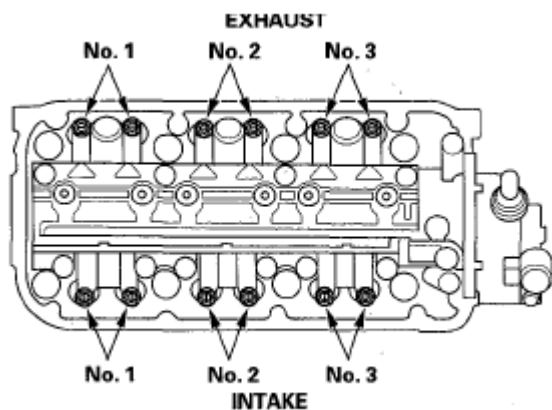


Fig. 163: Identifying Exhaust Valve - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

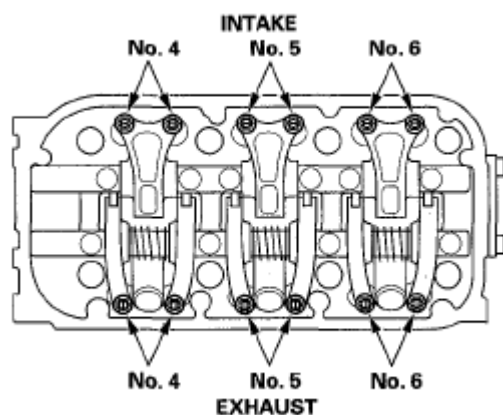


Fig. 164: Identifying Intake Valve - Front

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Insert the feeler gauge (A) between the adjusting screw (B) and the end of the valve stem on the No. 1 cylinder, and slide it back and forth; you should feel a slight amount of drag.

FRONT

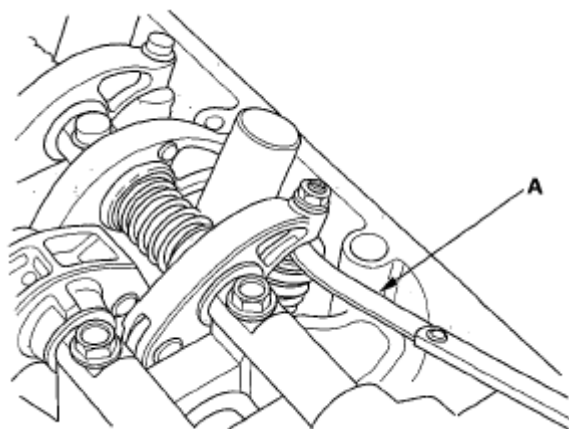


Fig. 165: Identifying Feeler Gauge Between Adjusting Screw And End Of Valve Stem - Front

Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

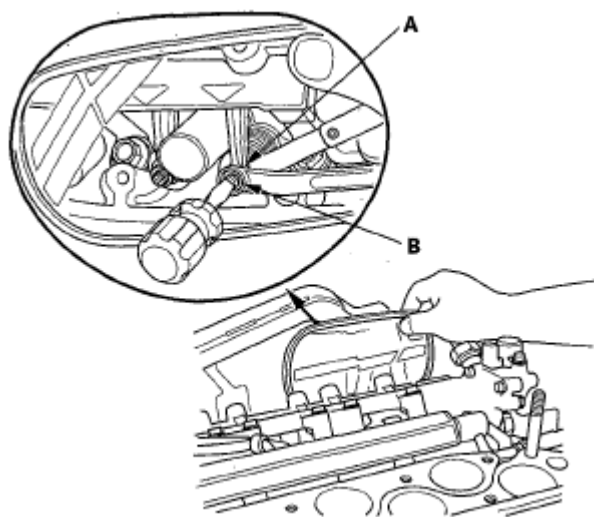


Fig. 166: Identifying Feeler Gauge Between Adjusting Screw And End Of Valve Stem - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If you feel too much or too little drag, loosen the locknut, and turn the adjusting screw until the drag on the feeler gauge is correct.

FRONT

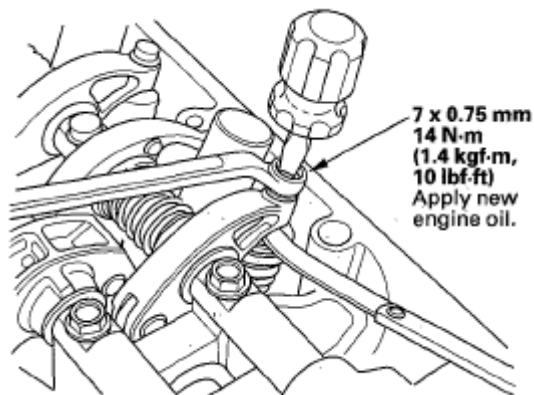


Fig. 167: Identifying Adjusting Screw - Front With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

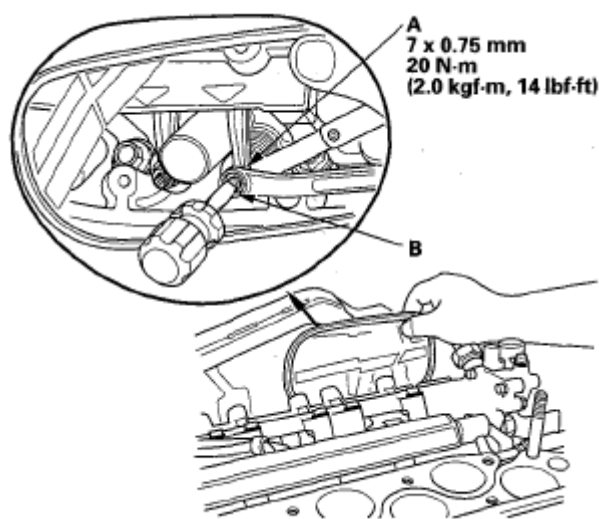


Fig. 168: Identifying Adjusting Screw - Rear With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. While holding the adjusting screw (B) with the screw driver, tighten the locknut (A), then recheck the clearance. Repeat the adjustment, if necessary.
8. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 4 piston TDC mark (B) on the front camshaft pulley.

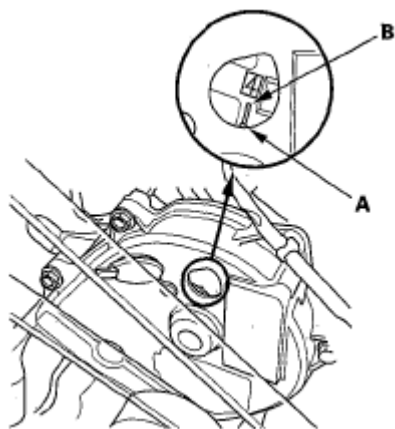


Fig. 169: Identifying Front Upper Cover Mark With No. 4 Piston TDC Mark
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Check and, if necessary, adjust the valve clearance on the No. 4 cylinder.
10. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 2 piston TDC mark (B) on the front camshaft pulley.

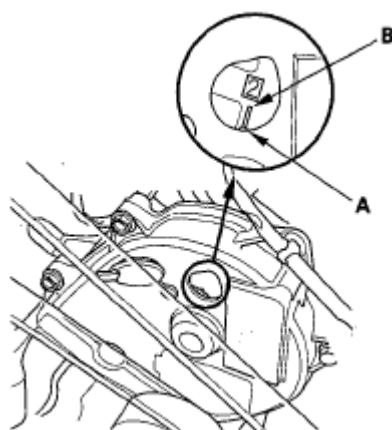


Fig. 170: Identifying Front Upper Cover Mark With No. 2 Piston TDC Mark
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Check and, if necessary, adjust the valve clearance on the No. 2 cylinder.
12. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 5 piston TDC mark (B) on the front camshaft pulley.

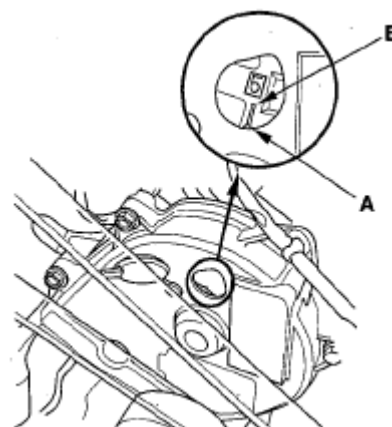


Fig. 171: Identifying Pointer On Front Upper Cover With No. 5 Piston TDC Mark On Front Camshaft Pulley
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Check and, if necessary, adjust the valve clearance on the No. 5 cylinder.
14. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 3 piston TDC mark (B) on the front camshaft pulley.

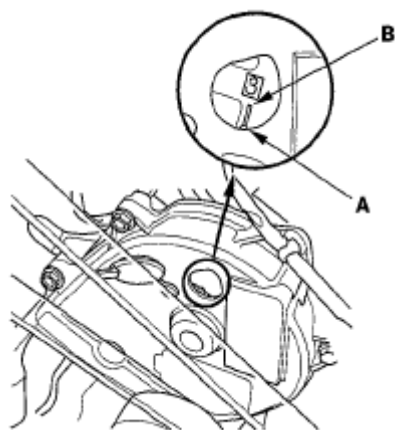


Fig. 172: Identifying Pointer On Front Upper Cover With No. 3 Piston TDC Mark On Front Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Check and, if necessary, adjust the valve clearance on the No. 3 cylinder.
16. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 6 piston TDC mark (B) on the front camshaft pulley.

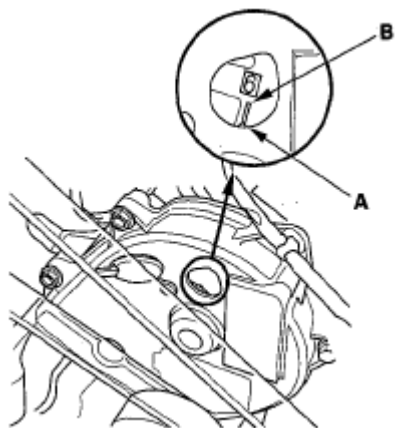


Fig. 173: Identifying Pointer On Front Upper Cover With No. 6 Piston TDC Mark On Front Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Check and, if necessary, adjust the valve clearance on the No. 6 cylinder.
18. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**).
19. Install the intake manifold (see **INSTALLATION**).

CRANKSHAFT PULLEY REMOVAL AND INSTALLATION

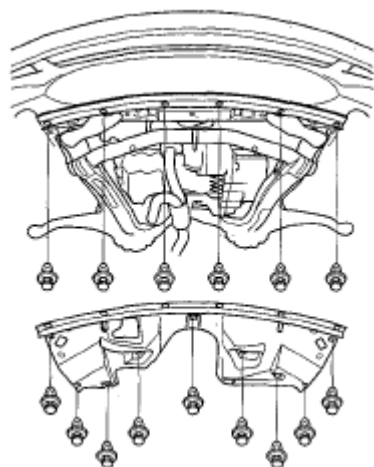
Special Tools Required

- Holder handle 07JAB-001020B

- Holder attachment, 50 mm, offset 07MAB-PY3010A
- Socket, 19 mm 07JAA-001020A, or a commercially available 19 mm socket

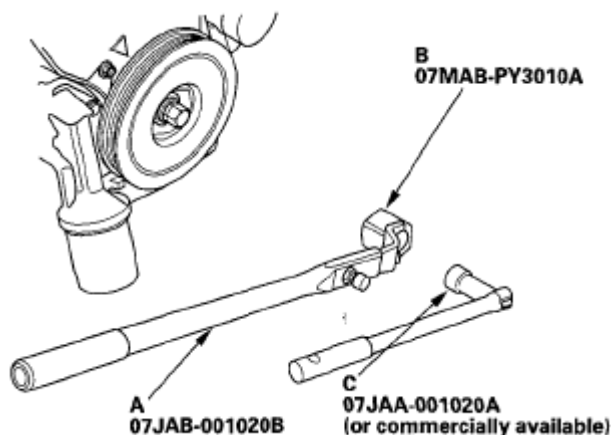
Removal

1. Remove the right front wheel.
2. Remove the splash shield.

**Fig. 174: Identifying Splash Shield And Bolt**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
4. Hold the pulley with the holder handle (A) and the holder attachment (B).

**Fig. 175: Identifying Holder Handle And Holder Attachment**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the bolt with a heavy duty 19 mm socket (C) and a breaker bar, then remove the crankshaft pulley.

Installation

1. Remove any oil and clean the pulleys (A), the crankshaft (B), the bolt (C), and the washer (D). Lubricate with new engine oil as shown.

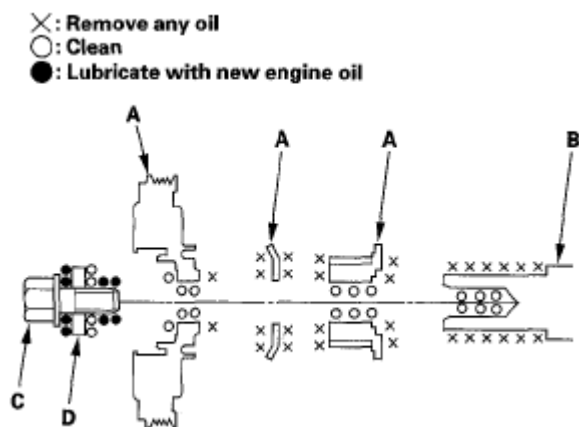


Fig. 176: Identifying Lubrication Points

Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the crankshaft pulley, then tighten the bolt. Do not use an impact wrench.
 1. Hold the pulley with the holder handle (A) and the holder attachment (B). Torque the bolt to 64 N.m (6.5 kgf.m, 47 lbf.ft) with a torque wrench and heavy duty 19 mm socket (C).
 2. Mark the bolt head (D) and the crankshaft pulley (E) as shown, then tighten the bolt an additional 60° (The mark on the bolt head line up with the mark on the crankshaft pulley).

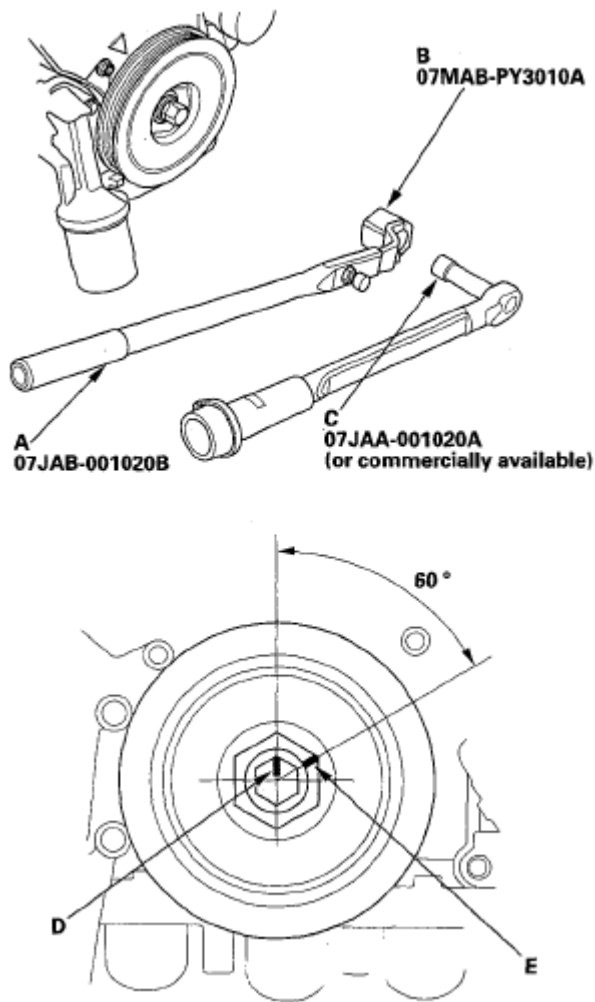


Fig. 177: Identifying Holder Handle And Holder Attachment
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
4. Install the splash shield.
5. Install the right front wheel.

TIMING BELT INSPECTION

1. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
2. Remove the front upper cover.

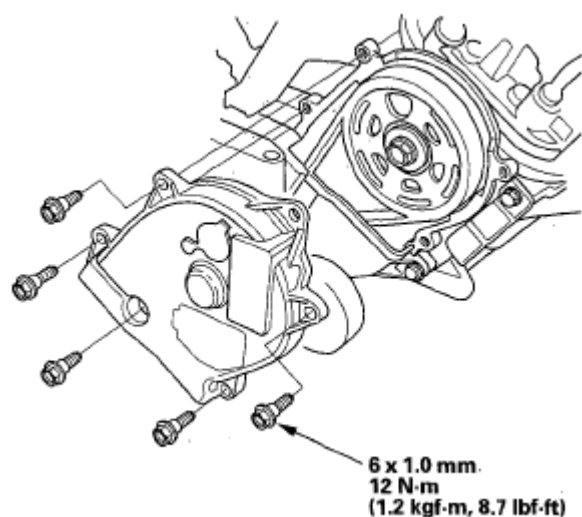


Fig. 178: Identifying Front Upper Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Inspect the timing belt for cracks and oil or coolant contamination. Replace the belt if it is cracked, or is contaminated with oil or coolant. Wipe off any oil or solvent that gets on the belt.

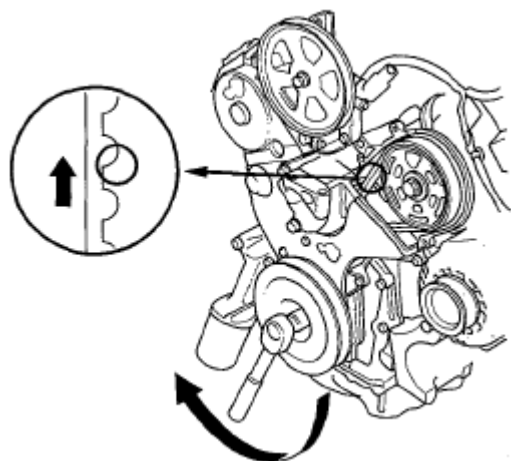


Fig. 179: Identifying Timing Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT REMOVAL

1. Turn the crankshaft so white mark (A) on the crankshaft pulley lines up with the pointer (B).

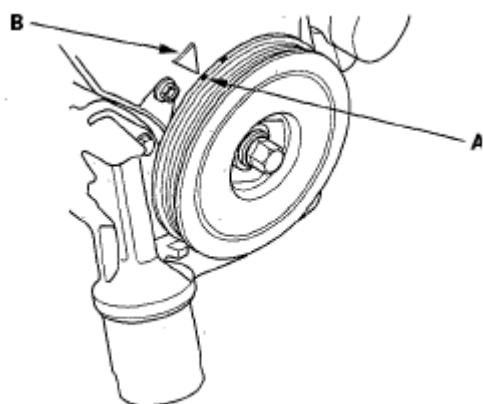


Fig. 180: Identifying Timing Mark On Crankshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Check that the No. 1 piston top dead center (TDC) mark (A) on the front camshaft pulley and the pointer (B) on the front upper cover are aligned.

NOTE: If the marks are not aligned, rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark.

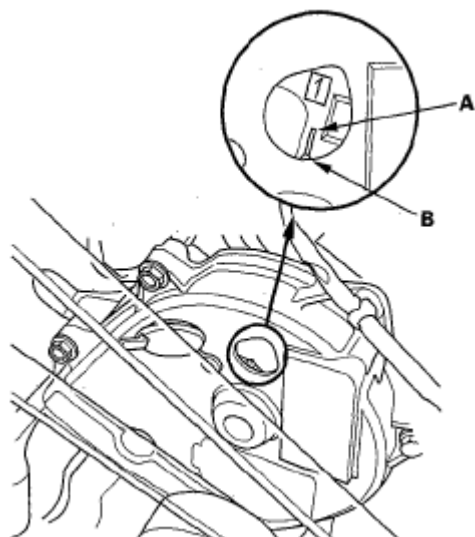


Fig. 181: Identifying No. 1 Piston Top Dead Center (TDC) Mark On Front Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Raise the vehicle on the lift, then remove the right front wheel.
4. Remove the splash shield.

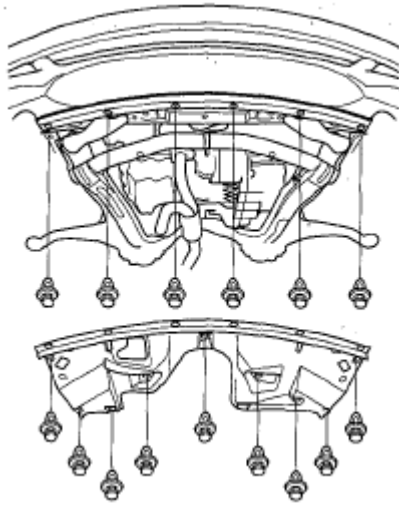


Fig. 182: Identifying Splash Shield

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
6. Support the engine with a jack and a wood block under the oil pan.
7. Remove the upper half of the side engine mount bracket.

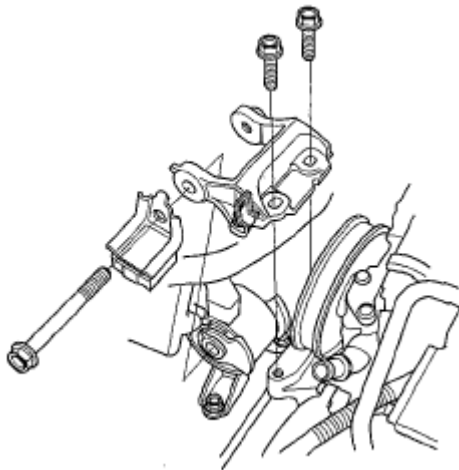


Fig. 183: Identifying Upper Half Of Side Engine Mount Bracket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**).
9. Remove the front upper cover (A) and the rear upper cover (B).

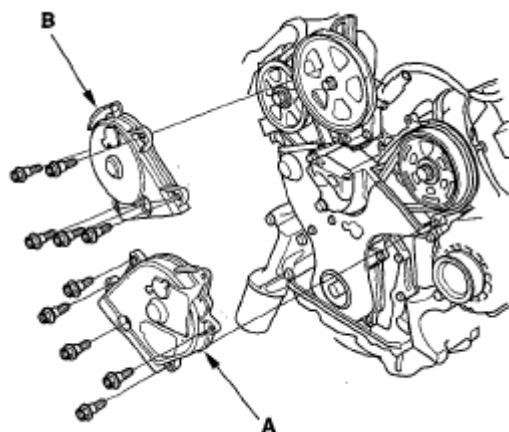


Fig. 184: Identifying Front Upper Cover And Rear Upper Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the lower cover.

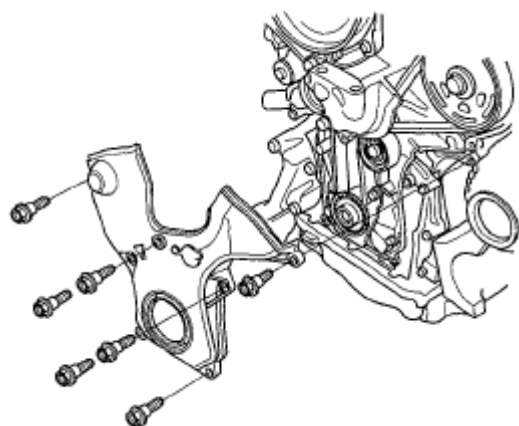


Fig. 185: Identifying Lower Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove one of the battery clamp bolts from the battery tray, and grind the end of it as shown.

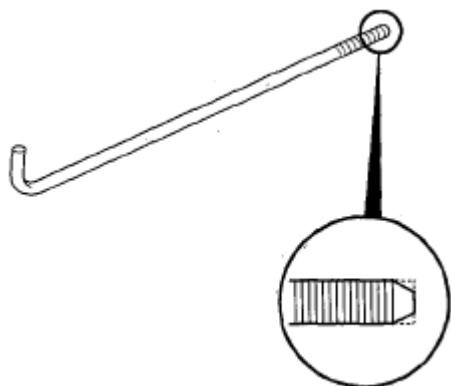
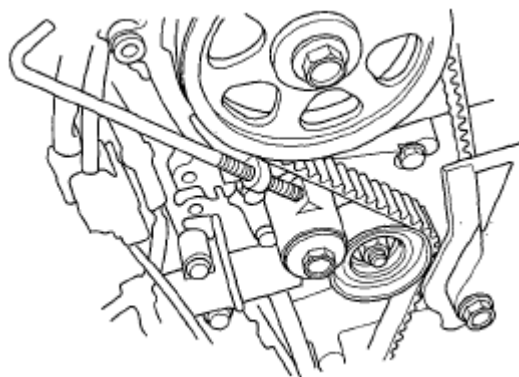
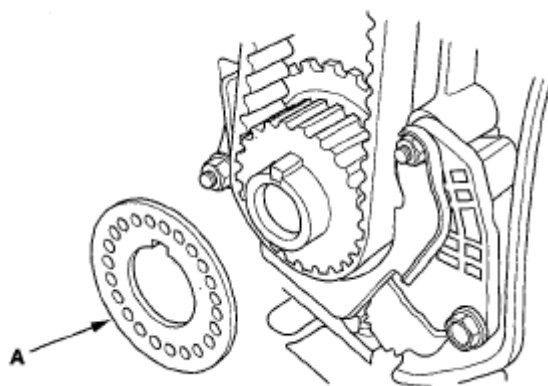


Fig. 186: Identifying Battery Clamp Bolts**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

12. Thread the battery clamp bolt in as shown to hold the timing belt adjuster in its current position. Tighten it by hand, do not use a wrench.

**Fig. 187: Identifying Battery Clamp Bolt****Courtesy of AMERICAN HONDA MOTOR CO., INC.**

13. Remove the timing belt guide plate (A).

**Fig. 188: Identifying Timing Belt Guide Plate****Courtesy of AMERICAN HONDA MOTOR CO., INC.**

14. Remove the lower half of the side engine mount bracket.

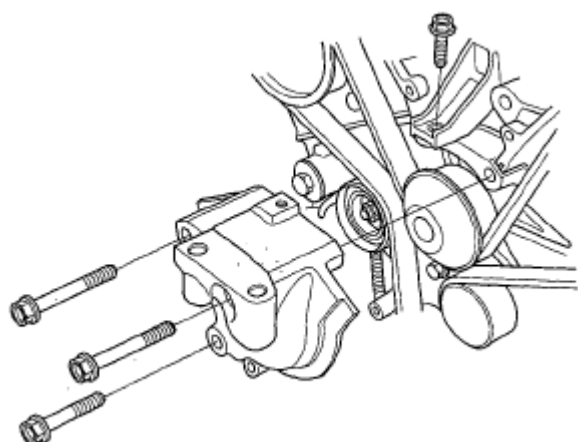


Fig. 189: Identifying Lower Half Of Side Engine Mount Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the idler pulley bolt (A) and the idler pulley (B), then remove the timing belt. Discard the idler pulley bolt.

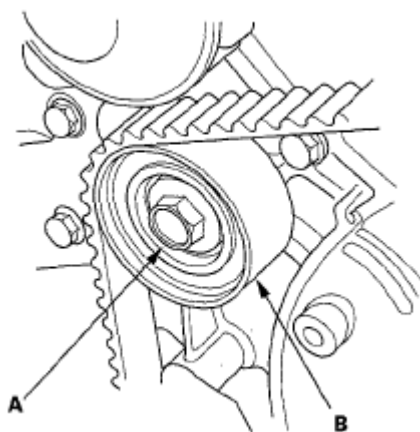


Fig. 190: Identifying Idler Pulley And Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT INSTALLATION

NOTE: The following procedure is the installation procedure for a used timing belt. If you are installing a new belt, refer to the **TIMING BELT REPLACEMENT procedure**.

1. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
2. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.

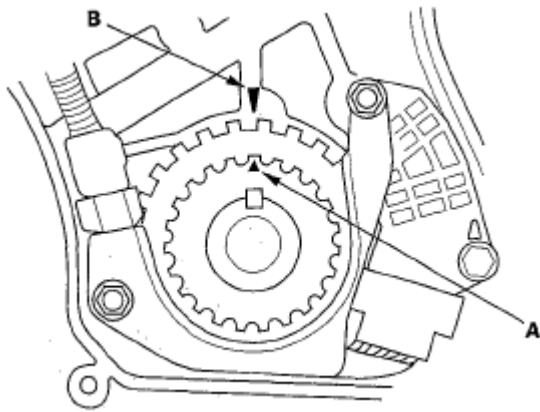


Fig. 191: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley With Pointer On Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

FRONT

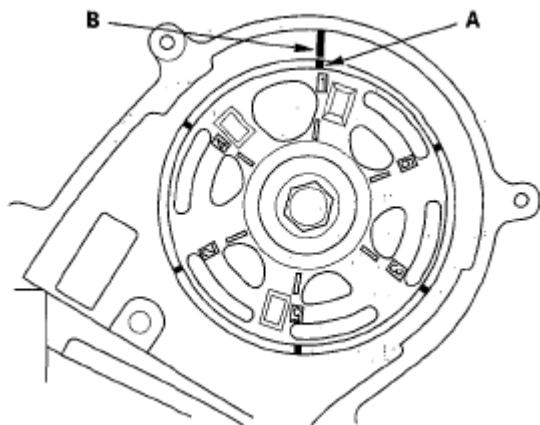


Fig. 192: Identifying TDC Marks On Camshaft Pulleys With Pointers On Back Covers - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

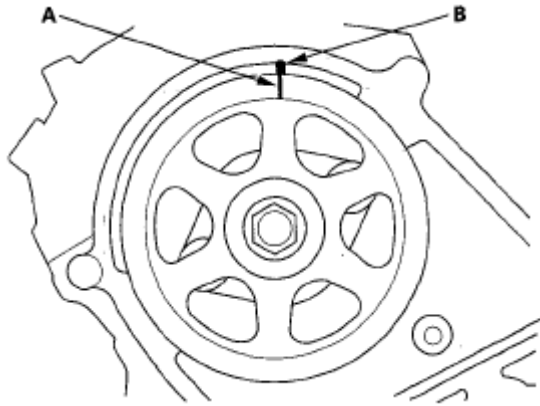


Fig. 193: Identifying TDC Marks On Camshaft Pulleys With Pointers On Back Covers - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Loosely install the idler pulley with a new idler pulley bolt so the pulley can move but does not come off.
5. If the auto-tensioner has extended and the timing belt cannot be installed, do the **TIMING BELT REPLACEMENT** procedure .
6. Install the timing belt in a counterclockwise sequence starting with the drive pulley. Take care not to damage the timing belt during installation.
 1. Drive pulley (A)
 2. Idler pulley (B)
 3. Front camshaft pulley (C)
 4. Water pump pulley (D)
 5. Rear camshaft pulley (E)
 6. Adjusting pulley (F)

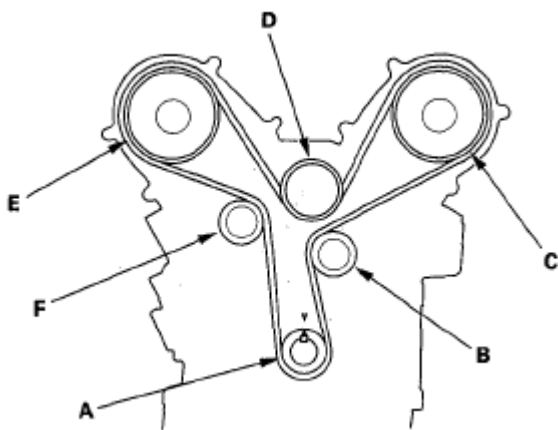


Fig. 194: Identifying Belt Routing Diagram
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Tighten the idler pulley bolt.

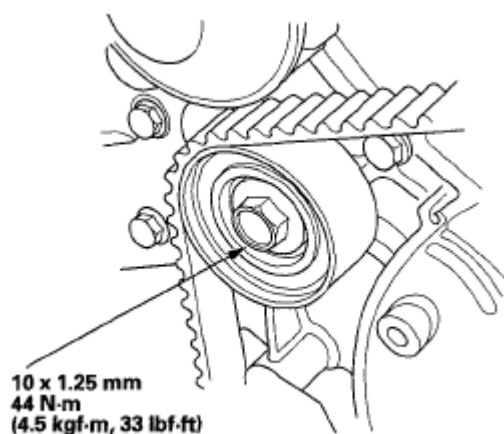


Fig. 195: Identifying Idler Pulley Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the battery clamp bolt from the back cover.

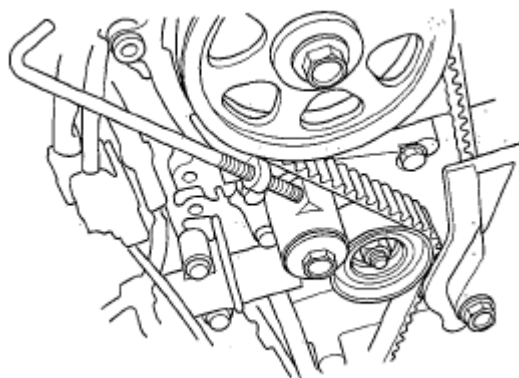


Fig. 196: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Install the lower half of the side engine mount bracket.

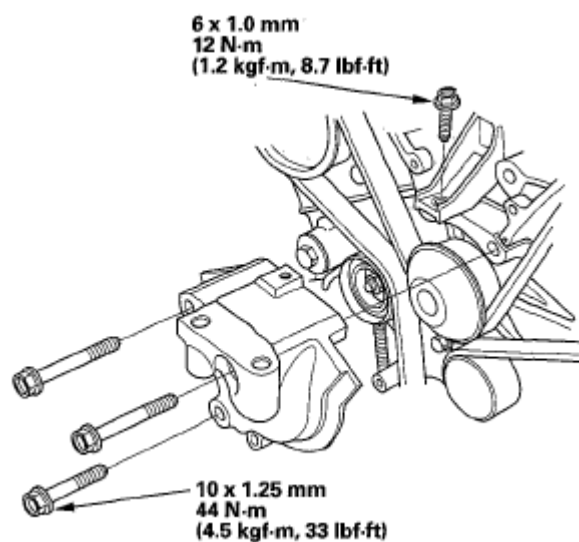


Fig. 197: Identifying Lower Half Of Side Engine Mount Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the timing belt guide plate as shown.

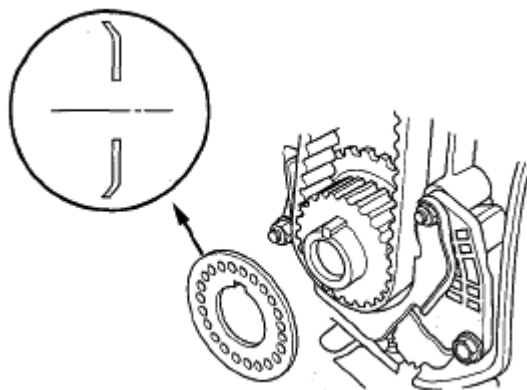


Fig. 198: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the lower cover.

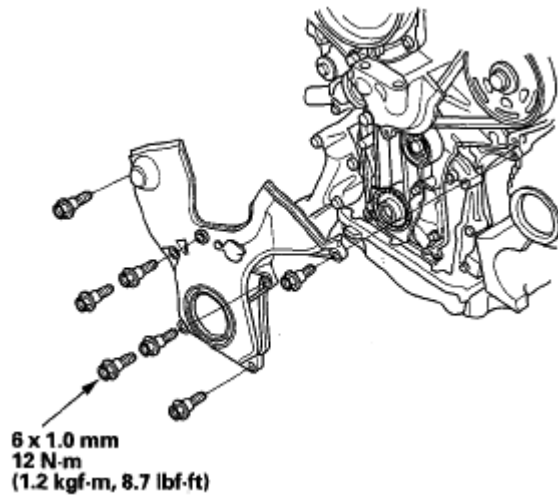


Fig. 199: Identifying Lower Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the front upper cover (A) and the rear upper cover (B).

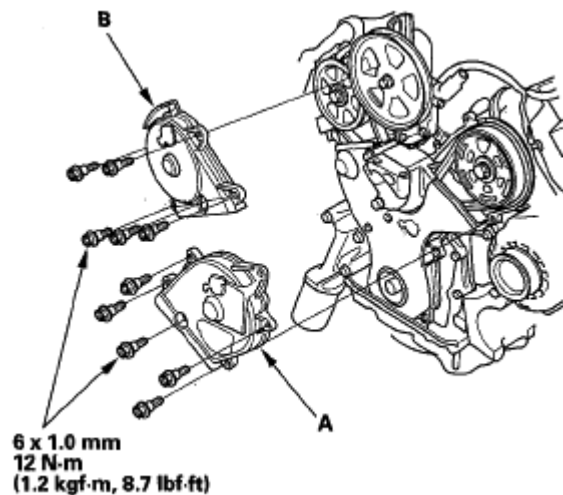


Fig. 200: Identifying Front Upper Cover And Rear Upper Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**).
14. Rotate the crankshaft pulley six turns clockwise so the timing belt positions itself on the pulleys.
15. Turn the crankshaft pulley so its white mark (A) lines up with the pointer (B).

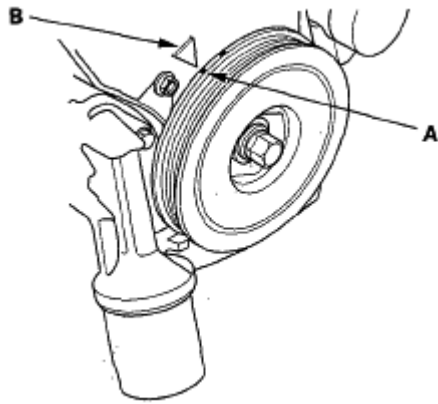


Fig. 201: Identifying Timing Mark On Crankshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Check the camshaft pulley marks.

NOTE: If the marks are not aligned, rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark.

- If the camshaft pulley marks are at TDC, go to step 17.
- If the camshaft pulley marks are not at TDC, remove the timing belt and repeat steps 2 through 16.

FRONT

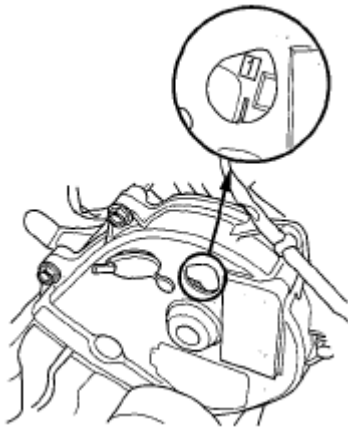


Fig. 202: Identifying Camshaft Pulley Marks - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

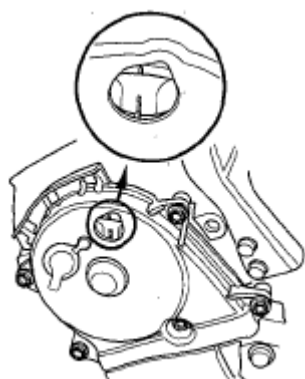


Fig. 203: Identifying Camshaft Pulley Marks - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Install the upper half of the side engine mount bracket, and tighten the new mounting bolts (A), then the mass damper mounting bolt (B).

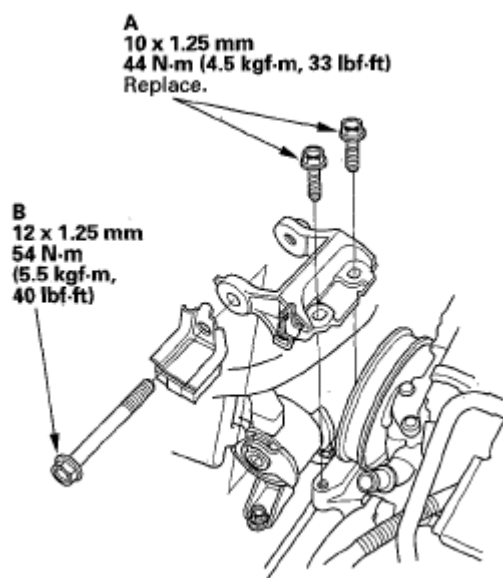


Fig. 204: Identifying Upper Half Of Side Engine Mount Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
19. Install the splash shield.

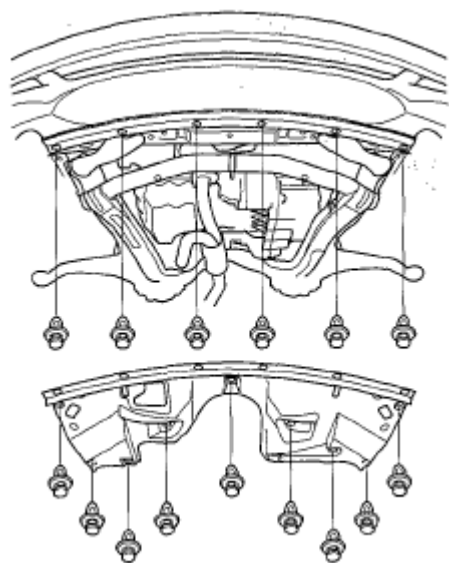


Fig. 205: Identifying Splash Shield And Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the right front wheel.
21. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

TIMING BELT REPLACEMENT

NOTE: The following procedure is for the installation of a new timing belt. If you are installing a used belt, refer to the **TIMING BELT INSTALLATION** procedure .

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
3. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.

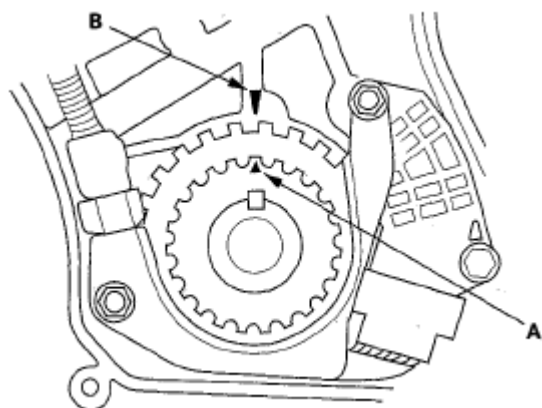


Fig. 206: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley With Pointer On Oil Pump

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

FRONT

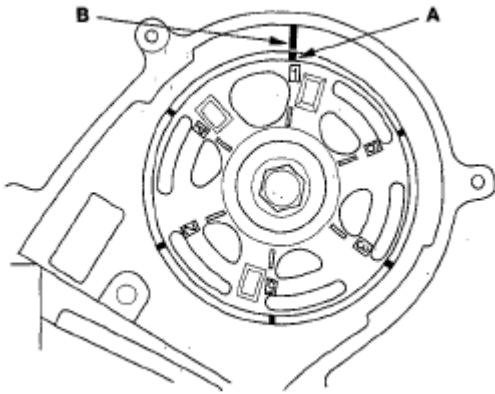


Fig. 207: Identifying TDC Marks On Camshaft Pulleys With Back Covers - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

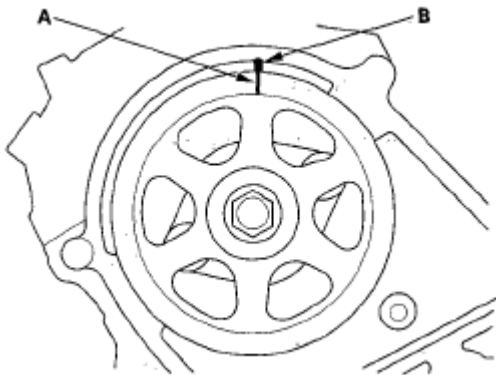


Fig. 208: Identifying TDC Marks On Camshaft Pulleys With Back Covers - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the battery clamp bolt from the back cover.
6. Remove the auto-tensioner.

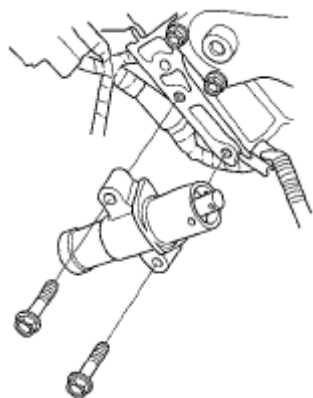


Fig. 209: Identifying Auto-Tensioner

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Align the holes on the rod and the housing of the auto-tensioner.

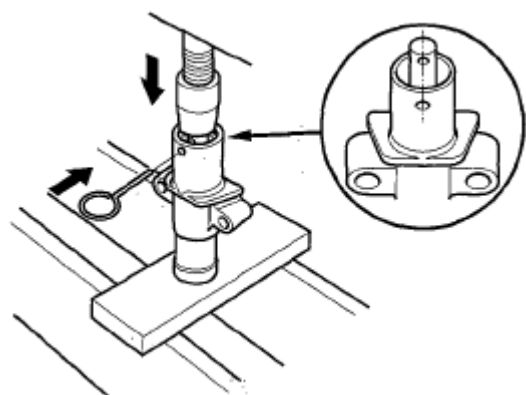


Fig. 210: Identifying Holes On Rod And Housing Of Auto-Tensioner

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Use a hydraulic press to slowly compress the auto-tensioner. Insert a 2.0 mm (0.08 in.) pin through the housing and the rod.

NOTE: The compression pressure should not exceed 9,800 N (1,000 kgf, 2,200 lbf).

9. Install the auto-tensioner.

NOTE: Make sure the pin stays in place.

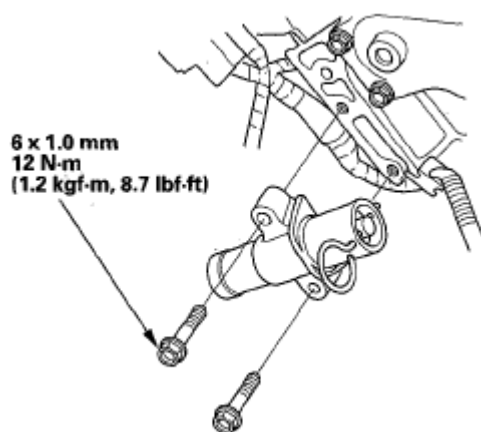


Fig. 211: Identifying Auto-Tensioner With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Thread the battery clamp bolt in as shown to hold the timing belt adjuster. Tighten it by hand; do not use a wrench.

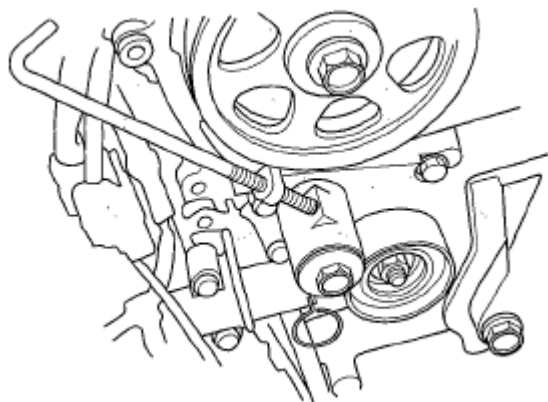


Fig. 212: Identifying Battery Clamp Bolt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Loosely install the idler pulley with a new idler pulley bolt so the pulley can move but does not come off.
12. Install the timing belt in a counterclockwise sequence starting with the drive pulley.
 1. Drive pulley (A)
 2. Idler pulley (B)
 3. Front camshaft pulley (C)
 4. Water pump pulley (D)
 5. Rear camshaft pulley (E)
 6. Adjusting pulley (F)

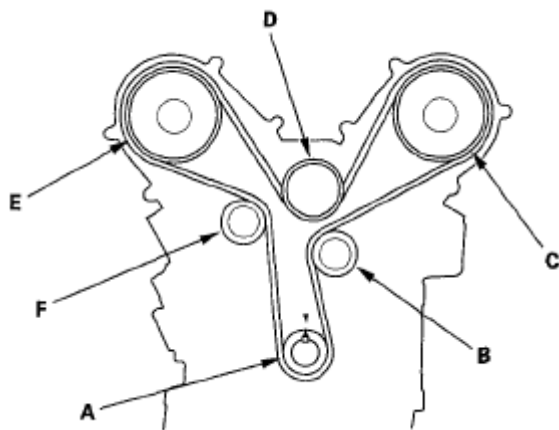


Fig. 213: Identifying Belt Routing Diagram

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Tighten the idler pulley bolt.

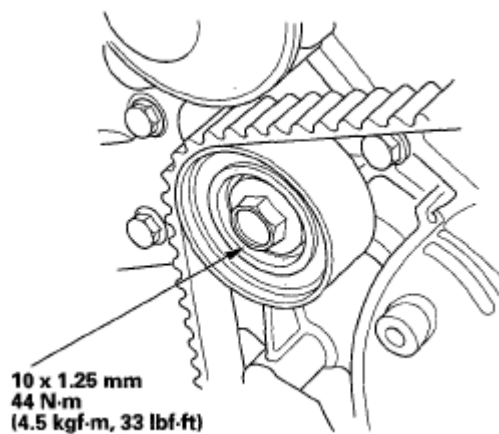


Fig. 214: Identifying Idler Pulley Bolt With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the pin from the auto-tensioner.

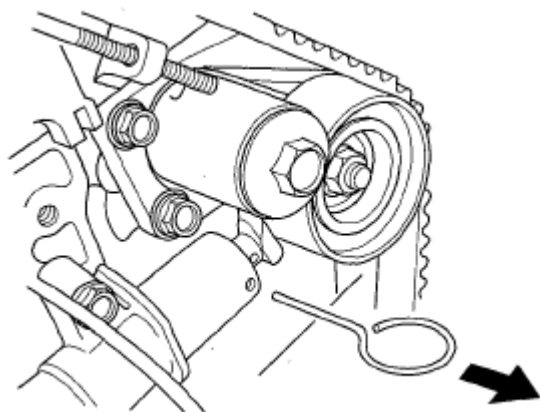


Fig. 215: Identifying Auto-Tensioner Pin
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the battery clamp bolt from the back cover.
16. Install the lower half of the side engine mount bracket.

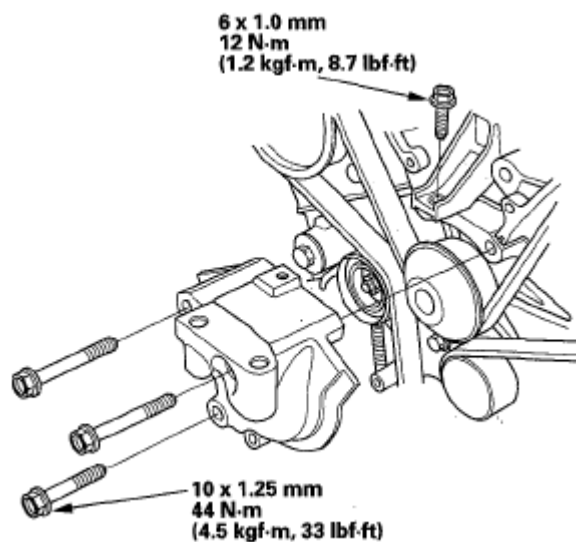


Fig. 216: Identifying Lower Half Of Side Engine Mount Bracket With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Install the timing belt guide plate as shown.

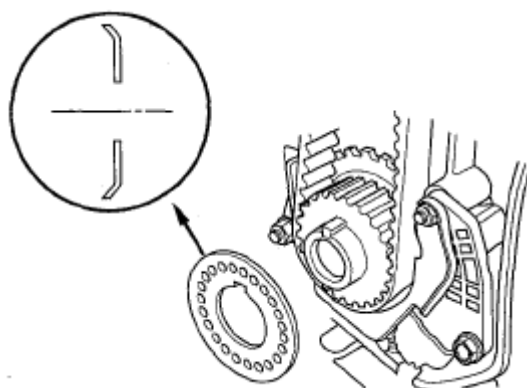


Fig. 217: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the lower cover.

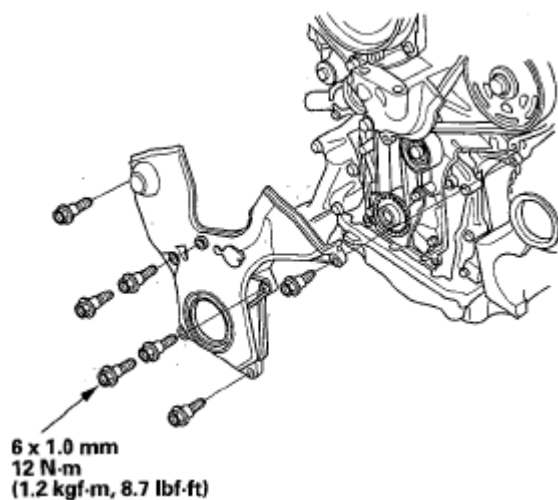


Fig. 218: Identifying Lower Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the front upper cover (A) and the rear upper cover (B).

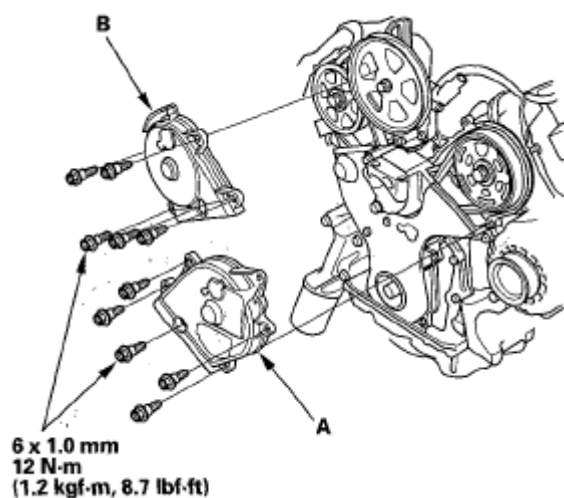


Fig. 219: Identifying Front Upper Cover And Rear Upper Cover With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**).
21. Rotate the crankshaft pulley six turns clockwise so the timing belt positions itself on the pulleys.
22. Turn the crankshaft pulley so its white mark (A) lines up with the pointer (B).

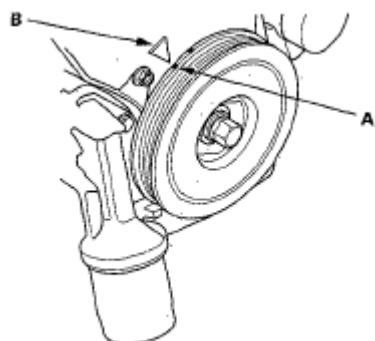


Fig. 220: Identifying Timing Mark On Crankshaft Pulley
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Check the camshaft pulley marks.

NOTE: If the marks are not aligned/rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark.

- If the camshaft pulley marks are at TDC, go to step 24.
- If the camshaft pulley marks are not at TDC, remove the timing belt and repeat steps 3 through 22.

FRONT

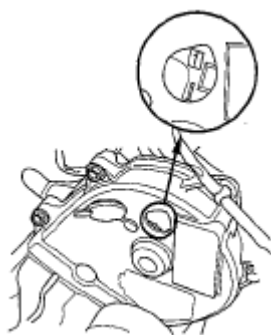


Fig. 221: Identifying Camshaft Pulley Marks - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

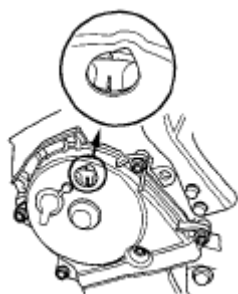


Fig. 222: Identifying Camshaft Pulley Marks - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Install the upper half of the side engine mount bracket, and tighten the new mounting bolts (A), then the mass damper mounting bolt (B).

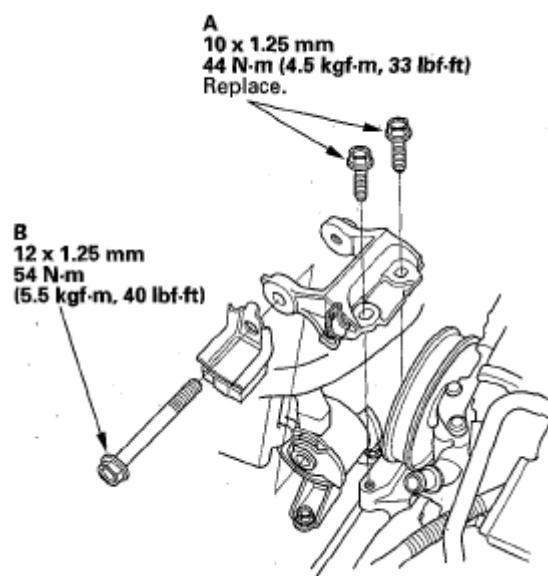


Fig. 223: Identifying Upper Half Of Side Engine Mount Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
26. Install the splash shield.

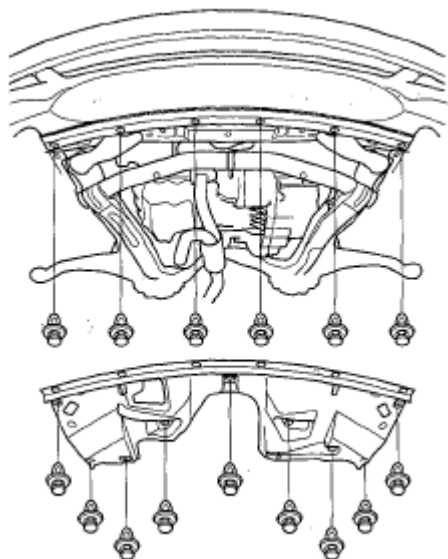


Fig. 224: Identifying Splash Shield And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

27. Install the right front wheel.
28. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

TIMING BELT ADJUSTER REPLACEMENT

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Remove the battery clamp bolt from the back cover.
3. Remove the auto-tensioner.
4. Remove the bolt (A), then remove the timing belt adjuster (B) and the collar (C).

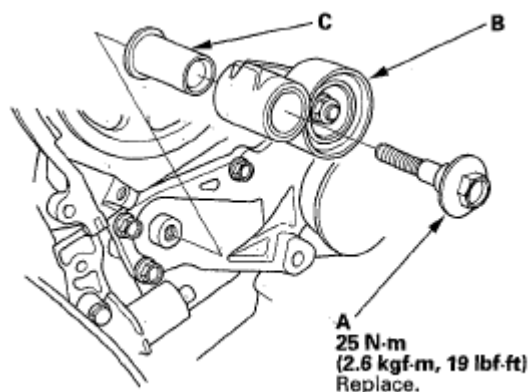


Fig. 225: Identifying Timing Belt Adjuster And Collar With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the timing belt adjuster in the reverse order of removal.
6. Install the timing belt (see **TIMING BELT INSTALLATION**).

TIMING BELT DRIVE PULLEY REPLACEMENT

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Remove the crankshaft position (CKP) sensor (see **CKP SENSOR REPLACEMENT**).
3. Remove the timing belt drive pulley (A) and the key (B).

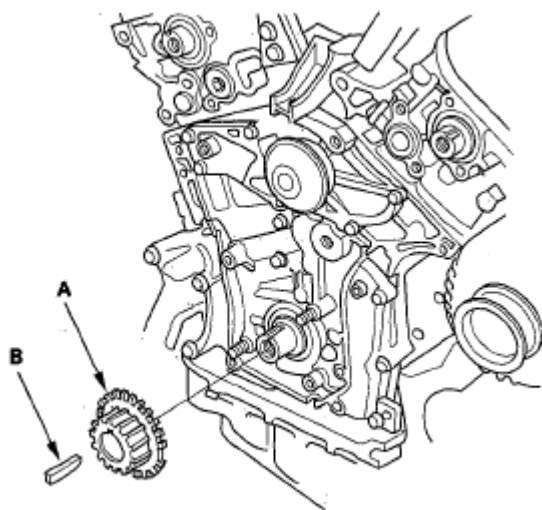


Fig. 226: Identifying Timing Belt Drive Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Inspect the timing belt pulley and the key for damage. If it is cracked or damaged, replace the timing belt drive pulley.
5. Install the new timing belt drive pulley and the key.
6. Install the CKP sensor (see **CKP SENSOR REPLACEMENT**).

7. Install the timing belt (see **TIMING BELT INSTALLATION**).
8. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

CYLINDER HEAD COVER REMOVAL

Front

1. Remove the intake manifold (see **REMOVAL**).
2. Remove the three ignition coils from the front cylinder head (see **IGNITION COIL REMOVAL/INSTALLATION**).
3. Remove the dipstick.
4. Remove the two bolts (A) securing the harness holder, and remove the harness clamp (B).

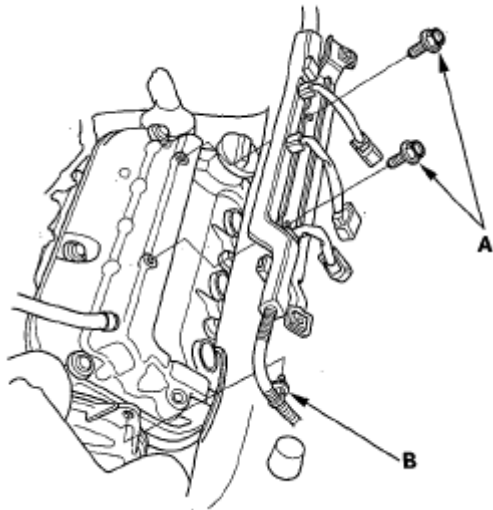


Fig. 227: Identifying Harness Clamp And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the front cylinder head cover.

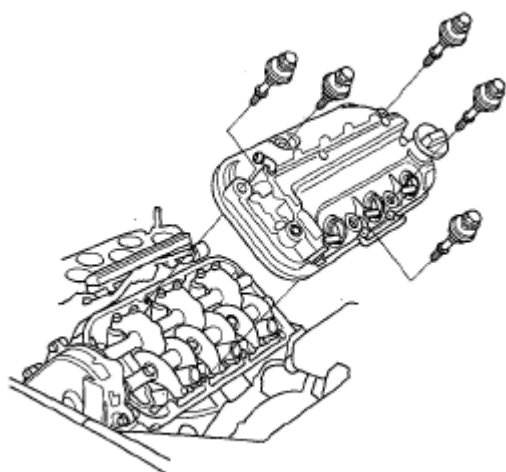


Fig. 228: Identifying Front Cylinder Head Cover
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rear

1. Remove the intake manifold (see **REMOVAL**).
2. Remove the three ignition coils from the rear cylinder head (see **IGNITION COIL REMOVAL/INSTALLATION**).
3. Disconnect the three injector connectors, rocker arm oil control solenoid connector, and engine oil pressure (EOP) sensor connector from the rear cylinder head.
4. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
5. Remove the power steering pump (see step 5 **CYLINDER HEAD REMOVAL**) with the hoses connected.
6. Remove the harness holder mounting bolts (A) and the engine ground cable bolt (B).

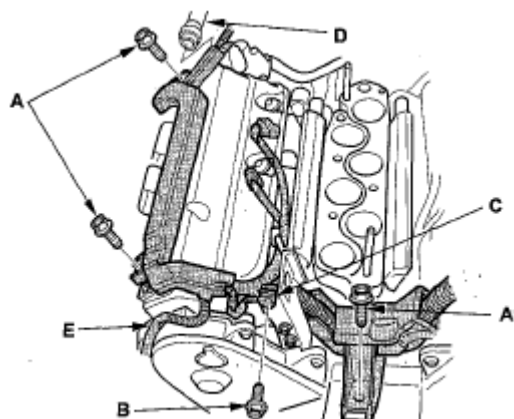


Fig. 229: Identifying Harness Holder Mounting Bolts And Engine Ground Cable Bolt
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the engine ground cable (C) and the breather hose (D).

8. Remove the harness (E) from the rear upper cover.
9. Remove the rear cylinder head cover.

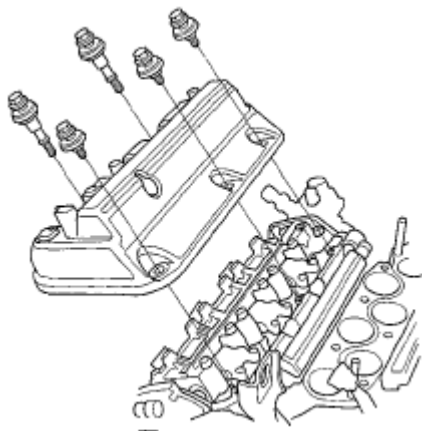


Fig. 230: Identifying Engine Ground Cable And Breather Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HEAD COVER INSTALLATION

Front

1. Check the spark plug seals for damage. If any seal is damaged, replace it.
2. Thoroughly clean the head cover gasket and the groove of the cylinder head cover.
3. Install the head cover gasket (A) in the groove of the cylinder head cover (B). Make sure the head cover gasket is seated securely.

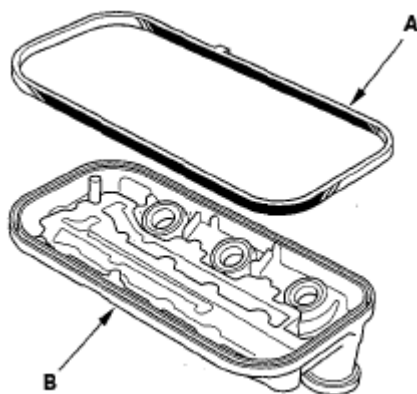


Fig. 231: Identifying Head Cover Gasket And Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Clean the head cover contacting surfaces with a shop towel.
5. Set the spark plug seals (A) on the spark plug tubes, and install the cylinder head cover (B).

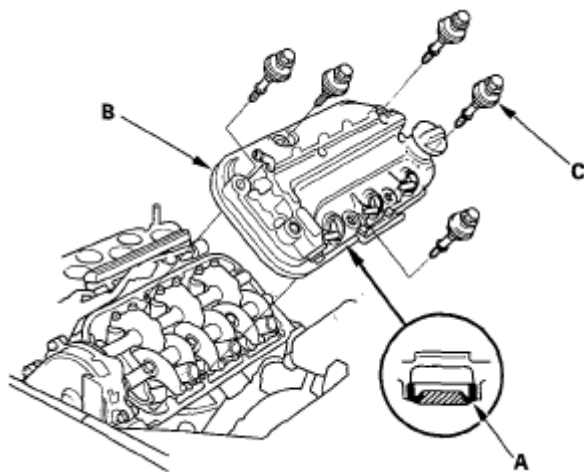


Fig. 232: Identifying Cylinder Head Cover And Spark Plug Seals
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Inspect the cover washers (C). Replace any washer that is damaged or deteriorated.
7. Tighten the bolts in three steps. In the final step tighten all bolts, in sequence, 12 N.m (1.2 kgf.m, 8.7 lbf.ft).

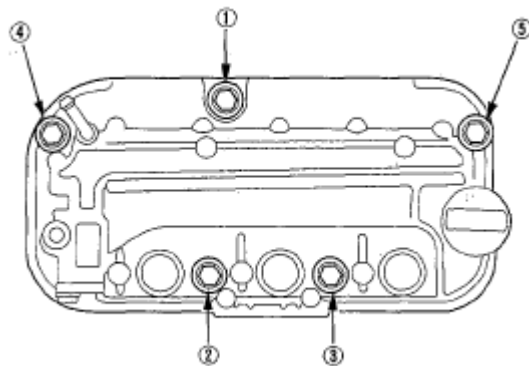


Fig. 233: Identifying Tightening Sequence Of Cylinder Head Cover Bolts
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Tighten the two bolts (A) securing the harness holder, and install the harness clamp (B).

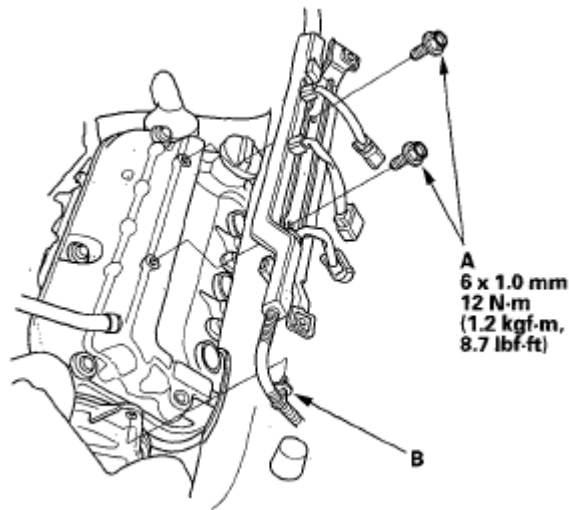


Fig. 234: Identifying Harness Clamp And Bolts With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Install the dipstick.
10. Install the three ignition coils to the front cylinder head (see **IGNITION COIL REMOVAL/INSTALLATION**).
11. Install the intake manifold (see **INSTALLATION**).

Rear

1. Check the spark plug seals for damage. If any seal is damaged, replace it.
2. Thoroughly clean the head cover gasket and the groove of the cylinder head cover.
3. Install the head cover gasket (A) in the groove of the cylinder head cover (B). Make sure the head cover gasket is seated securely.

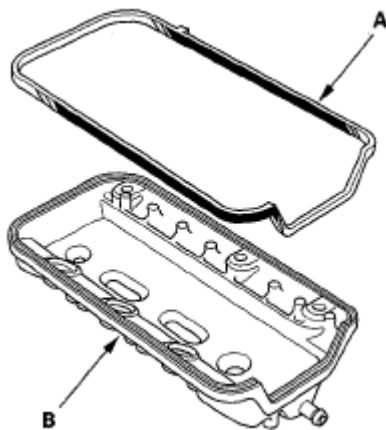


Fig. 235: Identifying Head Cover Gasket And Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove all of the old liquid gasket from the rocker shaft holder and cylinder head.
5. Clean the head cover contacting surfaces with a shop towel.
6. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the rocker shaft holder mating areas (A). Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

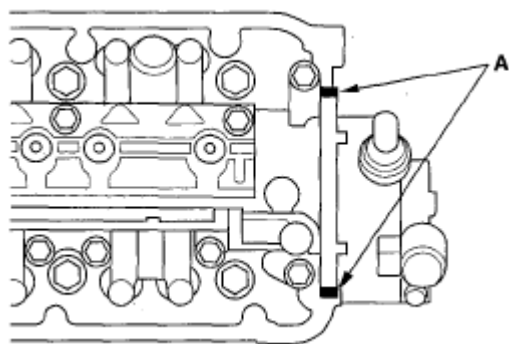


Fig. 236: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Set the spark plug seals (A) on the spark plug tubes, and install the rear cylinder head cover (B).

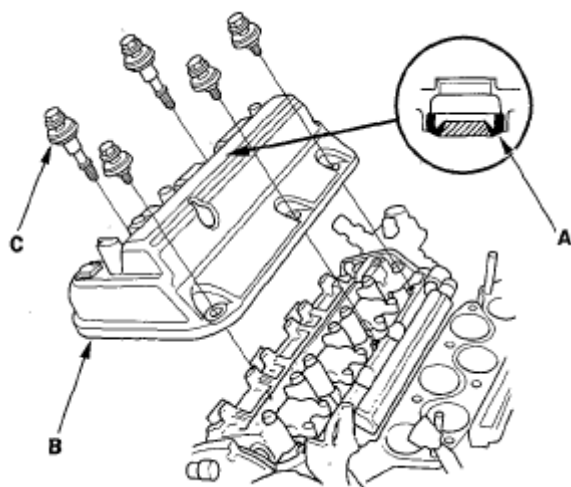


Fig. 237: Identifying Spark Plug Seals And Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Inspect the spark seals for damage.
9. Inspect the cover washers (C). Replace any washer that is damaged or deteriorated.

10. Tighten the bolts in three steps. In the final step tighten all bolts, in sequence, 12 N.m (1.2 kgf.m, 8.7 lbf.ft).

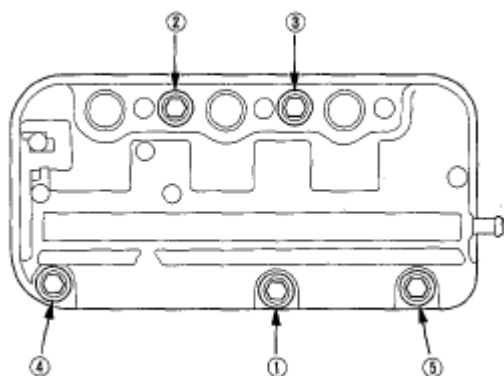


Fig. 238: Identifying Tightening Sequence Of Cylinder Head Cover Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Connect the rear rocker arm oil pressure switch connector (A), the rocker arm oil control solenoid B (BANK 1) connector (B), the rocker arm oil control solenoid A (BANK 1) connector (C), the rear air fuel ratio (A/F) sensor 1 connector (D), the rear secondary heated oxygen sensor 2 (secondary HO2S) connector (E), and the harness clamps (F), then install the harness holder (G).

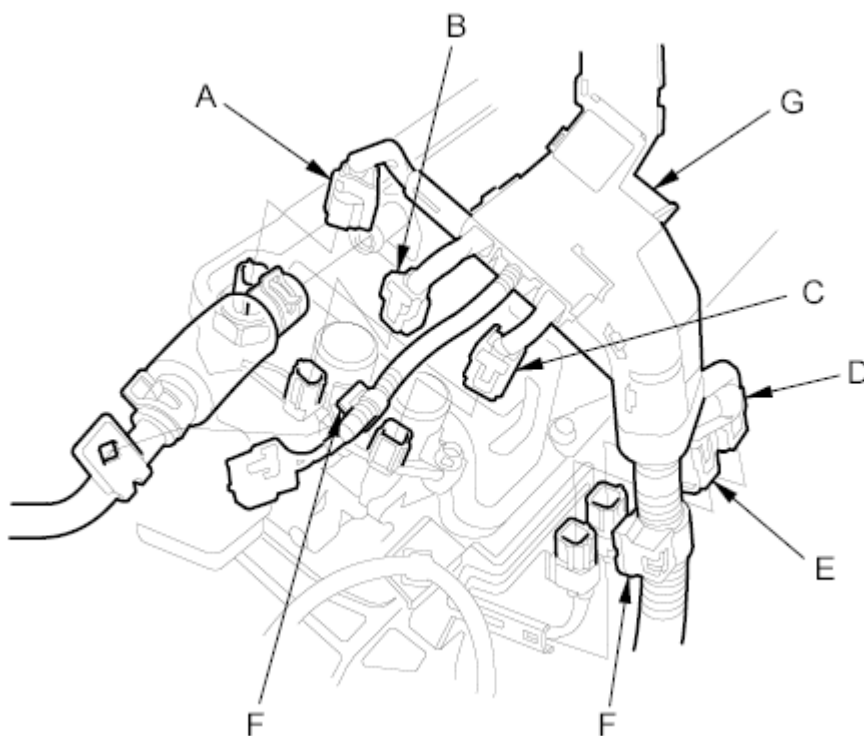


Fig. 239: Identifying Rear Rocker Arm Oil Pressure Switch Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Tighten the harness holder mounting bolts (A).

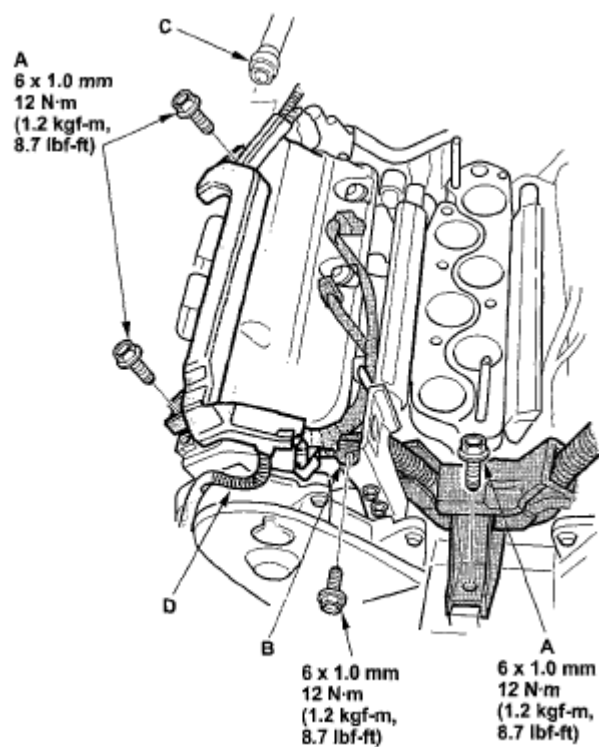


Fig. 240: Identifying Harness Holder Mounting Bolts With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the engine ground cable (B) and the breather hose (C), then install the harness (D) to the rear upper cover.
14. Reconnect the three injector connectors (E) and the two harness clips (F).
15. Install the power steering pump (see step 30 CAMSHAFT OIL SEAL INSTALLATION - IN CAR).
16. Install the drive belt (see DRIVE BELT REPLACEMENT).
17. Install the three ignition coils to the rear cylinder head (see IGNITION COIL REMOVAL/INSTALLATION).
18. Install the intake manifold (see INSTALLATION).

CYLINDER HEAD REMOVAL

NOTE:

- Use fender covers to avoid damaging painted surfaces.
- To avoid damaging the wires and terminals, unplug the wiring connectors carefully while holding the connector portion.
- Connect the Honda Diagnostic System (HDS) to the data link connector (DLC), and monitor the engine coolant temperature (ECT). To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 100°F (38°C) before loosening the cylinder head bolts.

- **Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.**

1. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING**).
2. Do the battery terminal disconnection procedure (see **BATTERY TERMINAL DISCONNECTION AND RECONNECTION**).
3. Drain the engine coolant (see **COOLANT CHECK**).
4. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
5. Remove the power steering (P/S) pump (A) and the bolt (B) securing the P/S hose bracket.

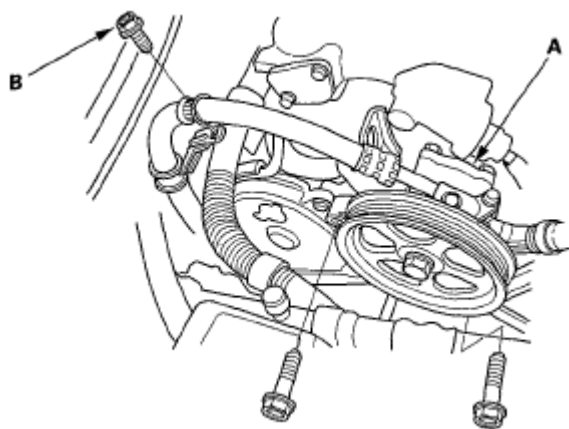


Fig. 241: Identifying Power Steering Pump And Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the alternator (see **REMOVAL ('07 MODEL)**).
7. Remove the intake manifold (see **REMOVAL**).
8. Remove the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
9. Remove the timing belt (see **TIMING BELT REMOVAL**).
10. Disconnect the following engine wire harness connectors and wire harness clamps from the cylinder head:
 - Six injector connectors
 - Engine coolant temperature (ECT) sensor 1 connector
 - Engine coolant temperature (ECT) sensor 2 connector
 - Camshaft position (CMP) sensor connector
 - Crankshaft position (CKP) sensor connector
 - Exhaust gas recirculation (EGR) valve connector
 - Rocker arm oil control solenoid connector
 - Engine oil pressure (EOP) sensor connector
 - Oil pressure switch connector
 - Two air fuel ratio (A/F) sensor connectors

- Two secondary heated oxygen sensor (secondary HO2S) connectors
11. Remove the front warm up three way catalytic converter (front WU-TWC) (see **FRONT**) and the rear warm up three way catalytic converter (rear WU-TWC) (see **REAR**).
 12. Remove the quick-connect fitting cover (A), then disconnect the fuel feed hose (B) (see **FUEL LINE/QUICK-CONNECT FITTING REMOVAL**).

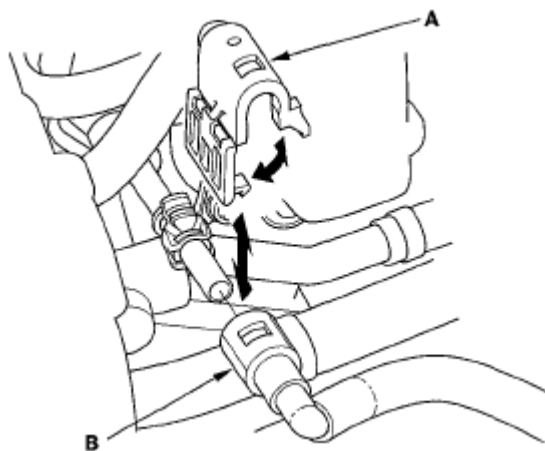


Fig. 242: Identifying Quick-Connect Fitting Cover
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the evaporative emission (EVAP) canister purge joint (A) from the bracket.

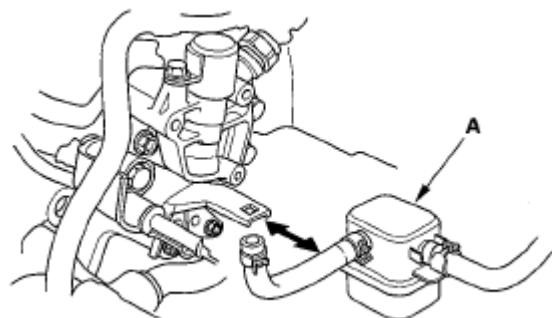


Fig. 243: Identifying Evaporative Emission Canister Purge Joint
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the connector bracket from the front cylinder head.

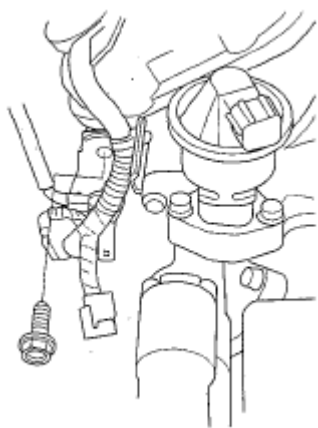


Fig. 244: Identifying Harness Bracket Bolt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the harness bracket from the front cylinder head.



Fig. 245: Identifying Harness Bracket Bolt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Remove the injector base.
17. Remove the water passage.
18. Remove the camshaft pulleys (A) and the back covers (B).

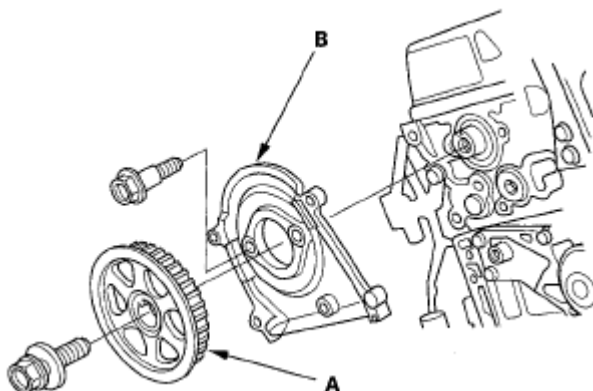


Fig. 246: Identifying Front And Rear Camshaft Pulleys And Front And Rear Back Covers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Remove the cylinder head covers.
20. Remove the cylinder head bolts. To prevent warpage, loosen the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

FRONT

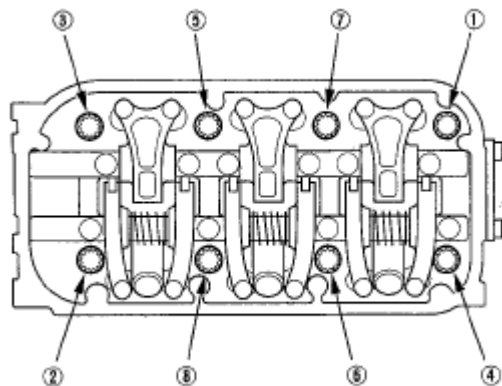


Fig. 247: Identifying Removing Sequence Of Cylinder Head Covers Bolts - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

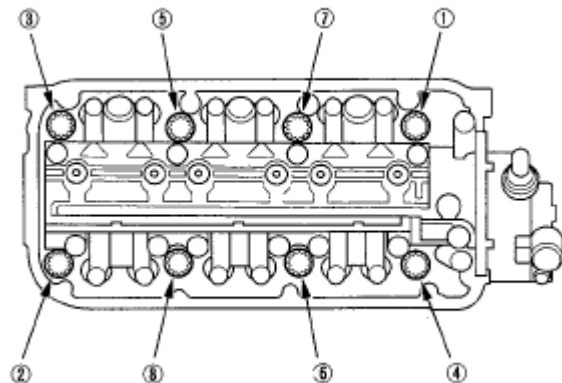


Fig. 248: Identifying Removing Sequence Of Cylinder Head Covers Bolts - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Remove the cylinder heads.

CAMSHAFT REPLACEMENT

Front

1. Make sure you have the anti-theft code for the audio system and the navigation system (if equipped).

2. Disconnect the negative cable from the battery, then disconnect the positive cable.
3. Remove the battery.
4. Drain the engine coolant (see **COOLANT CHECK**).
5. Remove the upper radiator hose.

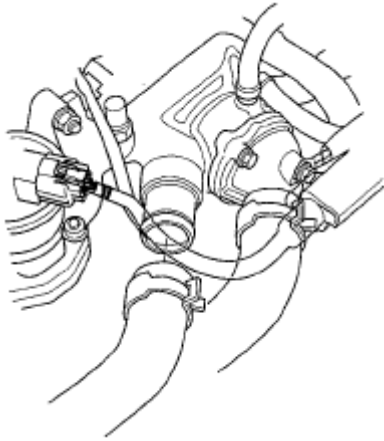


Fig. 249: Identifying Upper Radiator Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the exhaust gas recirculation (EGR) valve (see **EGR VALVE REPLACEMENT**).
7. Remove the stud bolts (A).

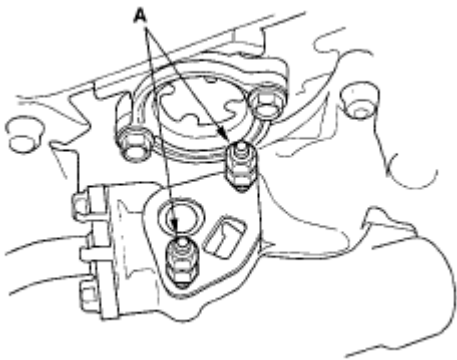


Fig. 250: Identifying Stud Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the timing belt (see **TIMING BELT REMOVAL**).
9. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
10. Remove the front camshaft pulley.
11. Remove the thrust cover (A), then remove the front camshaft (B).

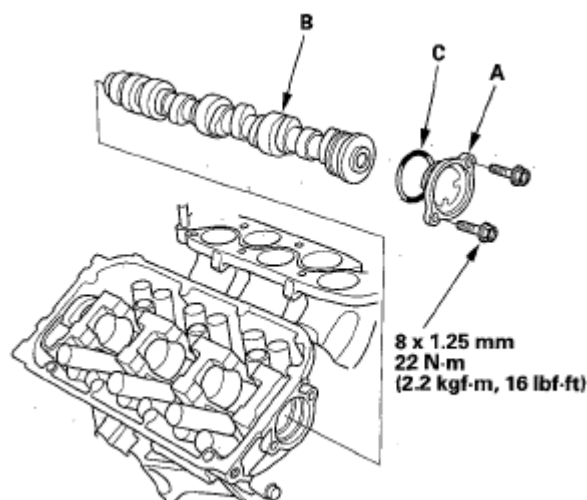


Fig. 251: Identifying Thrust Cover And Camshaft With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the front camshaft in the reverse order of removal with a new O-ring (C). Apply new engine oil to the journals and the cam lobes.
13. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the front camshaft pulley (see step 11 **REAR**).
14. Install the rocker arm assembly, then tighten the mounting bolts (see step 9 **CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION**).
15. Install the timing belt (see **TIMING BELT INSTALLATION**).
16. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
17. Install the upper radiator hose.
18. Install the battery. Clean the battery posts and cable terminals, then assemble them and apply grease to prevent corrosion.
19. Fill the radiator with engine coolant and bleed the air out from the system (see step 8 **THERMOSTAT REPLACEMENT**).
20. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).
21. Enter the anti-theft code for the audio system and the navigation system (if equipped).
22. Set the clock (on vehicles without navigation).

Rear

1. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING**).
2. Remove the air cleaner assembly (see **AIR CLEANER REMOVAL/INSTALLATION**).
3. Remove the intake manifold (see **REMOVAL**).
4. Remove the quick-connect fitting cover (A), then disconnect the fuel feed hose (B) (see **FUEL LINE/QUICK-CONNECT FITTING REMOVAL**).

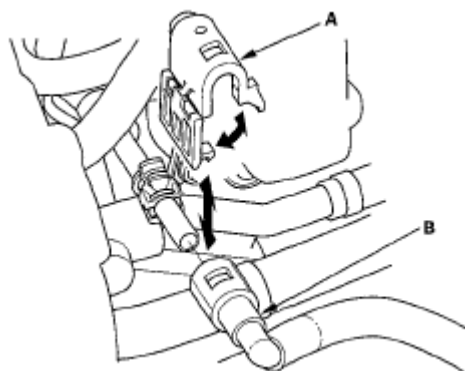


Fig. 252: Identifying Quick-Connect Fitting Cover And Fuel Feed Hose
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the brake lines from the master cylinder (see **MASTER CYLINDER REPLACEMENT**).
6. Remove the timing belt (see **TIMING BELT REMOVAL**).
7. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
8. Remove the rear camshaft pulley.
9. Remove the thrust cover (A), then remove the camshaft (B).

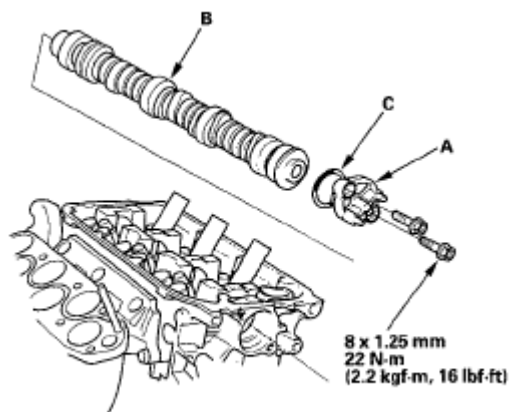


Fig. 253: Identifying Thrust Cover And Camshaft With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the camshaft in the reverse order of removal. Always use a new O-ring (C). Apply new engine oil to the journals and the cam lobes.
11. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head.
12. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the rocker shaft holder mating surface of the cylinder head (see step 8 **CYLINDER HEAD INSTALLATION**). Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.

- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

13. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the rear camshaft pulley (see step 12 **CYLINDER HEAD INSTALLATION**).
14. Install the rocker arm assembly, then tighten the mounting bolts (see step 10 **CYLINDER HEAD INSTALLATION**).
15. Install the timing belt (see **TIMING BELT INSTALLATION**).
16. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
17. Install the brake lines (see **MASTER CYLINDER REPLACEMENT**) and do the brake system bleeding procedure (see **BRAKE SYSTEM BLEEDING**).
18. Connect the fuel feed hose (see **FUEL LINE/QUICK-CONNECT FITTING INSTALLATION**), then install the quick-connect fitting cover.
19. Install the intake manifold (see **INSTALLATION**).
20. Install the air cleaner assembly (see **AIR CLEANER REMOVAL/INSTALLATION**).
21. Inspect for fuel leaks. Turn the ignition switch to ON (II) (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation three times, then check for fuel leakage at any point in the fuel line.
22. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

CYLINDER HEAD INSPECTION FOR WARPAGE

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
2. Inspect the camshaft (see **CAMSHAFT INSPECTION**).
3. Check the cylinder head for warpage. Measure along the edges, and three ways across the center.
 - 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 the cylinder head.
 - Maximum resurface limit is 0.2 mm (0.008 in.) based on a height of 121 mm (4.76 in.).

Cylinder Head Height

Standard (New): 120.95-121.05 mm (4.762-4.766 in.)

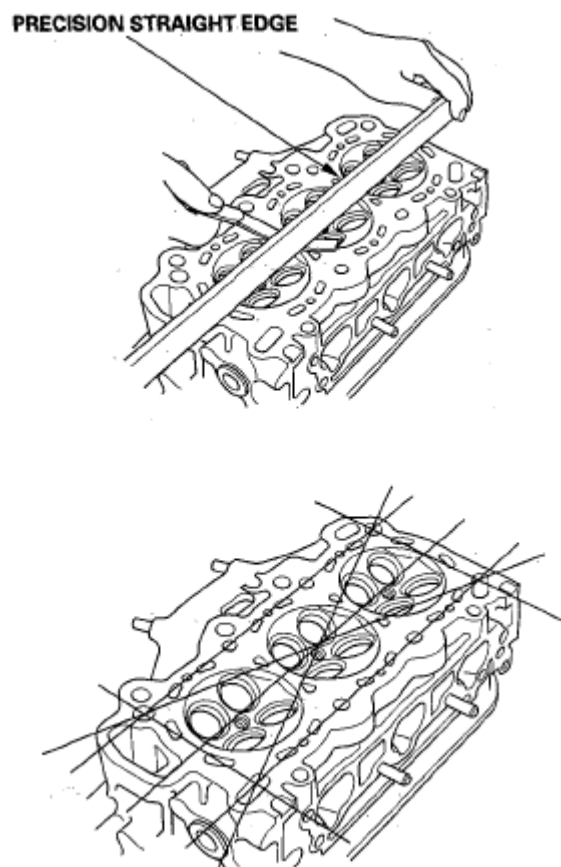


Fig. 254: Identifying Cylinder Head Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM ASSEMBLY REMOVAL

Front

1. Remove the cylinder head cover (see **CYLINDER HEAD COVER REMOVAL**).
2. Loosen the locknuts and the adjusting screws (A).

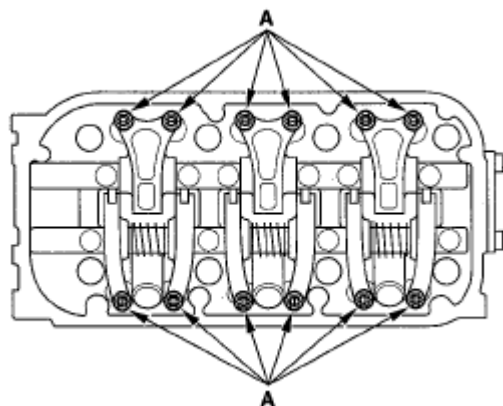


Fig. 255: Identifying Adjusting Screws

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the bolts and the rocker arm assembly.
1. Loosen the rocker shaft mounting bolts in sequence two turns at a time, to prevent damaging the valves or rocker arm assembly.
2. When removing the rocker arm assembly, do not remove the rocker shaft mounting bolts. The bolts will keep the springs and the rocker arms on the shafts.

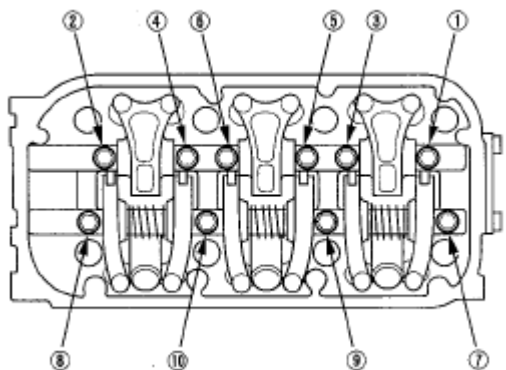


Fig. 256: Identifying Removing Sequence Of Rocker Shaft Mounting Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rear

1. Remove the cylinder head cover (see CYLINDER HEAD COVER INSTALLATION).
2. Loosen the locknuts and the adjusting screws (A).

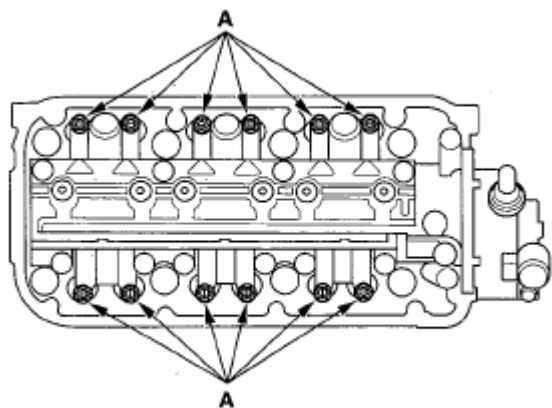


Fig. 257: Identifying Adjusting Screws

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the bolts and the rocker arm assembly.
1. Loosen the rocker shaft bridge mounting bolts and the rocker shaft holder mounting bolts in sequence two

turns at a time, to prevent damaging the valves or rocker arm assembly.

2. When removing the rocker arm assembly, do not remove the rocker shaft bridge mounting bolts and the rocker shaft holder mounting bolts. The bolts will keep the rocker arms on the shafts.

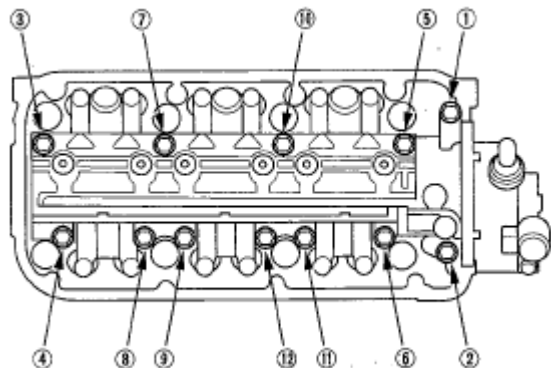


Fig. 258: Identifying Removing Sequence Of Rocker Shaft Holder Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY

Front

NOTE:

- Identify parts as they are removed so they can be reinstalled in their original locations.
- Inspect the rocker shafts and the rocker arms (see **ROCKER ARM AND SHAFT INSPECTION**).
- If reused, the rocker arms must be installed in their original locations.
- When removing or installing the rocker arm assembly, do not remove the rocker shaft mounting bolts. The bolts will keep the springs and the rocker arms on the shaft.
- Prior to reassembling, clean all the parts in solvent, dry them, and apply new engine oil to any contact points.

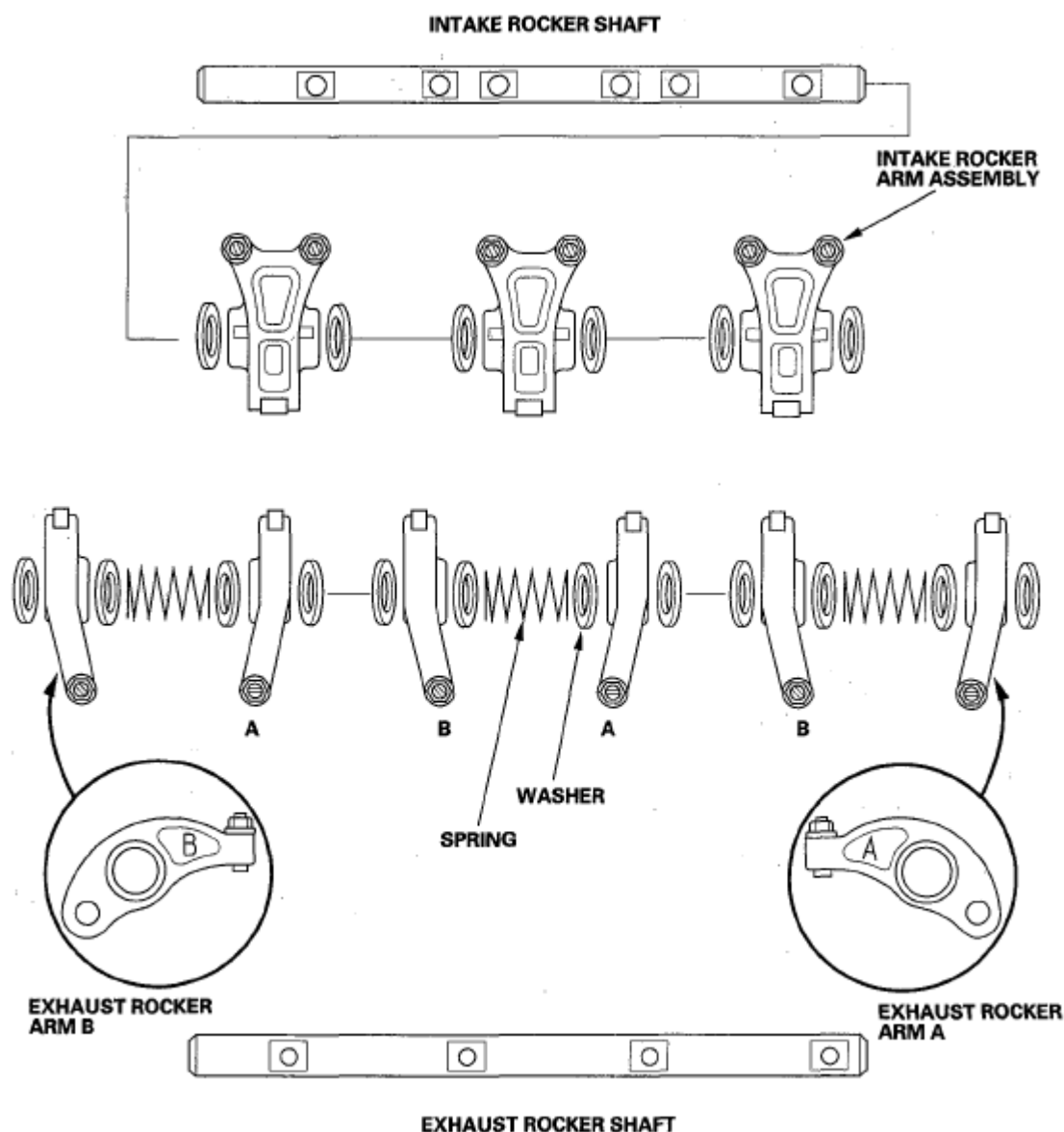


Fig. 259: Identifying Rocker Arm And Shaft Assembly Components - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rear

NOTE:

- Identify parts as they are removed so they can be reinstalled in their original locations.
- Inspect the rocker shafts and the rocker arms (see **ROCKER ARM AND SHAFT INSPECTION**).
- If reused, the rocker arms must be installed in their original locations.
- When removing or installing the rocker arm assembly, do not remove the mounting bolts. The bolts will keep the rocker arms, rocker shaft bridge, and rocker shaft on the shaft.

- If the rocker shaft does not remove or does not install by hand, remove or install the rocker shaft by heating the rocker shaft bridge.
- Bundle the rocker arms with rubber bands to keep them together as a set, and remove the bands after the rocker arms have been installed.
- Prior to reassembling, clean all the parts in solvent, dry them, and apply new engine oil to any contact points.
- When replacing the rocker arm assembly, remove the fastening hardware from the new rocker arm assembly.

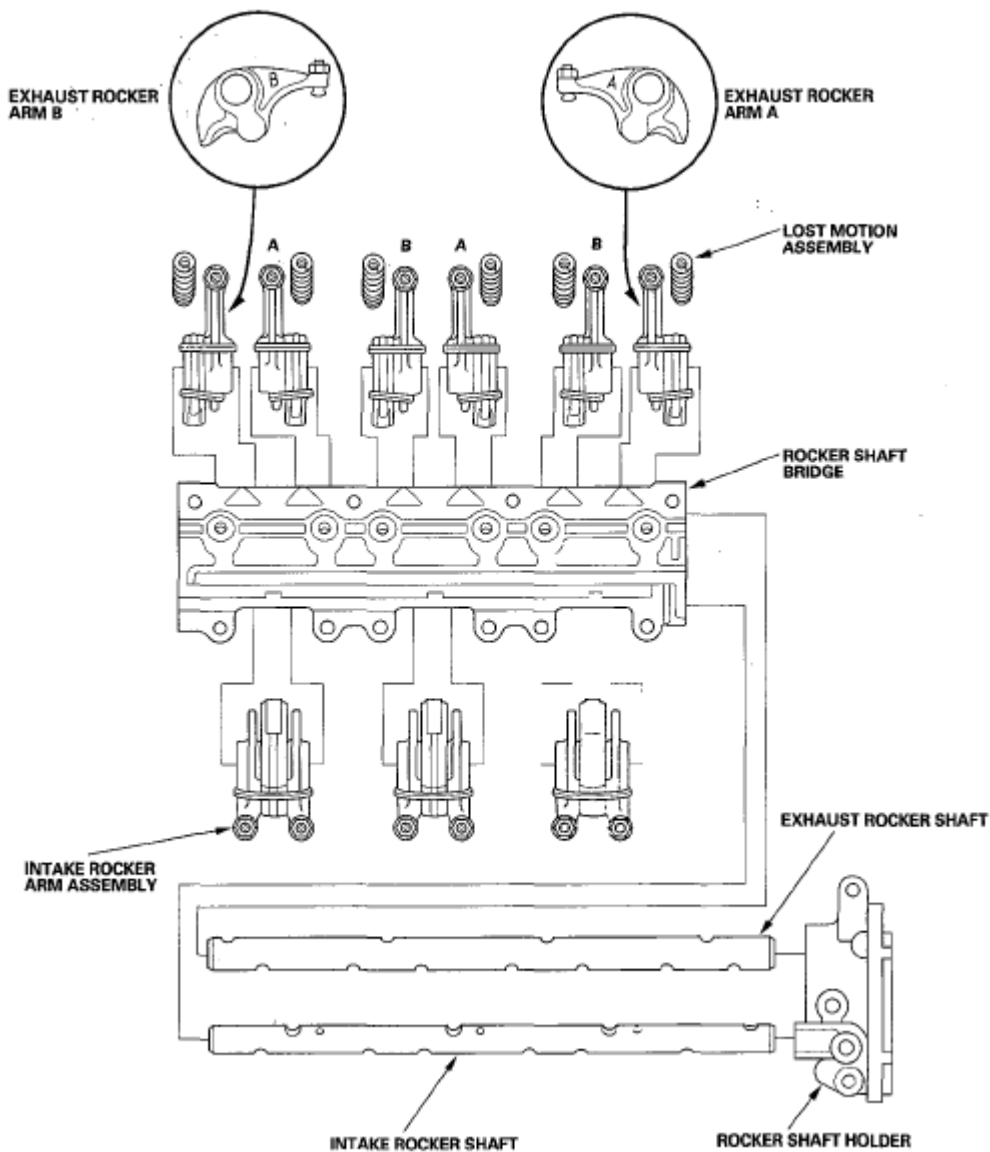


Fig. 260: Identifying Rocker Arm And Shaft Assembly Components - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT INSPECTION

1. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**), then
2. Disassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
3. Measure the diameter of the shaft at the first rocker location.

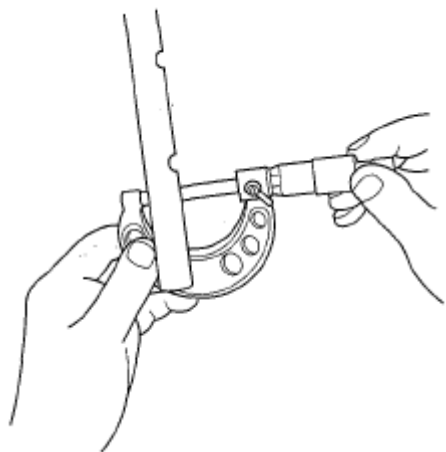


Fig. 261: Identifying Diameter Of Shaft

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Zero the gauge (A) to the shaft diameter.

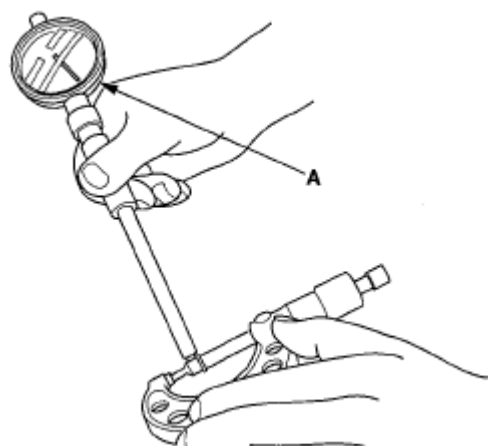


Fig. 262: Identifying Zero Gauge To Shaft Diameter

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the inside diameter of the rocker arm, and check it for an out-of-round condition.

No. 1, No. 2, No. 3, and No. 4 CYLINDERS:

Intake Rocker Arm-to-Shaft Clearance:

Standard (New): 0.015-0.046 mm (0.0006-0.0018 in.)

Service Limit: 0.046 mm (0.0018 in.)

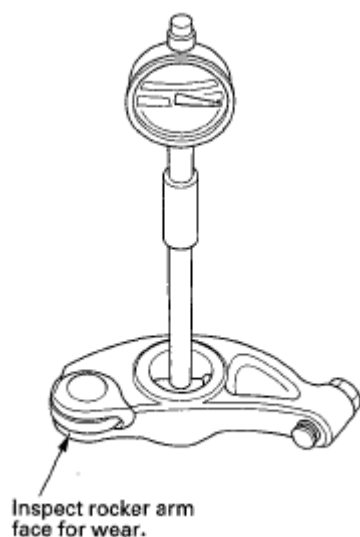
Exhaust Rocker Arm-to-Shaft Clearance:**Standard (New): 0.015-0.046 mm (0.0006-0.0018 in.)****Service Limit: 0.046 mm (0.0018 in.)****No. 5 and No. 6 CYLINDERS:****Intake Rocker Arm-to-Shaft Clearance:****Standard (New): 0.018-0.056 mm (0.0007-0.0022 in.)****Service Limit: 0.056 mm (0.0022 in.)****Exhaust Rocker Arm-to-Shaft Clearance:****Standard (New): 0.018-0.047 mm (0.0007-0.0019 in.)****Service Limit: 0.047 mm (0.0019 in.)**

Fig. 263: Identifying Inside Diameter Of Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Repeat for all rockers and both shafts. If the clearance is over the limit, replace the rocker shaft and all over-tolerance rocker arms. If any variable cylinder management rocker arm needs replacement, replace all rocker arms in that set (primary and secondary).

Variable Cylinder Management Rocker Arms

7. Inspect the rocker arm pistons (A). Slide them into the rocker arms. If they do not move smoothly, replace the rocker arm set.

NOTE:

- **Apply new engine oil to the rocker arm pistons when reassembling.**
- **When removing the rocker arm pistons from the intake primary rocker arm B and the exhaust secondary rocker arms (C), carefully apply air pressure to the oil passage of the rocker arm.**

INTAKE

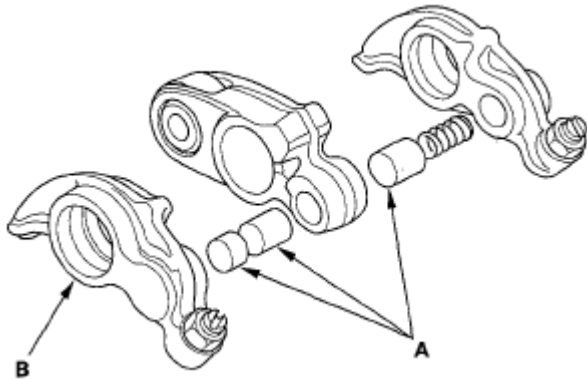


Fig. 264: Identifying Rocker Arm Pistons - Intake
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

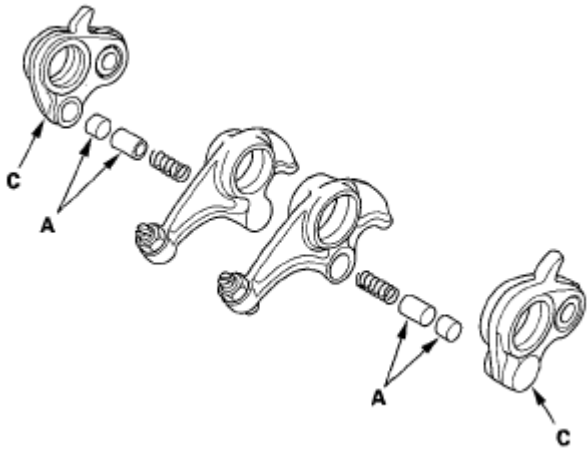


Fig. 265: Identifying Rocker Arm Pistons - Exhaust
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).

CAMSHAFT INSPECTION

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
2. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
3. Front: Put the rocker shafts on the front cylinder head, then tighten the bolts to the specified torque.

Specified Torque

8 x 1.25 mm: 24 N.m (2.4 kgf.m, 17 lbf.ft)

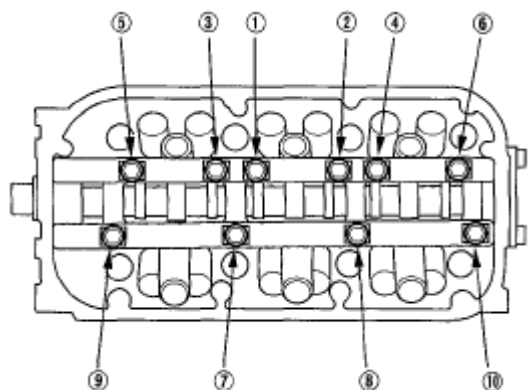


Fig. 266: Identifying Tightening Sequence Of Rocker Arm Bolts - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Rear: Put the rocker shaft bridge and rocker shaft holder on the rear cylinder head, then tighten the bolts to the specified torque.

Specified Torque

8 x 1.25 mm: 22 N.m (2.2 kgf.m, 15 lbf.ft)

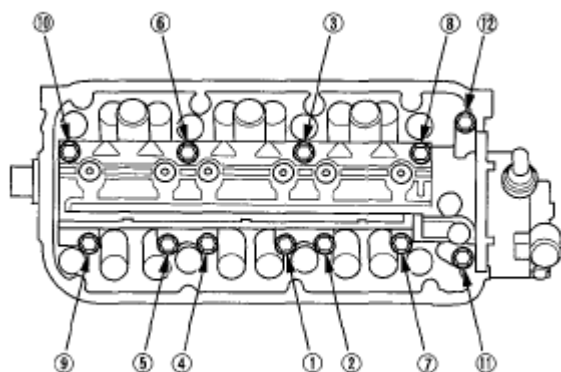


Fig. 267: Identifying Tightening Sequence Of Rocker Arm Bolts - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Seat the camshaft by pushing it toward the rear of the cylinder head.
6. Zero the dial indicator against the end of the camshaft. Push the camshaft back and forth and read the end play. If the end play is beyond the service limit, replace the thrust cover and recheck. If it is still beyond the service limit, replace the camshaft.

Camshaft End Play

Standard (New): 0.05-0.20 mm (0.002-0.008 in.)

Service Limit: 0.20 mm (0.008 in.)

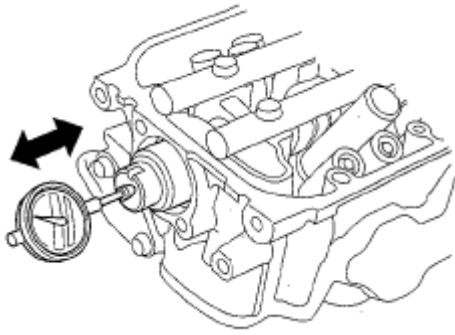


Fig. 268: Identifying Camshaft End Play

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the camshaft thrust cover (A), then pull out the camshaft (B).

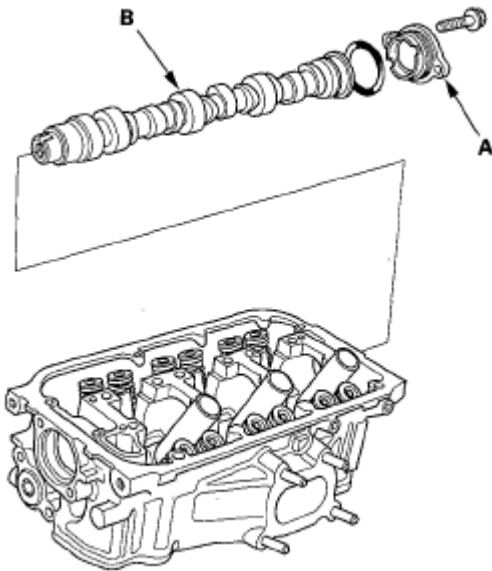


Fig. 269: Identifying Camshaft Thrust Cover And Camshaft

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Wipe the camshaft clean, then inspect the lift ramps. Replace the camshaft if any lobes are pitted, scored, or excessively worn.
9. Measure the diameter of each camshaft journal.

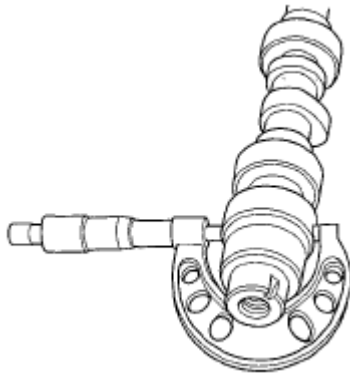


Fig. 270: Identifying Diameter Of Camshaft Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Zero the gauge to the journal diameter.

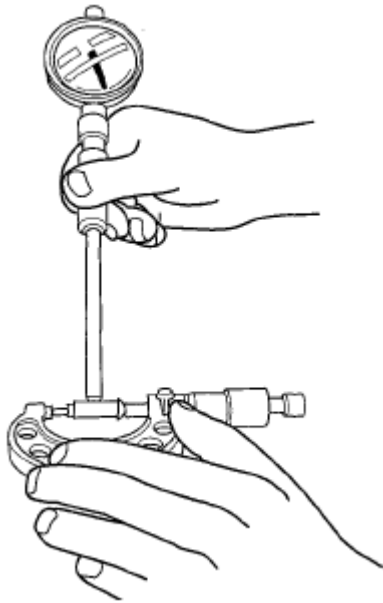


Fig. 271: Identifying Zero Gauge To Journal Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Clean the camshaft bearing surfaces in the cylinder head. Measure the inside diameter of each camshaft bearing surface, and check for an out-of-round condition.
- If the camshaft-to-holder clearance is within limits, go to step 13.
 - If the camshaft-to-holder clearance is beyond the service limit and the camshaft has been replaced, replace the cylinder head.
 - If the camshaft-to-holder clearance is beyond the service limit and the camshaft has not been replaced, go to step 12.

Camshaft-to-Holder Oil Clearance

Standard (New): 0.050-0.089 mm (0.0020-0.0035 in.)

Service Limit: 0.15 mm (0.006 in.)

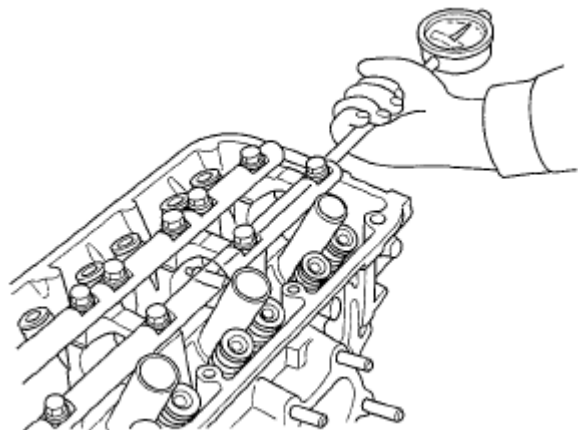


Fig. 272: Identifying Camshaft-To-Holder Oil Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Check total runout with the camshaft supported on V-blocks.
 - If the total runout of the camshaft is within the service limit, replace the cylinder head.
 - If the total runout is beyond the service limit, replace the camshaft and recheck the oil clearance. If the oil clearance is still out of tolerance, replace the cylinder head.

Camshaft Total Runout

Standard (New): 0.03 mm (0.001 in.) max.

Service Limit: 0.04 mm (0.002 in.)

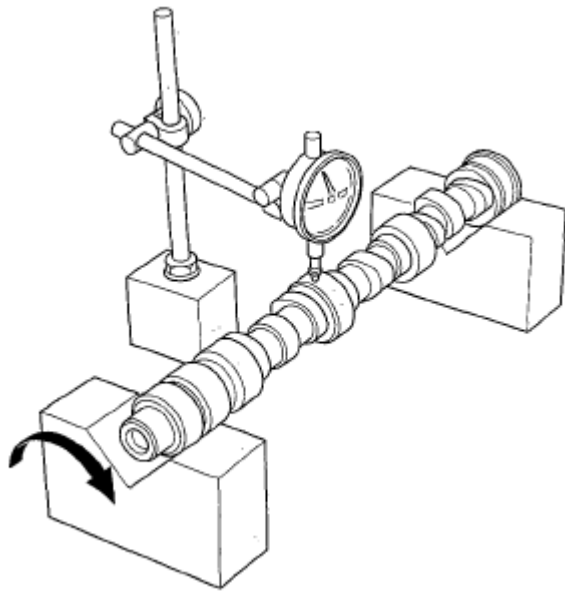


Fig. 273: Identifying Camshaft Total Runout

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Measure cam lobe height.

NOTE: When measuring the cam lobe height of the rear camshaft, measure the secondary cam lobes.

Cam Lobe Height Standard (New)

Front:

Intake: 36.149 mm (1.4232 in.)

Exhaust: 35.864 mm (1.4120 in.)

Rear:

Intake: 35.406 mm (1.3939 in.)

Exhaust: 37.035 mm (1.4581 in.)

FRONT

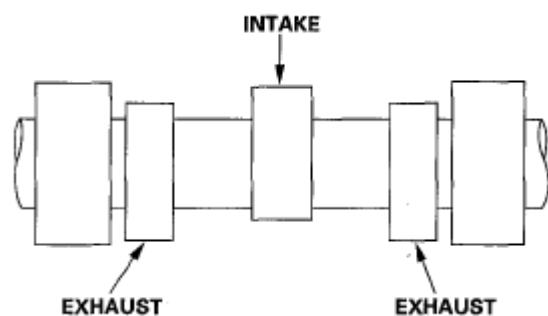


Fig. 274: Identifying Cam Lobe Height - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

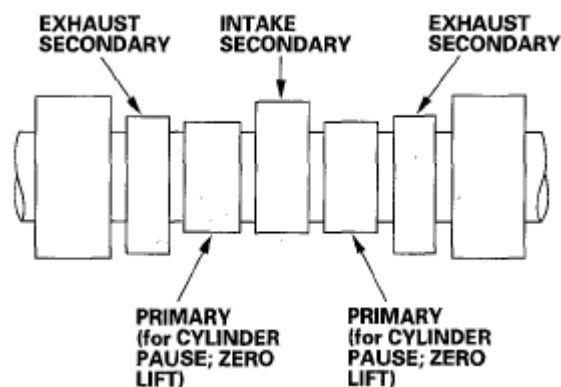


Fig. 275: Identifying Cam Lobe Height - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

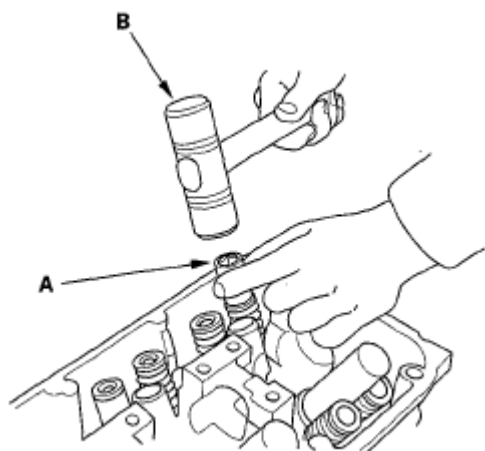
VALVE, SPRING, AND VALVE SEAL REMOVAL

Special Tools Required

Valve spring compressor attachment 07757-PJ1010A

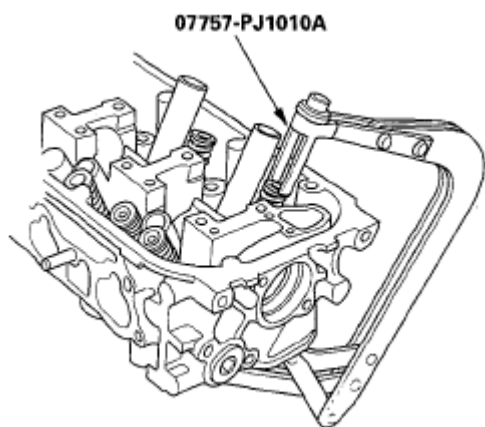
Identify the valves and the valve springs as they are removed so that each item can be reinstalled in its original position.

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
2. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
3. Using an appropriate-sized socket (A) and a plastic mallet (B), lightly tap the spring retainer to loosen the valve cotters.

**Fig. 276: Identifying Spring Retainer**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the valve spring compressor attachment and valve spring compressor. Compress the spring and remove the valve cotters.

**Fig. 277: Identifying Valve Cotters**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the valve spring compressor and the valve spring compressor attachment, the spring retainer, and the valve spring.
6. Install the valve guide seal remover (A).

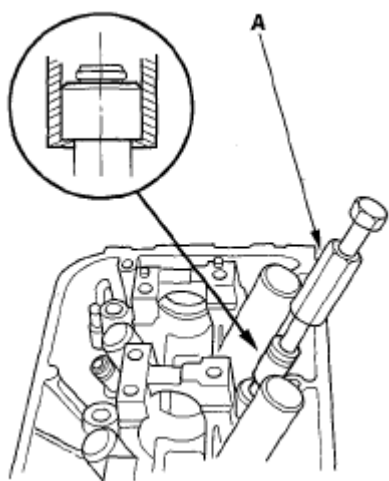


Fig. 278: Identifying Valve Guide Seal Remover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve seal.

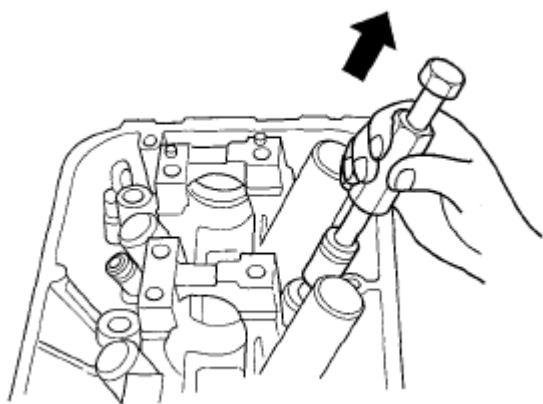


Fig. 279: Identifying Valve Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the valve spring seat and valve.

VALVE INSPECTION

1. Remove the valves (see **VALVE, SPRING, AND VALVE SEAL REMOVAL**).
2. Measure the valve in these areas.

Intake Valve Dimensions

A Standard (New): 34.90-35.10 mm (1.374-1.382 in.)

B Standard (New): 115.70-116.30 mm (4.555-4.579 in.)

C Standard (New): 5.485-5.495 mm (0.2159-0.2163 in.)

C Service Limit: 5.455 mm (0.2148 in.)

Exhaust Valve Dimensions

A Standard (New): 29.90-30.10 mm (1.177-1.185 in.)

B Standard (New): 113.90-114.50 mm (4.484-4.508 in.)

C Standard (New): 5.450-5.460 mm (0.2146-0.2150 in.)

C Service Limit: 5.420 mm (0.2134 in.)

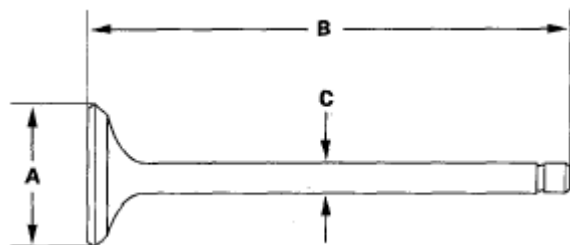


Fig. 280: Identifying Valve Dimension

Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE STEM-TO-GUIDE CLEARANCE INSPECTION

1. Remove the valves (see **VALVE, SPRING, AND VALVE SEAL REMOVAL**).
2. Slide the valve out of its guide about 10 mm (0.39 in.), then measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).
 - If the measurement exceeds the service limit, recheck it using a new valve.
 - If the measurement is now within the service limit, reassemble using a new valve.
 - If the measurement with a new valve still exceeds the service limit, go to step 3.

Intake Valve Stem-to-Guide Clearance

Standard (New): 0.04-0.09 mm (0.002-0.004 in.)

Service Limit: 0.16 mm (0.006 in.)

Exhaust Valve Stem-to-Guide Clearance

Standard (New): 0.11-0.16 mm (0.004-0.006 in.)

Service Limit: 0.22 mm (0.009 in.)

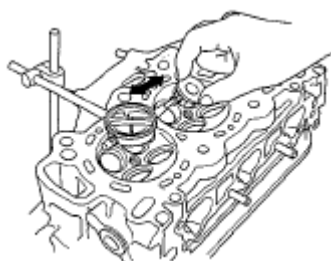


Fig. 281: Identifying Intake Valve Stem-To-Guide Clearance

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Subtract the valve stem O.D. (measured with a micrometer) from the valve guide I.D. (measured with an inside micrometer or a ball gauge).

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): 0.020-0.045 mm (0.0008-0.0018 in.)

Service Limit: 0.08 mm (0.003 in.)

Exhaust Valve Stem-to-Guide Clearance

Standard (New): 0.055-0.080 mm (0.0022-0.0031 in.)

Service Limit: 0.11 mm (0.004 in.)

VALVE GUIDE REPLACEMENT

Special Tools Required

- Valve guide driver, 5.5 mm 07742-0010100
 - Valve guide reamer, 5.5 mm 07HAH-PJ7A100
1. Inspect the valve stem-to-guide clearance (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**).
 2. As illustrated, use a commercially available air-impact valve guide driver (A) modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using the valve guide driver and a conventional hammer.

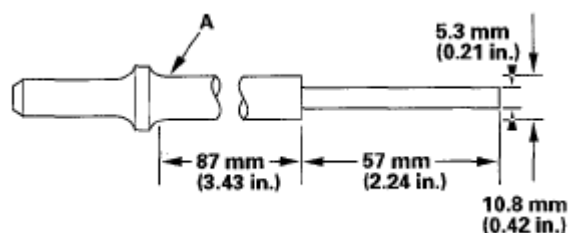


Fig. 282: Identifying Valve Guide Driver Dimension
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Select the proper replacement guides, and chill them in the freezer section of a refrigerator for about an hour.
4. Use a hot plate or oven to evenly heat the cylinder head to 300°F (150°C). Monitor the temperature with a cooking thermometer. Do not get the head hotter than 300°F (150°C); excessive heat may loosen the valve seats.

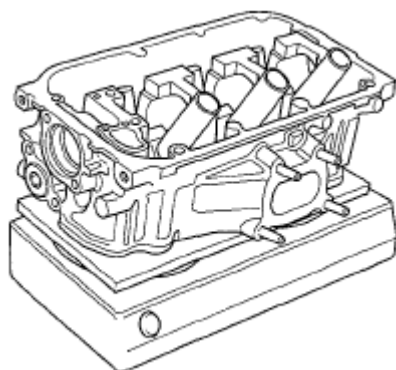


Fig. 283: Identifying Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.1 in.) towards the combustion chamber. This will knock off some of the carbon and make removal easier. Hold the air hammer directly in line with the valve guide to prevent damaging the driver. Wear safety goggles or a face shield.
6. Turn the head over, and drive the guide out toward the camshaft side of the head.

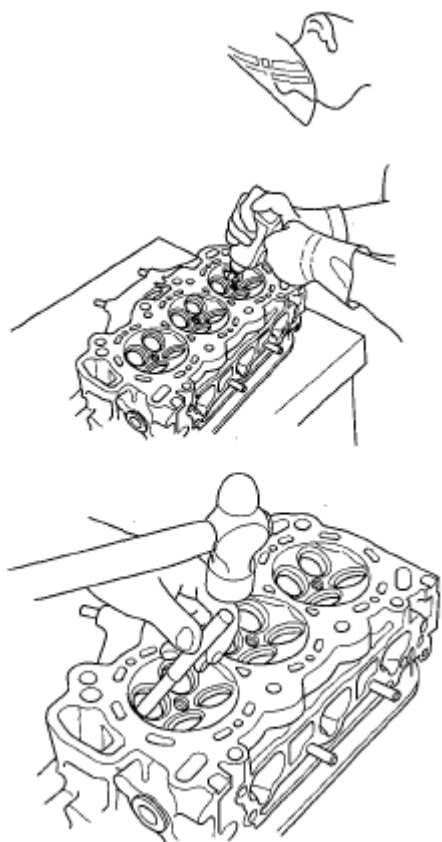


Fig. 284: Identifying Guide

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. If a valve guide still won't move, drill it out with a 8 mm (5/16 in.) bit, then try again.

NOTE: **Drill guides only in extreme cases; you could damage the cylinder head if the guide breaks.**

8. Take out the new guide(s) from the freezer, one at a time, as you need them.
9. Apply a thin coat of new engine oil to the outside of the new valve guide. Install the guide from the camshaft side of the head; use the valve guide driver to drive the guide to the specified installed height (A) of the guide (B). If you have all 12 guides to do, you may have to reheat the head.

Valve Guide Installed Height

Intake: 21.20-22.20 mm (0.835-0.874 in.)

Exhaust: 20.60-21.60 mm (0.811 -0.850 in.)

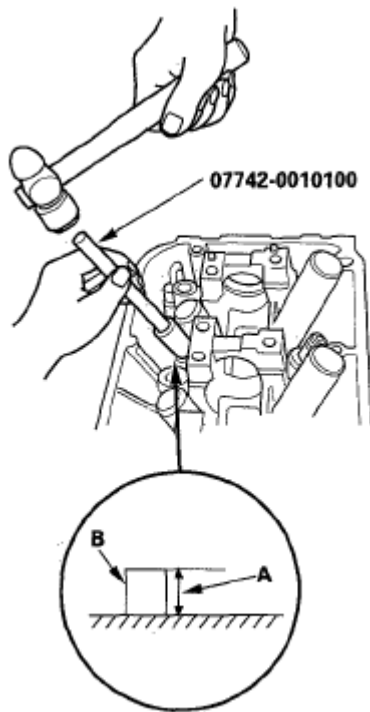


Fig. 285: Identifying Valve Guide Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Coat both the reamer and the valve guide with cutting oil.
11. Rotate the reamer clockwise the full length of the valve guide bore.

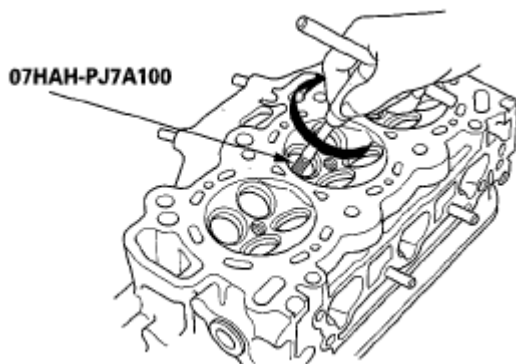


Fig. 286: Identifying Reaming Valve Guide
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Continue to rotate the reamer clockwise while removing it from the bore.
13. Thoroughly wash the guide in detergent and water to remove any cutting residue.
14. Check the clearance with a valve (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**). Verify that a valve slides in the intake and exhaust valve guides without sticking.
15. Inspect the valve seating. If necessary renew the valve seat using a valve seat cutter (see **VALVE SEAT**

RECONDITIONING).**VALVE SEAT RECONDITIONING**

1. Inspect valve stem-to-guide clearance (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**). If the valve guides are worn, replace them (see **VALVE GUIDE REPLACEMENT**) before cutting the valve seats.
2. Renew the valve seats in the cylinder head using a valve seat cutter.

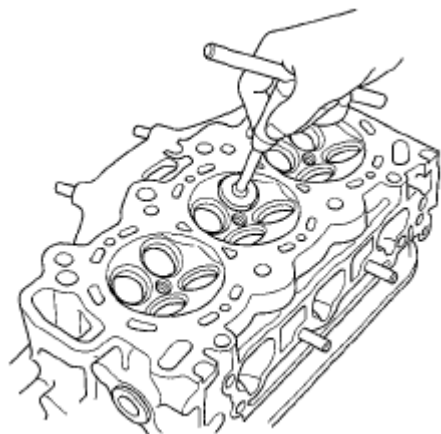


Fig. 287: Identifying Reaming Valve Seat
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.
4. Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 67.5° cutter (intake seat) or the 60° cutter (exhaust seat). Check the width of the seat and adjust accordingly.

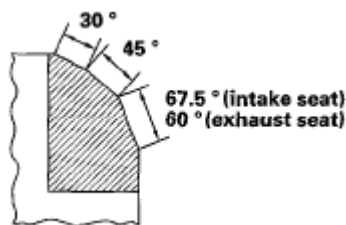


Fig. 288: Identifying Valve Seat Cutting Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

Valve Seat Width

Standard (New): 1.25-1.55 mm (0.049-0.061 in.)

Service Limit: 2.00 mm (0.079 in.)

6. After resurfacing the seat, inspect it for even valve seating. Apply Prussian Blue compound (A) to the valve face. Insert the valve in its original location in the head, then lift it and snap it closed against the seat several times.

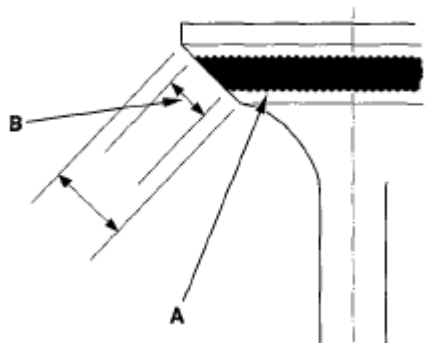


Fig. 289: Identifying Actual Valve Seating Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. The actual valve seating surface (B), 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 67.5° cutter (intake seat) or the 60° cutter (exhaust seat) 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.

8. Insert the intake and exhaust valves in the head, and measure the valve stem installed height (A).

Intake Valve Stem Installed Height

Standard (New): 46.75-47.55 mm (1.841-1.872 in.)

Service Limit: 47.80 mm (1.882 in.)

Exhaust Valve Stem Installed Height

Standard (New): 46.68-47.48 mm (1.838-1.869 in.)

Service Limit: 47.73 mm (1.879 in.)

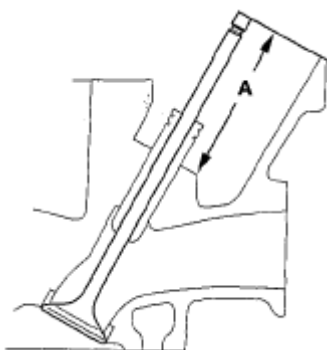


Fig. 290: Identifying Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

VALVE, SPRING, AND VALVE SEAL INSTALLATION

Special Tools Required

- Stem seal driver 07PAD-0010000
 - Valve spring compressor attachment 07757-PJ1010A
1. Coat the valve stems with new engine oil. Install the valves in the valve guides.
 2. Check that the valves move up and down smoothly.
 3. Install the spring seats on the cylinder head.
 4. Install the new valve seals (A) using the stem seal driver (B).

NOTE: Exhaust valve seals (C) have a black spring (D) and intake valve seals (E) have a white spring (F). They are not interchangeable.

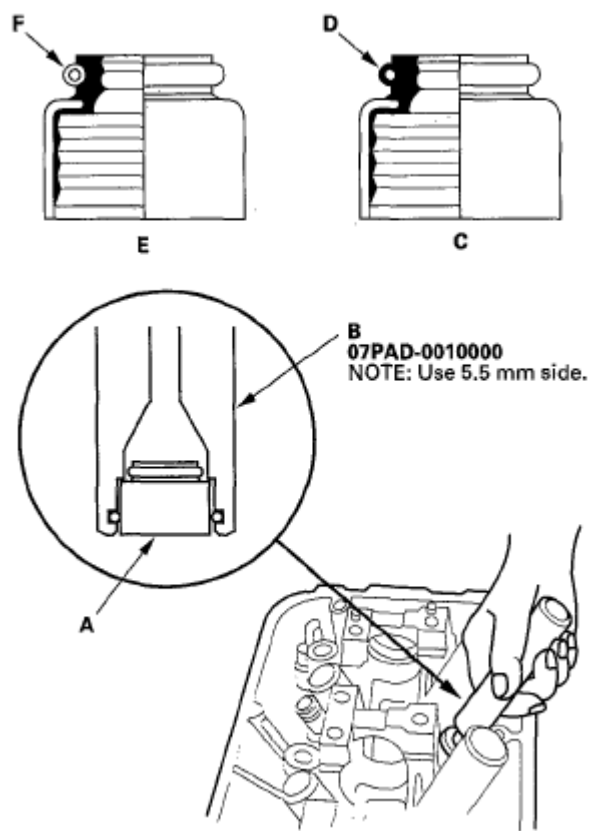


Fig. 291: Identifying Valve Seals

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the valve spring and the spring retainer. Place the end of the valve spring with closely wound coils toward the cylinder head.
6. Install the valve spring compressor attachment and valve spring compressor. Compress the spring and install the valve cotters.

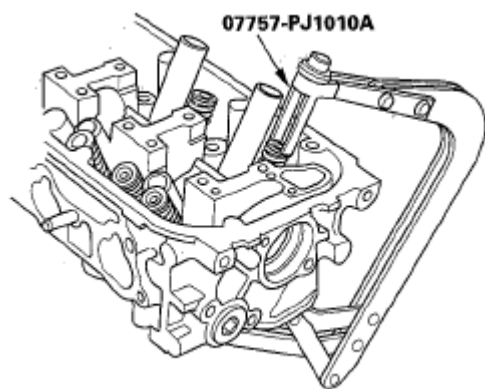


Fig. 292: Identifying Valve Cotters

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve spring compressor and the valve spring compressor attachment.

8. Lightly tap the end of each valve stem two or three times with a plastic mallet (A) to ensure proper seating of the valve and valve cotteners. Tap the valve stem only along its axis so you do not bend the stem.



Fig. 293: Identifying Valve Stem

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION

Front

1. Apply a light coat of new engine oil around the camshaft oil seal.
2. Gently tap the new camshaft oil seal (A) into the cylinder head.
 1. Tap the camshaft oil seal in squarely.
 2. Install the oil seal about 0.5-1.5 mm (0.02-0.06 in.) below the surface of the cylinder head.

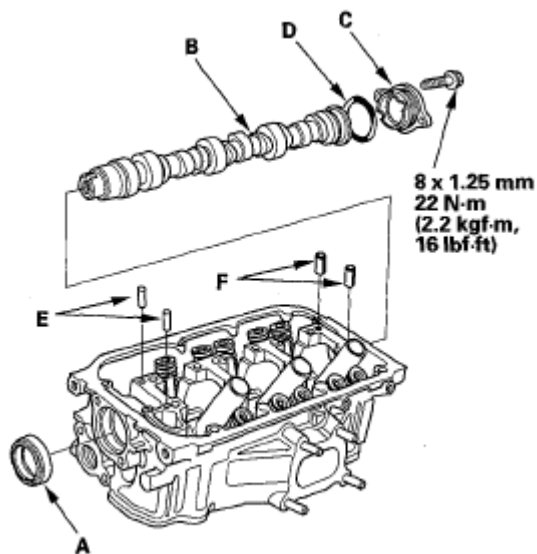


Fig. 294: Identifying Camshaft, Rocker Arm Assembly, Camshaft Seal And Pulley - Front With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Insert the camshaft (B) into the cylinder head, then install the camshaft thrust cover (C). Always use a new O-ring (D). Apply new engine oil to the journals and cam lobes.
4. Check that the oil seal lips are not distorted.
5. Install the solid dowel pins (E) and the hollow dowel pins (F).
6. Loosen the valve adjusting screws.
7. If the rocker arm assembly is disassembled, reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
8. Set the rocker arm assembly in place, and loosely install the bolts. Make sure the rocker arms are properly positioned on the valve stems.
9. Tighten each bolt two turns at a time in the sequence shown to ensure that the rockers do not bind on the valves.

Specified Torque

8 x 1.25 mm: 24 N.m (2.4 kgf.m, 17 lbf.ft)

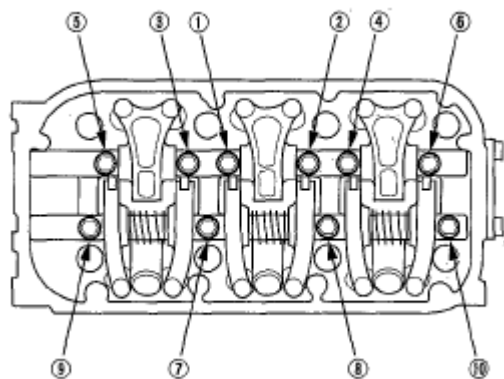


Fig. 295: Identifying Tightening Sequence Of Rocker Arm Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the injector base (A). Always use a new gasket (B).

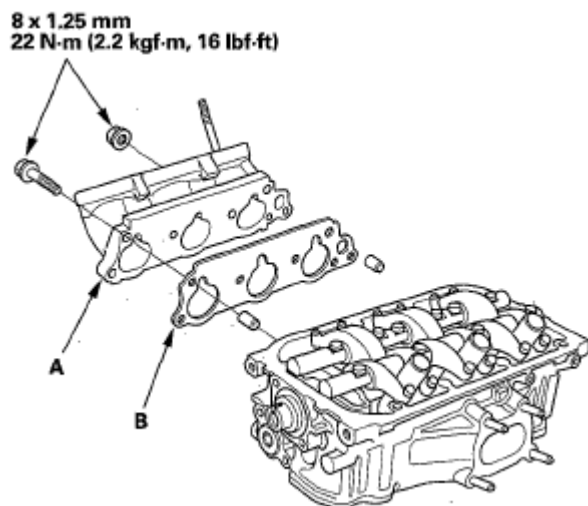


Fig. 296: Identifying Injector Base And Gasket With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Apply new engine oil to the threads of the camshaft pulley mounting bolt (A). Install the back cover (B), then install the camshaft pulley (C).

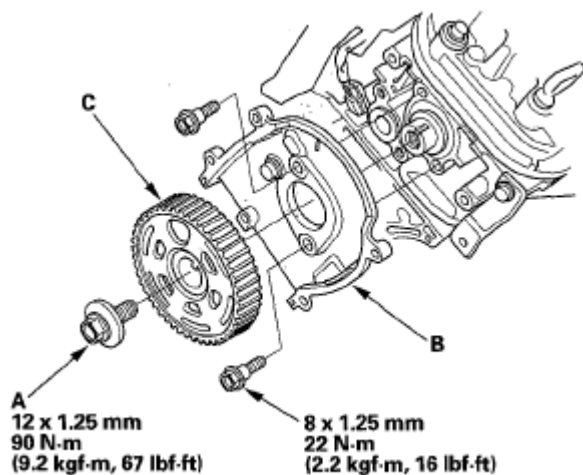


Fig. 297: Identifying Camshaft Pulley Mounting Bolt And Back Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Set the camshaft pulley to top dead center (TDC) before bolting them onto the engine block (see step 6 **CYLINDER HEAD INSTALLATION**).

Rear

1. Reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
2. Loosen the valve adjusting screws.
3. Apply a light coat of new engine oil around the camshaft oil seal.

4. Gently tap the new camshaft oil seal (A) into the cylinder head.
 1. Tap the camshaft oil seal in squarely.
 2. Install the oil seal about 0.5-1.5 mm (0.02-0.06 in.) below the surface of the cylinder head.

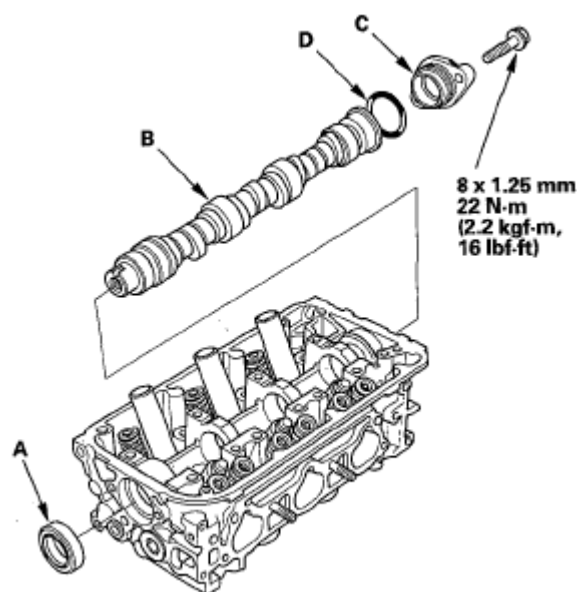


Fig. 298: Identifying Camshaft, Rocker Arm Assembly, Camshaft Seal And Pulley - Rear With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Insert the camshaft (B) into the cylinder head, then install the camshaft thrust cover (C). Always use a new O-ring (D). Apply new engine oil to the journals and cam lobes.
6. Check that the oil seal lips are not distorted.
7. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head.
8. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the rocker shaft holder mating surface of the cylinder head. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

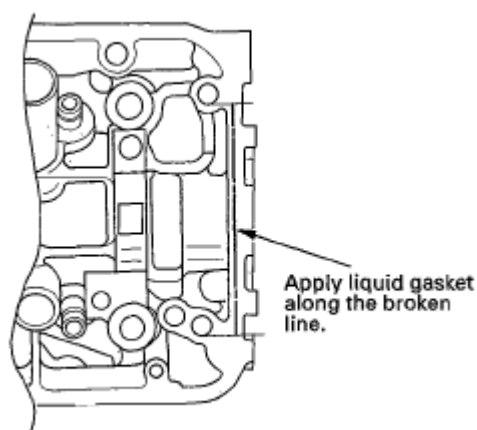


Fig. 299: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Set the rocker arm assembly in place, and loosely install the bolts. Make sure the rocker arms are properly positioned on the valve stems, and the dowel pins in the rocker shaft bridge are properly positioned to the cylinder head.
10. Tighten each bolt two turns at a time in the sequence shown to ensure that the rockers do not bind on the valves.

Specified Torque

8 x 1.25 mm: 22 N.m (2.2 kgf.m, 16 lbf.ft)

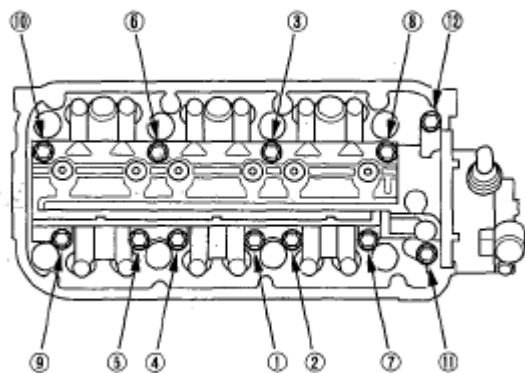


Fig. 300: Identifying Tightening Sequence Of Rocker Arm Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the injector base (A). Always use a new gasket (B).

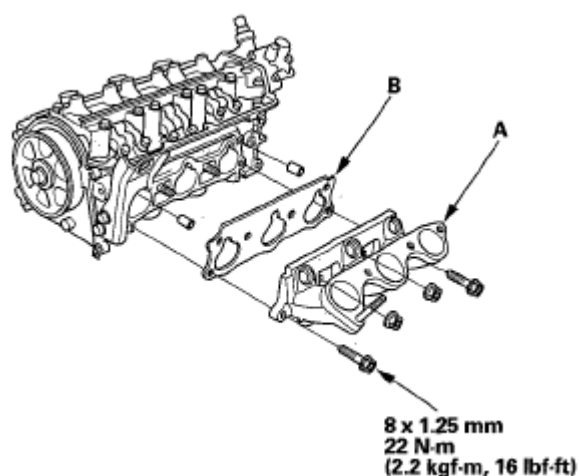


Fig. 301: Identifying Injector Base And Gasket With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Apply new engine oil to the threads of the camshaft pulley mounting bolt (A). Install the back cover (B), then install the camshaft pulley (C).

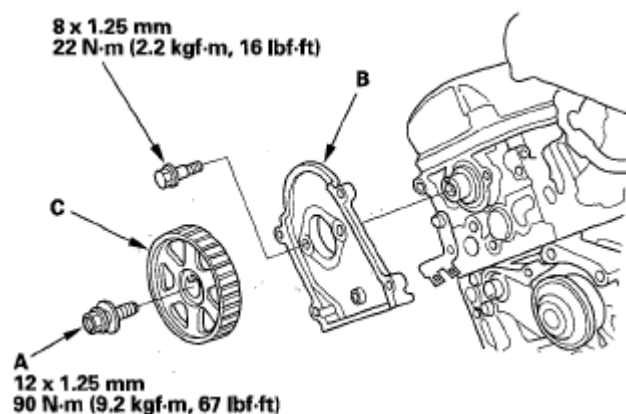


Fig. 302: Identifying Camshaft Pulley Mounting Bolt And Back Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Set the camshaft pulley to top dead center (TDC) before bolting them onto the engine block (see step 6 **CYLINDER HEAD INSTALLATION**).

CYLINDER HEAD INSTALLATION

1. Clean the cylinder head and the engine block surface.
2. Clean and install the oil control orifices (A) with new O-rings (B).

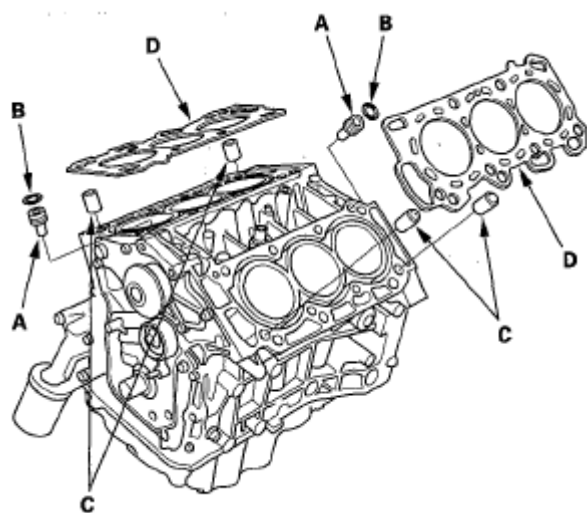


Fig. 303: Identifying Oil Control Orifices, O-Rings And Dowel Pins
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the dowel pins (C) and the new cylinder head gaskets (D).
4. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
5. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.

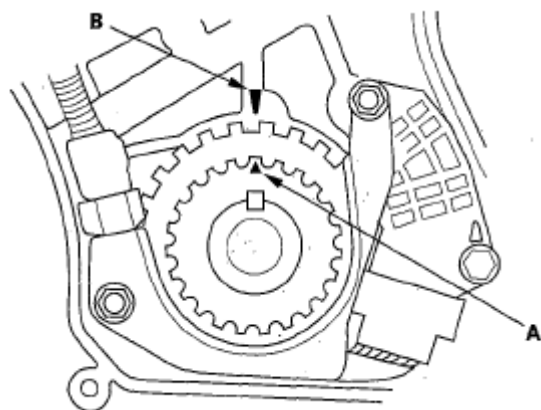


Fig. 304: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley With Oil Pump
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

FRONT

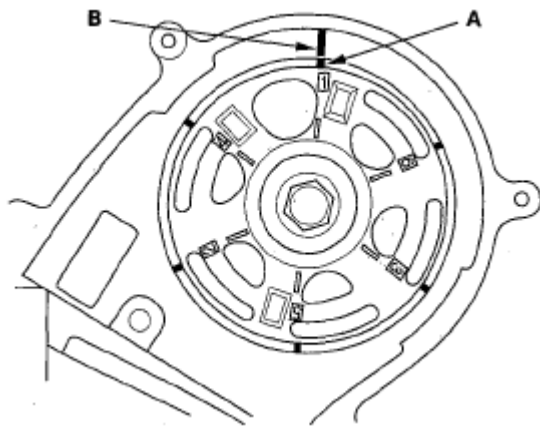


Fig. 305: Identifying TDC Marks On Camshaft Pulleys With Back Covers - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

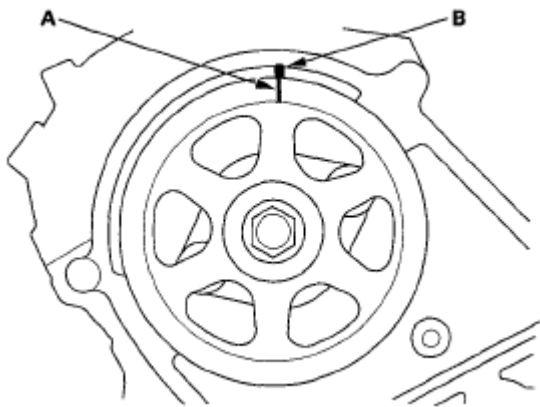


Fig. 306: Identifying TDC Marks On Camshaft Pulleys With Back Covers - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install the cylinder head onto the engine block.
8. Measure the diameter of each cylinder head bolt at point A and point B.

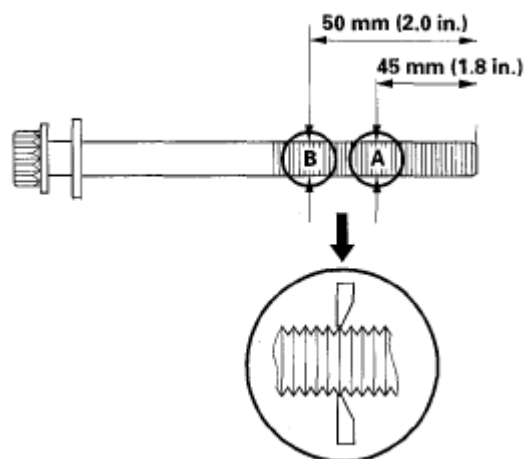


Fig. 307: Identifying Diameter Of Cylinder Head Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. If either diameter is less than 11.3 mm (0.44 in.), replace the cylinder head bolt.
10. Apply new engine oil to the threads and under the bolt heads of all cylinder head bolts.
11. Tighten the cylinder head bolts in sequence to 29 N.m (3.0 kgf.m, 22 lbf.ft). Using a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and do not overtighten. If a bolt makes any noise while you are torquing it, loosen the bolt and retorque it from the first step.

FRONT

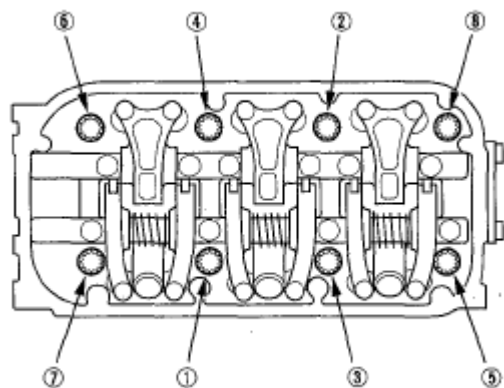


Fig. 308: Identifying Tightening Sequence Of Cylinder Head Bolts - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

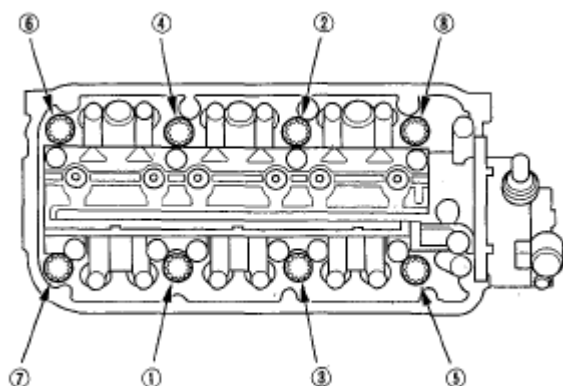


Fig. 309: Identifying Tightening Sequence Of Cylinder Head Bolts - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. After torquing, tighten all cylinder head bolts in two steps (90° per step). If you are using a new cylinder head bolt, tighten the bolt an extra 90°

NOTE: Remove the cylinder head bolt if you tightened it beyond the specified angle, and go back to step 8 of the procedure. Do not loosen it back to the specified angle.

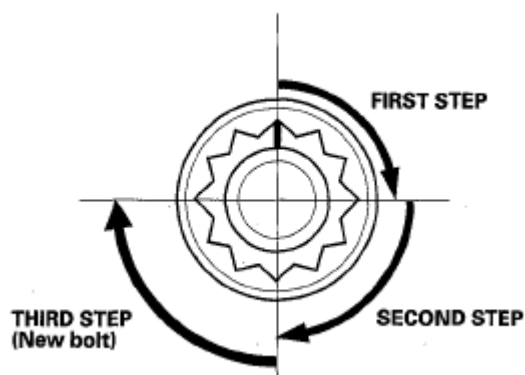


Fig. 310: Identifying Cylinder Head Bolt Tightening Steps
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the timing belt (see **TIMING BELT INSTALLATION**).
14. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
15. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**).
16. Install the front warm up three way catalytic converter (front WU-TWC) (see **FRONT**) and the rear warm up three way catalytic converters (rear WU-TWC) (see **REAR**).
17. Install the water passage (A). Always use a new O-ring (B) and the new gaskets (C).

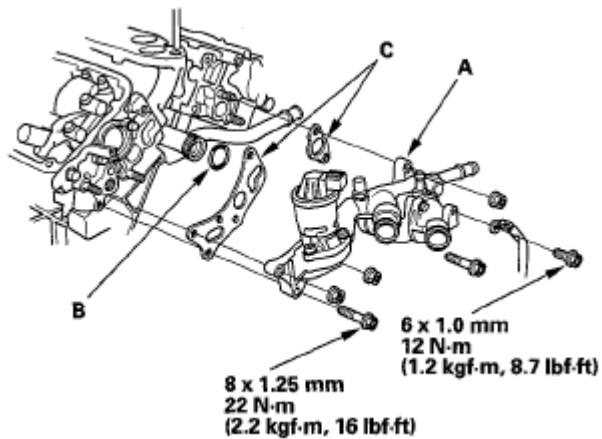


Fig. 311: Identifying Water Passage, O-Ring And Gaskets With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install new O-rings (A) onto the injectors, then install the fuel rails (see **INJECTOR REPLACEMENT**).

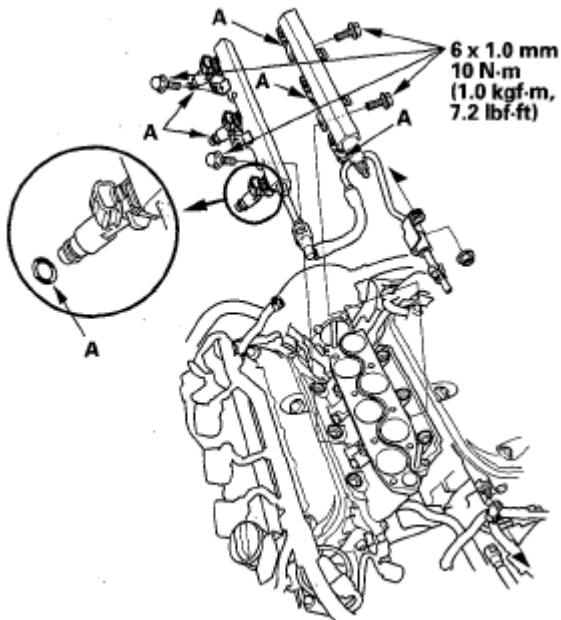


Fig. 312: Identifying O-Rings Onto Injectors With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the evaporative emission (EVAP) canister purge joint (A) to the bracket.

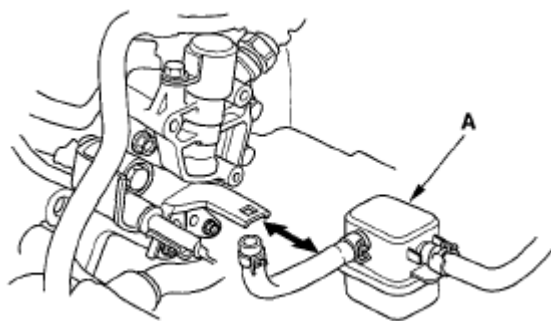


Fig. 313: Identifying Evaporative Emission Canister Purge Joint
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Connect the fuel feed hose (A) (see **FUEL LINE/QUICK-CONNECT FITTING INSTALLATION**), then install the quick-connect fitting cover (B).

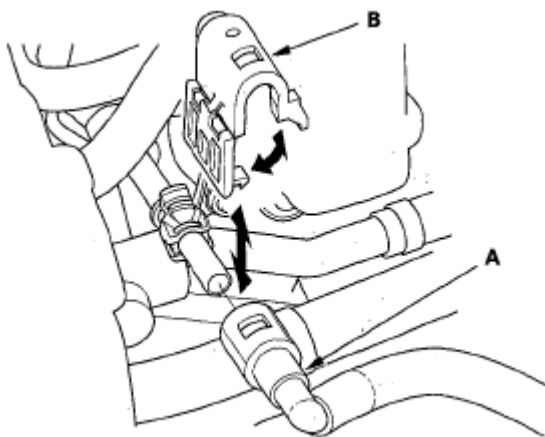


Fig. 314: Identifying Fuel Feed Hose And Quick-Connect Fitting Cover
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Tighten the bolt securing the harness bracket.

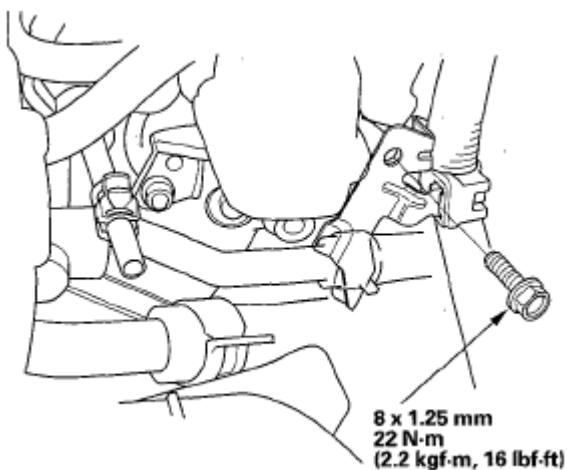


Fig. 315: Identifying Harness Bracket Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Tighten the bolt securing the harness bracket.

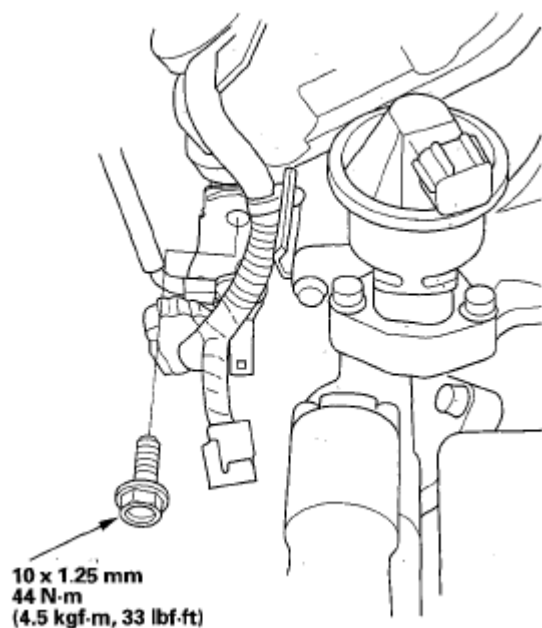


Fig. 316: Identifying Harness Bracket Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Install the heater hose (A) and the water bypass hose (B).

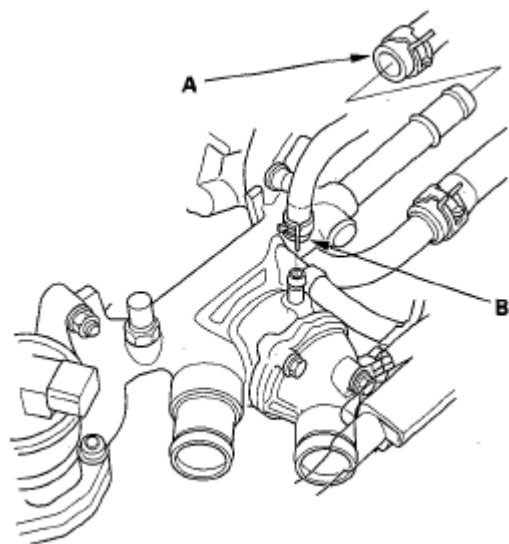


Fig. 317: Identifying Heater Hose And Water Bypass Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Install the upper radiator hose (A) and the lower radiator hose (B).

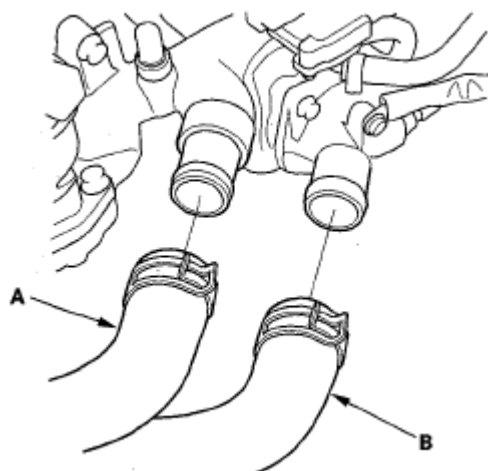


Fig. 318: Identifying Upper Radiator Hose And Lower Radiator Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Install the harness holder (A) to the bracket.

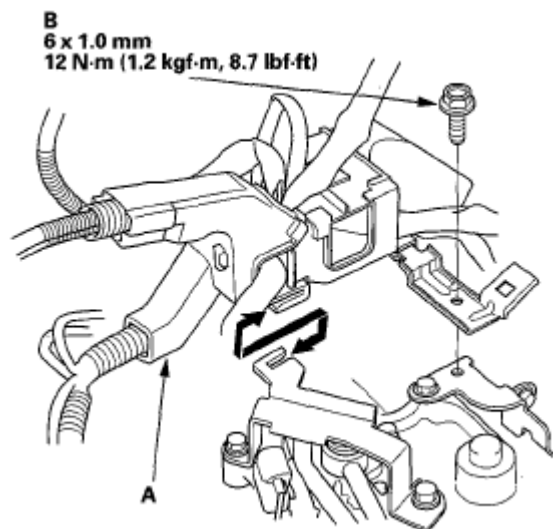


Fig. 319: Identifying Harness Holder With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

26. Tighten the bolt (B) securing the harness holder bracket.
27. Connect the following engine wire harness connectors and wire harness clamps from the cylinder head:
- Six injector connectors
 - Engine coolant temperature (ECT) sensor 1 connector
 - Engine coolant temperature (ECT) sensor 2 connector
 - Camshaft position (CMP) sensor connector

- Crankshaft position (CKP) sensor connector
 - Exhaust gas recirculation (EGR) valve connector
 - Rocker arm oil control solenoid connector
 - Engine oil pressure (EOP) sensor connector
 - Oil pressure switch connector
 - Two air fuel ratio (A/F) sensor connectors
 - Two secondary heated oxygen sensor (secondary HO2S) connectors
28. Install the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
 29. Install the intake manifold (see **INSTALLATION**).
 30. Install the power steering (P/S) pump (A), and tighten the bolt (B) securing the (P/S) hose bracket.

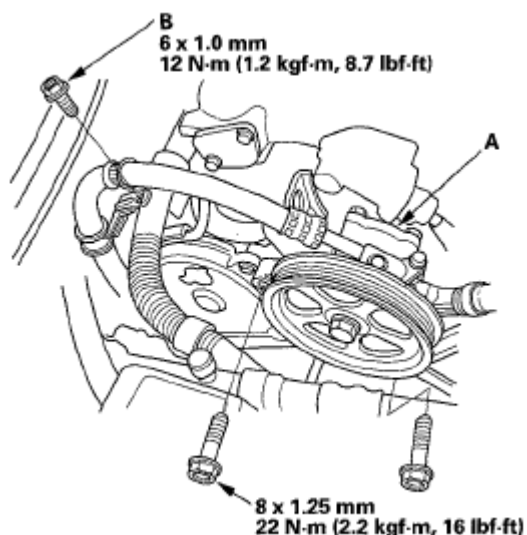


Fig. 320: Identifying Power Steering Pump And Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

31. Install the alternator (see **INSTALLATION ('07 MODEL)**).
32. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
33. Clean the battery posts and cable terminals, then assemble them and apply grease to prevent corrosion.
34. After installation, check that all tubes, hoses, and connectors are installed correctly.
35. Inspect for fuel leaks. Turn the ignition switch to ON (II) (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation three times, then check for fuel leakage at any point in the fuel line.
36. Refill the radiator with engine coolant, and bleed air from the cooling system with the heater valve open (see step 8 **THERMOSTAT REPLACEMENT**).
37. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).
38. Inspect the idle speed (see **IDLE SPEED INSPECTION**).
39. Inspect the ignition timing (see **IGNITION TIMING INSPECTION**).

40. Enter the anti-theft code for the audio system and the navigation system (if equipped).
41. Set the clock (on vehicles without navigation).

CAMSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

Camshaft oil seal driver 07GAF-SD40330

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Remove the camshaft pulley and back cover (see **CAMSHAFT REPLACEMENT**).
3. Remove the camshaft oil seal.
4. Dry the camshaft oil seal housing.
5. Apply a light coat of multipurpose grease to the lip of the camshaft oil seal.
6. Using the camshaft oil seal driver (A), a washer (B), and a 12 x 75 x 1.25 mm bolt (C), press in the camshaft oil seal (D) about 0.5-1.5 mm (0.02-0.06 in.) below the surface of the cylinder head.

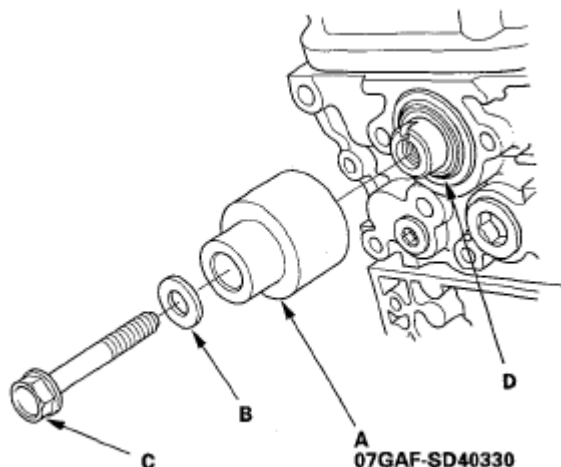


Fig. 321: Identifying Camshaft Oil Seal Driver, Washer And Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Apply new engine oil to the threads of the camshaft pulley mounting bolt. Install the back cover, then install the camshaft pulley:
 - Front (see step 11 **REAR**)
 - Rear (see step 12 **CYLINDER HEAD INSTALLATION**)
8. Install the timing belt (see **TIMING BELT INSTALLATION**).

SEALING BOLT INSTALLATION

NOTE: When installing the sealing bolt (A), always use a new washer (B).

FRONT

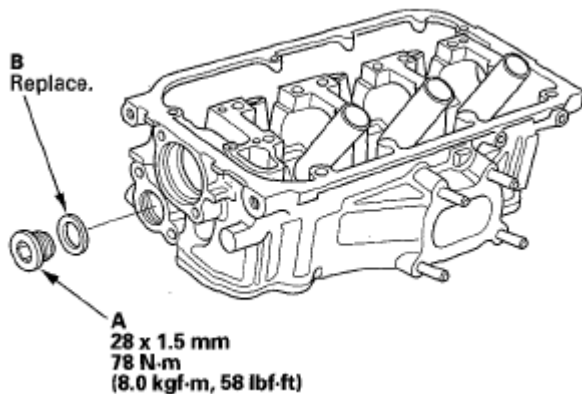


Fig. 322: Identifying Sealing Bolt - Front with Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

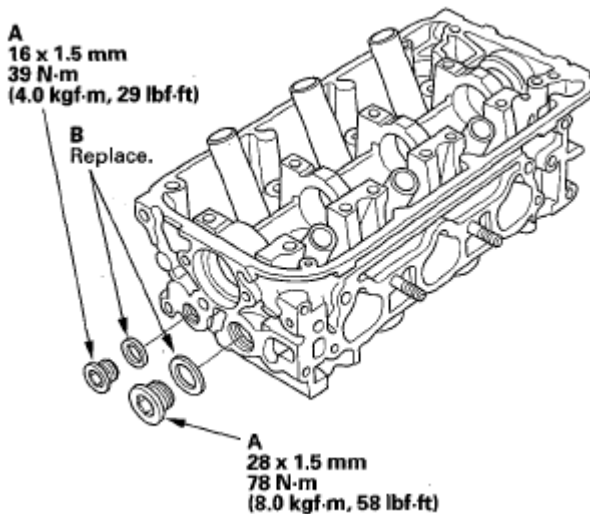


Fig. 323: Identifying Sealing Bolt - Rear With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HEAD ('08-10 MODEL J35A7 ENGINE)

SPECIAL TOOLS

2010 Honda Odyssey EX

2007-10 ENGINE Cylinder Head - Odyssey

Ref. No.	Tool Number	Description	Qty
①	07AAJ-PNAA101	Air Pressure Regulator	1
②	07GAF-SD40330	Camshaft Oil Seal Driver	1
③	07HAH-PJ7A100	Valve Guide Reamer, 5.5 mm	1
④	07JAA-001020A	Socket, 19 mm	1
⑤	07JAB-001020B	Holder Handle	1
⑥	07MAB-PY3010A	Holder Attachment, 50 mm, Offset	1
⑦	07PAD-0010000	Stem Seal Driver	1
⑧	07VAJ-P8A020A	VTEC Air Stopper	1
⑨	070AJ-001A101	VTEC Air Adapter	1
⑩	07742-0010100	Valve Guide Driver, 5.5 mm	1
⑪	07757-PJ1010A	Valve Spring Compressor Attachment	1

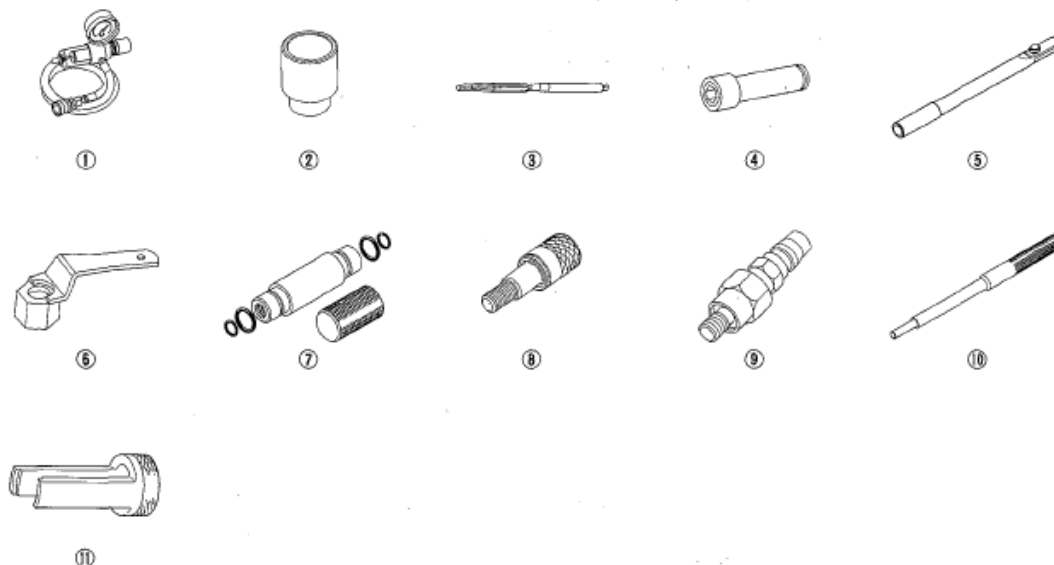


Fig. 324: Identifying Special Tools

Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

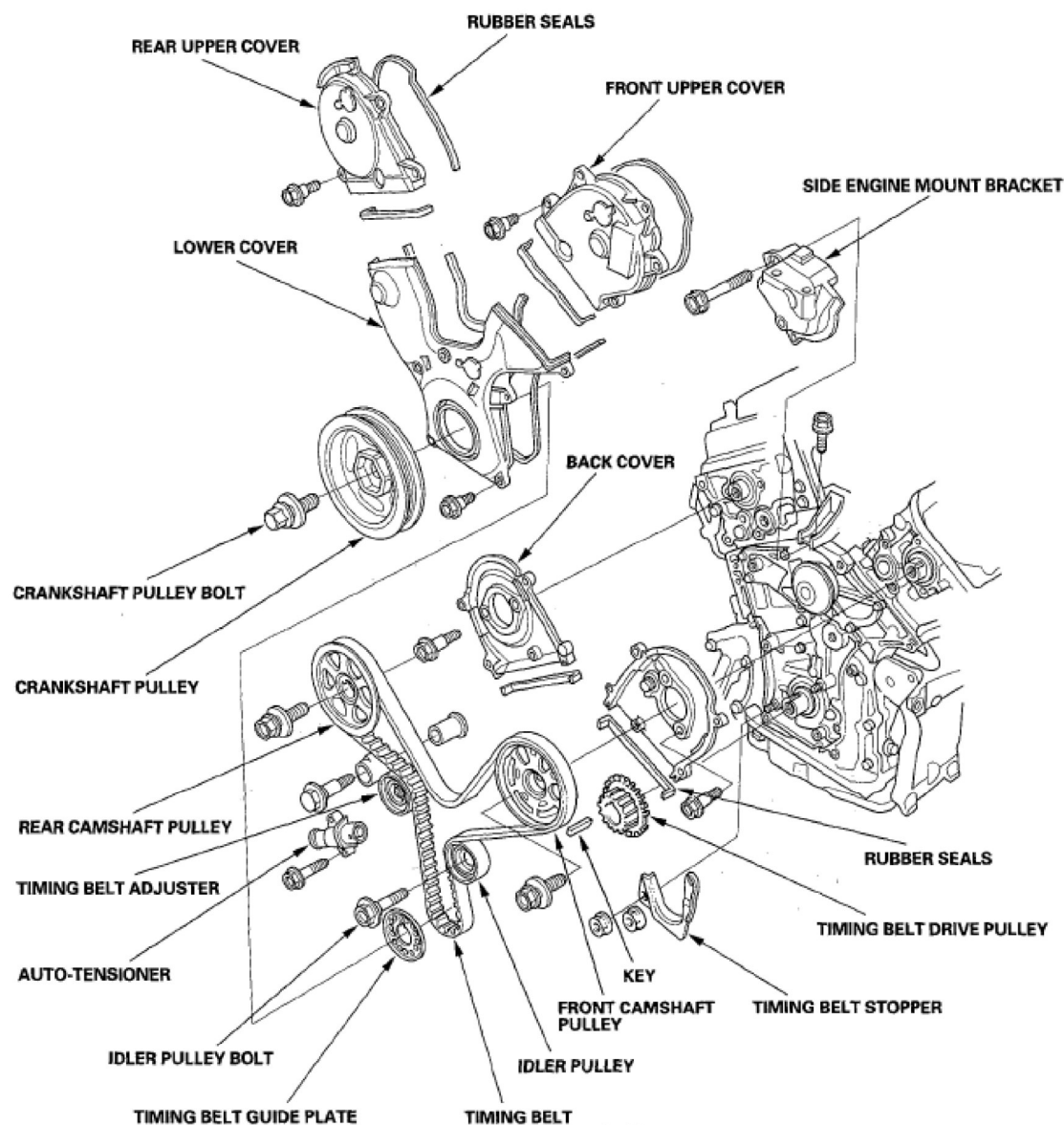


Fig. 325: Identifying Cylinder Head Component Location (1 Of 2)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

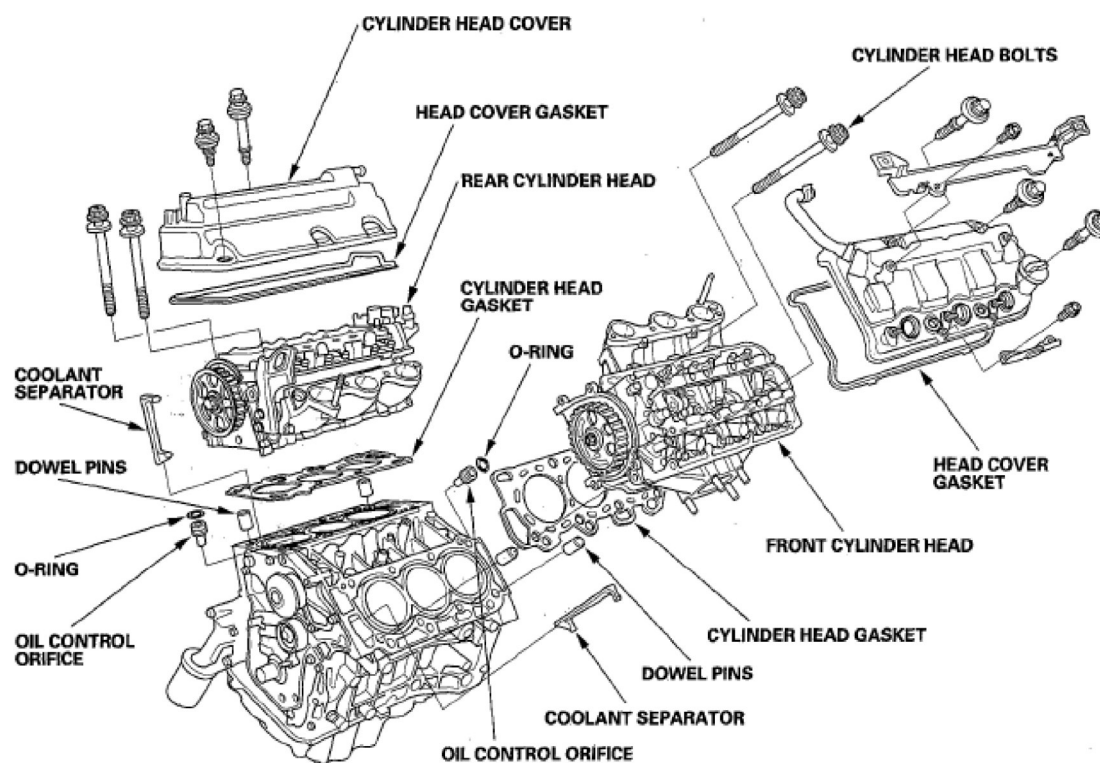


Fig. 326: Identifying Cylinder Head Component Location (2 Of 2)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

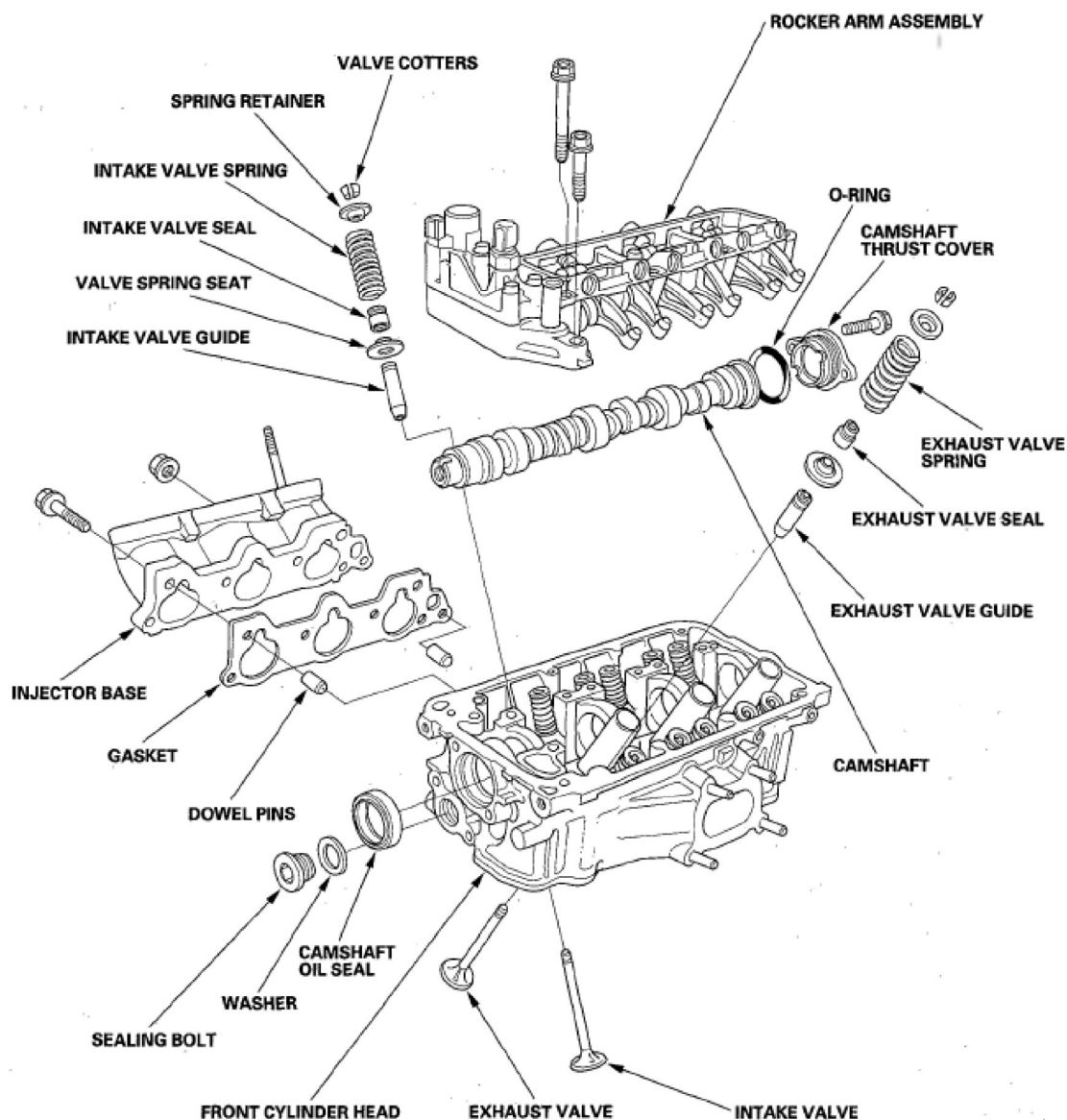


Fig. 327: Identifying Cylinder Head Component Location - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

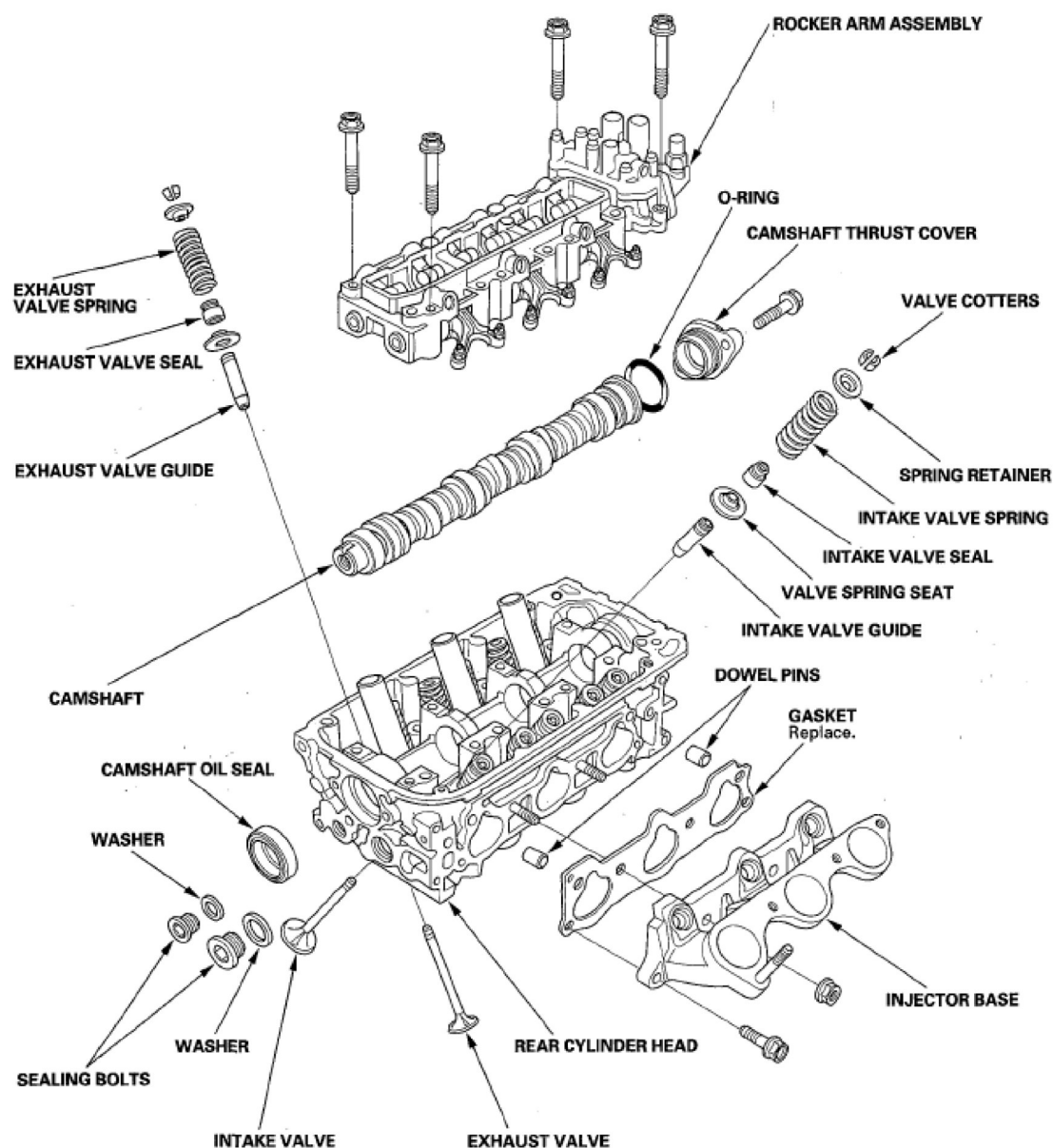


Fig. 328: Identifying Cylinder Head Component Location - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ENGINE COMPRESSION INSPECTION

NOTE: After the inspection, you must reset the powertrain control module (PCM). Otherwise, the PCM will continue to stop the fuel injectors from operating.

1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Turn the ignition switch to LOCK (0).
3. Connect the Honda Diagnostic System (HDS) to the data link connector (DLC) (see step 2 **GENERAL**

TROUBLESHOOTING INFORMATION).

4. Turn the ignition switch to ON (II).
5. Make sure the HDS communicates with the vehicle and the PCM. If it doesn't communicate, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING**).
6. Select PGM-FI, INSPECTION, then ALL INJECTORS OFF on the HDS.
7. Turn the ignition switch to LOCK (0).
8. Remove the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
9. Remove the six spark plugs.
10. Attach the compression gauge to a spark plug hole.

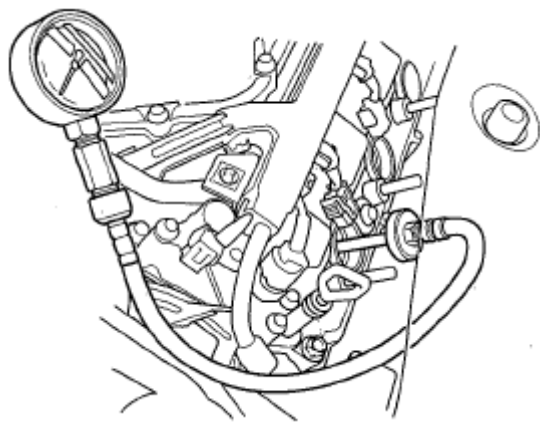


Fig. 329: Identifying Compression Gauge To Spark Plug Hole
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Step on the accelerator pedal to open the throttle, then crank the engine with the starter motor, and measure the compression.

Compression Pressure: Above 930 kPa (9.5 kgf/cm² , 135 psi)

12. Measure the compression on the remaining cylinders.

Maximum Variation: Within 200 kPa (2.0 kgf/cm² , 28 psi)

13. If the compression is not within specifications, check the following items, then remeasure the compression.
 - Confirmation cam timing
 - Damaged or worn valves and seats
 - Damaged cylinder head gaskets
 - Damaged or worn piston rings
 - Damaged or worn piston and cylinder bore
14. Remove the compression gauge from the spark plug hole.
15. Install the six spark plugs.

16. Install the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
17. Select PCM reset (see **HDS CLEAR COMMAND**) to cancel the ALL INJECTORS OFF on the HDS.

VARIABLE CYLINDER MANAGEMENT ROCKER ARM TEST

Special Tools Required

- Air pressure regulator 07AAJ-PNAA101
 - VTEC air adapter 070AJ-001A101
 - VTEC air stopper 07VAJ-P8A020A
1. Start the engine and let it run for 5 minutes, then turn the ignition switch to LOCK (0).
 2. Remove the six spark plugs.
 3. Remove the cylinder head covers (see **CYLINDER HEAD COVER REMOVAL**).
 4. Rotate the crankshaft pulley clockwise. Make sure that the intake primary rocker arm (A) and intake secondary rocker arm (B) are mechanically connected by the pistons and that the intake primary rocker arm and the intake secondary rocker arm should move together.
 - If the intake secondary rocker arm moves independently, remove the intake primary rocker arm and the intake secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any intake rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, then retest.
 - If the intake primary rocker arm and the intake secondary rocker arm move together, go to step 5.

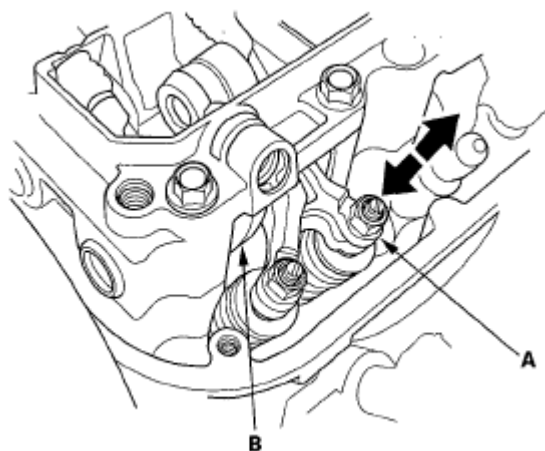


Fig. 330: Identifying Intake Primary Rocker Arm And Intake Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Rotate the crankshaft pulley clockwise. Make sure that the exhaust primary rocker arm (A) and the exhaust secondary rocker arm (B) are mechanically connected by the pistons and that the exhaust primary rocker arm and the exhaust secondary rocker arm should move together.
 - If the exhaust primary rocker arm moves independently, remove the exhaust primary rocker arm and the exhaust secondary rocker arm as an assembly, and check that the pistons in the rocker arms

move smoothly. If any exhaust rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, then retest.

- If the exhaust primary rocker arm and the exhaust secondary rocker arm move together, go to step 6.

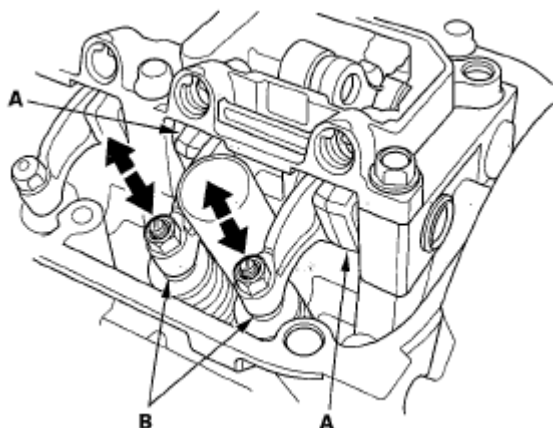


Fig. 331: Identifying Exhaust Primary Rocker Arm And Exhaust Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If repeat steps 4 and 5 for No. 1, No. 2, No. 3, and No. 4 cylinders. When the rocker arms pass the test, go to step 7.
7. Check that the air pressure on the shop air compressor gauge indicates over 200 kPa (2.0 kgf/cm² , 29 psi),
8. Inspect the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
9. Remove the sealing bolt, then install the VTEC air adapter (A) to the inspection hole and install the VTEC air stopper (B), then connect the air pressure regulator (C) as shown.

FRONT

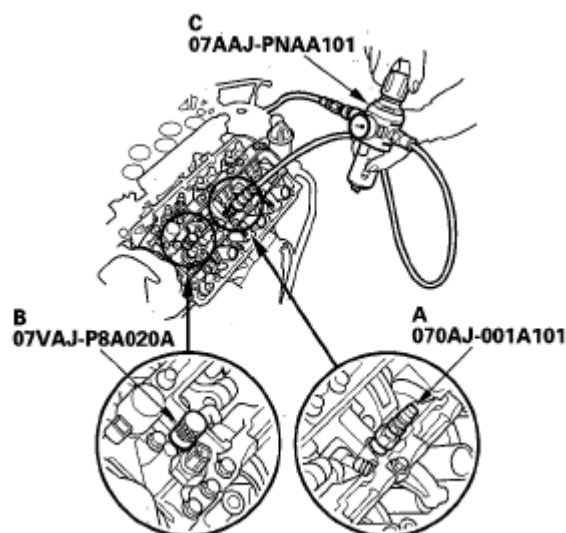


Fig. 332: Identifying Air Pressure Regulator - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

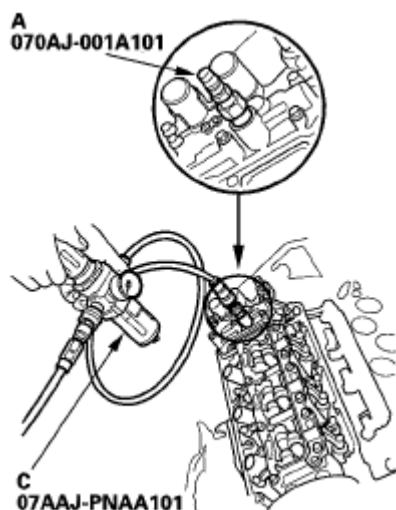


Fig. 333: Identifying Air Pressure Regulator - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Loosen the valve on the regulator, and apply the specified air pressure.

Specified Air Pressure: 200 kPa (2.0 kgf/cm² , 29 psi)

11. With the specified air pressure applied, rotate the crankshaft pulley clockwise. The intake secondary rocker arm (A) should move independently of the intake primary rocker arm (B).
 - If the intake secondary rocker arm does not move independently, remove the intake primary rocker arm and the intake secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any intake rocker arm needs replacing, replace the primary and the secondary rocker arms as an assembly, then retest.
 - If the intake secondary rocker arm move independently, go to step 12.

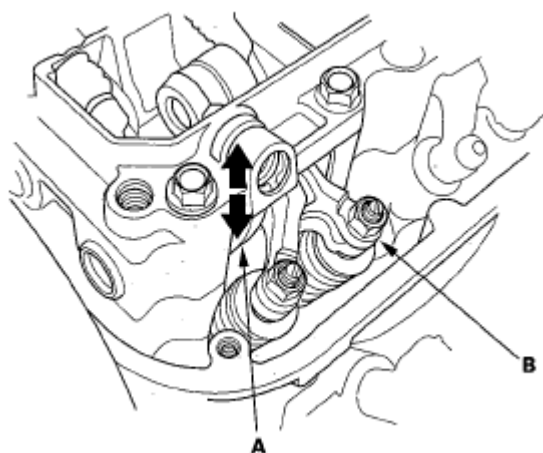


Fig. 334: Identifying Intake Secondary Rocker Arm And Intake Primary Rocker Arm
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. With the specified air pressure applied, rotate the crankshaft pulley clockwise. The exhaust primary rocker arm (A) should move independently of the exhaust secondary rocker arm (B).
 - If the exhaust primary rocker arm does not move independently, remove the exhaust primary rocker arm and the exhaust secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any exhaust rocker arm needs replacing, replace the primary and the secondary rocker arms as an assembly, then retest.
 - If the exhaust primary rocker arm moves independently, go to step 13.

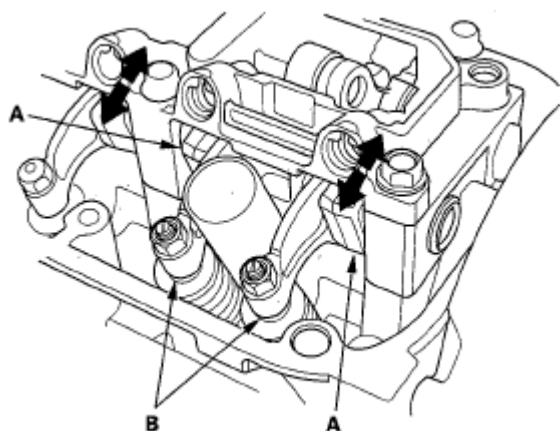


Fig. 335: Identifying Exhaust Primary Rocker Arm And Exhaust Secondary Rocker Arm
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. If repeat steps 11 and 12 for No. 1, No. 2, No. 3, and No. 4 cylinders. When the rocker arms pass the test, go to step 14.
14. Remove the air pressure regulator, the VTEC air adapter, and the VTEC air stopper.
15. Tighten the sealing bolts to 22 N.m (2.2 kgf.m, 16 lbf.ft).
16. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**).
17. Install the six spark plugs.

VALVE CLEARANCE ADJUSTMENT

NOTE: Connect the Honda Diagnostic System (HDS) to the data link connector (DLC), and monitor the engine coolant temperature (ECT). Adjust the valves only when the cylinder head temperature is less than 100°F (38°C).

1. Remove the cylinder head covers (see **CYLINDER HEAD COVER REMOVAL**).
2. Set the No. 1 piston at top dead center (TDC). Align the pointer (A) on the front upper cover with the No. 1 piston TDC mark (B) on the front camshaft pulley.

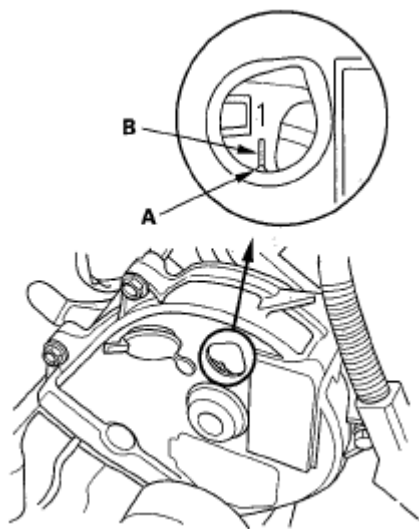


Fig. 336: Identifying Front Upper Cover With No. 1 Piston TDC Mark
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Select the correct thickness feeler gauge for the valves you are going to check.

Valve Clearance

Intake: 0.20-0.24 mm (0.008-0.009 in.)

Exhaust: 0.28-0.32 mm (0.011-0.013 in.)

REAR

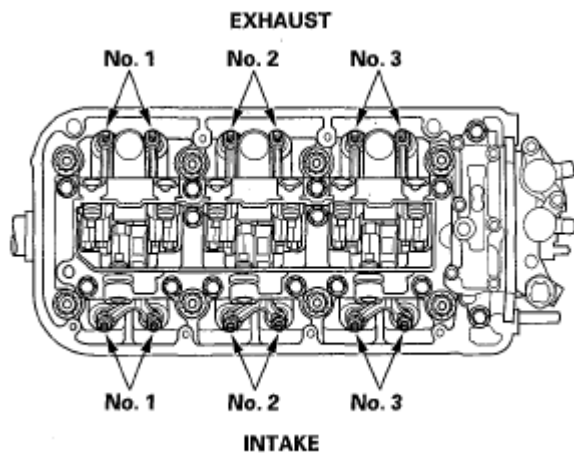


Fig. 337: Identifying Valve Location - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

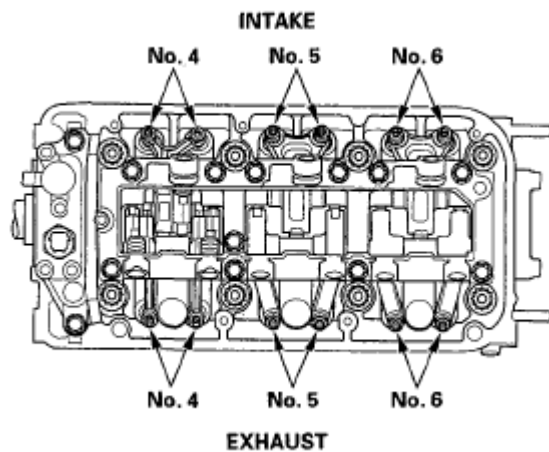


Fig. 338: Identifying Valve Location - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Insert the feeler gauge (A) between the adjusting screw and the end of the valve stem on the No. 1 cylinder, and slide it back and forth; you should feel a slight amount of drag.

INTAKE

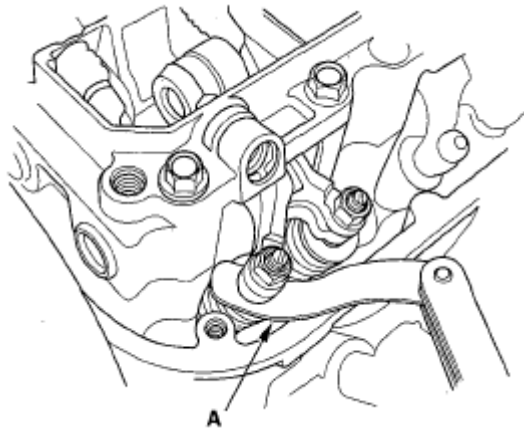


Fig. 339: Identifying Feeler Gauge Between Adjusting Screw And End Of Valve Stem - Intake
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

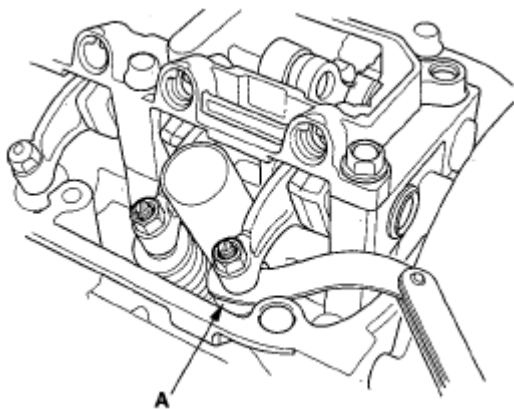


Fig. 340: Identifying Feeler Gauge Between Adjusting Screw And End Of Valve Stem - Exhaust
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. If you feel too much or too little drag, loosen the locknut, and turn the adjusting screw until the drag on the feeler gauge is correct.

INTAKE

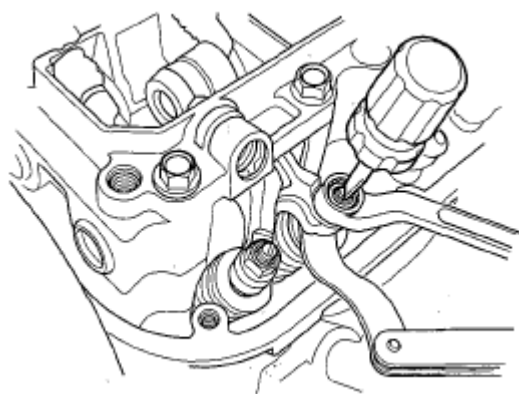


Fig. 341: Identifying Adjusting Screw - Intake
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

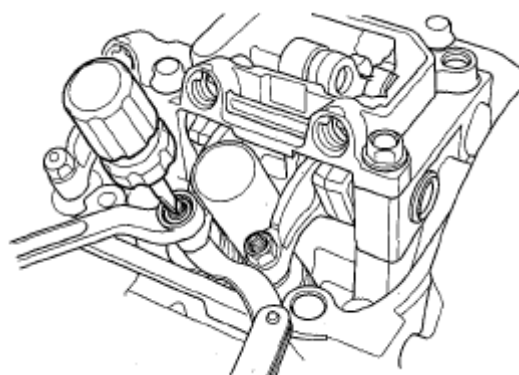


Fig. 342: Identifying Adjusting Screw - Exhaust
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. While holding the adjusting screw with the screw driver, tighten the locknut, then recheck the clearance. Repeat the adjustment, if necessary.

Specified Torque

No. 1, No. 2, No. 3, and No. 4 cylinders:

20 N.m (2.0 kgf.m, 14 lbf.ft)

Apply new engine oil to the nut threads.

No. 5 and No. 6 cylinders:

14 N.m (1.4 kgf.m, 10 lbf.ft)

Apply new engine oil to the nut threads.

7. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 4 piston TDC mark (B) on the front camshaft pulley.

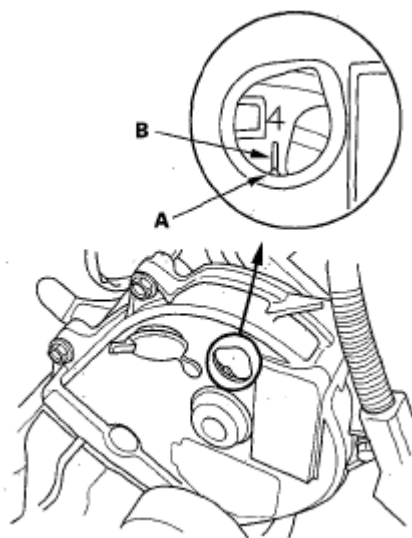


Fig. 343: Identifying Front Upper Cover With No. 4 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Check and, if necessary, adjust the valve clearance on the No. 4 cylinder.
9. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 2 piston TDC mark (B) on the front camshaft pulley.

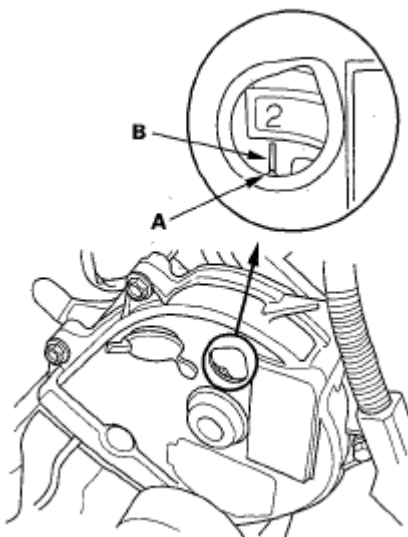


Fig. 344: Identifying Pointer On Front Upper Cover With No. 2 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Check and, if necessary, adjust the valve clearance on the No. 2 cylinder.

11. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 5 piston TDC mark (B) on the front camshaft pulley.

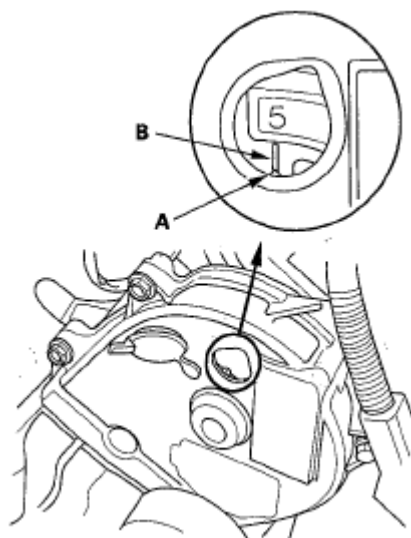


Fig. 345: Identifying Pointer On Front Upper Cover With No. 5 Piston TDC Mark On Front Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Check and, if necessary, adjust the valve clearance on the No. 5 cylinder.
13. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 3 piston TDC mark (B) on the front camshaft pulley.

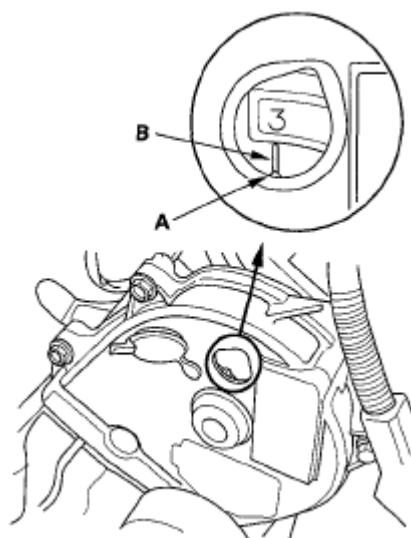


Fig. 346: Identifying Pointer On Front Upper Cover With No. 3 Piston TDC Mark On Front Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Check and, if necessary, adjust the valve clearance on the No. 3 cylinder.
15. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 6 piston TDC mark (B) on the front camshaft pulley.

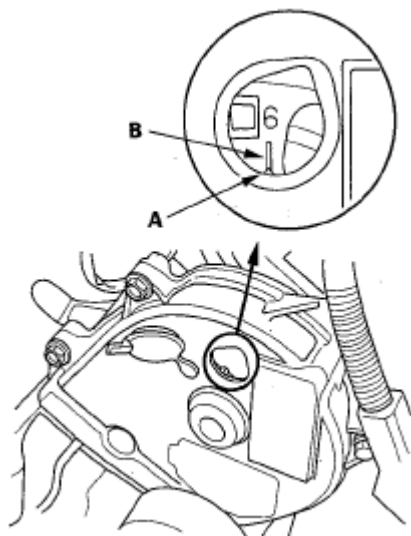


Fig. 347: Identifying Pointer On Front Upper Cover With No. 6 Piston TDC Mark On Front Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Check and, if necessary, adjust the valve clearance on the No. 6 cylinder.
17. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**).

CRANKSHAFT PULLEY REMOVAL AND INSTALLATION

Special Tools Required

- Holder handle 07JAB-001020B
- Holder attachment, 50 mm, offset 07MAB-PY3010A
- Socket, 19 mm 07JAA-001020A, or a commercially available 19 mm socket

Removal

1. Remove the right front wheel.
2. Remove the splash shield.

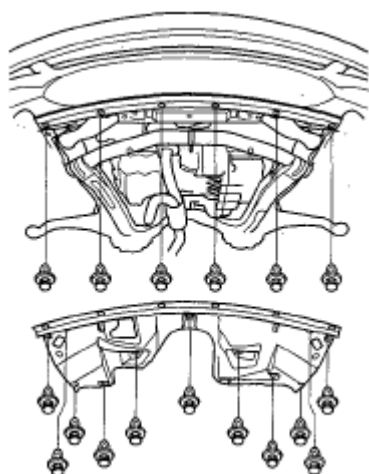


Fig. 348: Identifying Splash Shield And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
4. Hold the pulley with the holder handle (A) and the holder attachment (B).

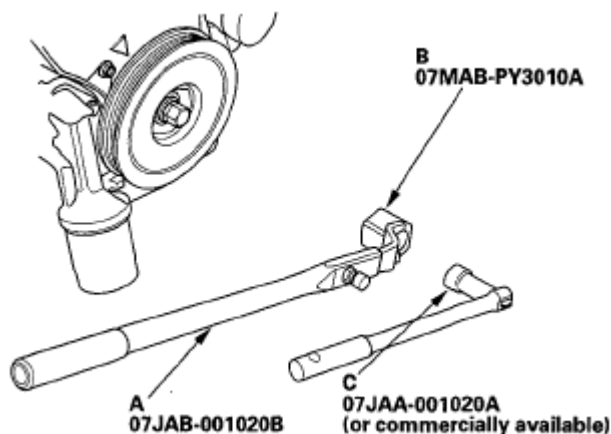


Fig. 349: Identifying Holder Handle And Holder Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the bolt with a heavy duty 19 mm socket (C) and a breaker bar, then remove the crankshaft pulley.

Installation

1. Remove any oil and clean the pulleys (A), the crankshaft (B), the bolt (C), and the washer (D). Lubricate with new engine oil as shown.

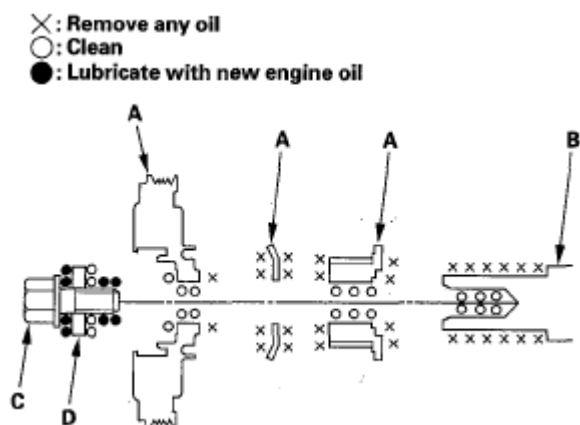


Fig. 350: Identifying Lubricating Points

Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the crankshaft pulley, then tighten the bolt. Do not use an impact wrench.
 1. Hold the pulley with the holder handle (A) and the holder attachment (B). Torque the bolt to 64 N.m (6.5 kgf.m, 47 lbf.ft) with a torque wrench and heavy duty 19 mm socket (C).
 2. Mark the bolt head (D) and the crankshaft pulley (E) as shown, then tighten the bolt an additional 60° (The mark on the bolt head line up with the mark on the crankshaft pulley).

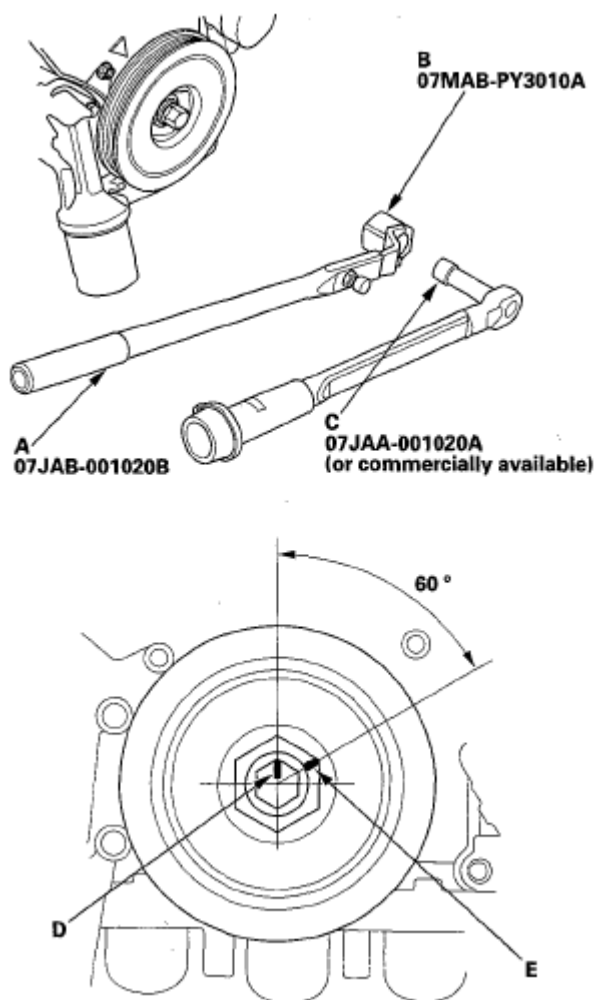


Fig. 351: Identifying Holder Handle And Holder Attachment
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
4. Install the splash shield.
5. Install the right front wheel.

TIMING BELT INSPECTION

1. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
2. Remove the front upper cover.

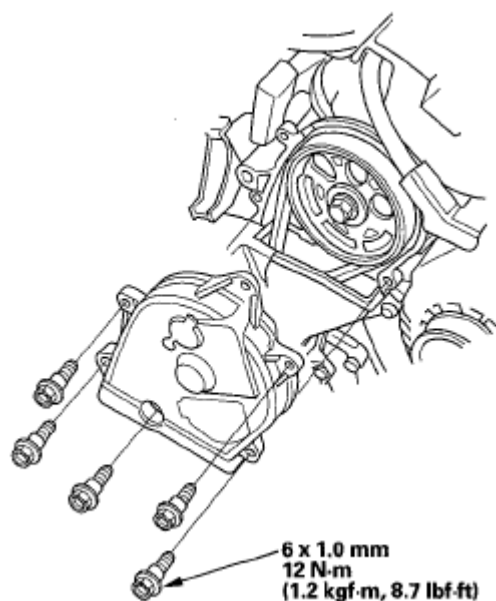


Fig. 352: Identifying Front Upper Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Inspect the timing belt for cracks and oil or coolant contamination. Replace the belt if it is cracked, or is contaminated with oil or coolant. Wipe off any oil or solvent that gets on the belt.

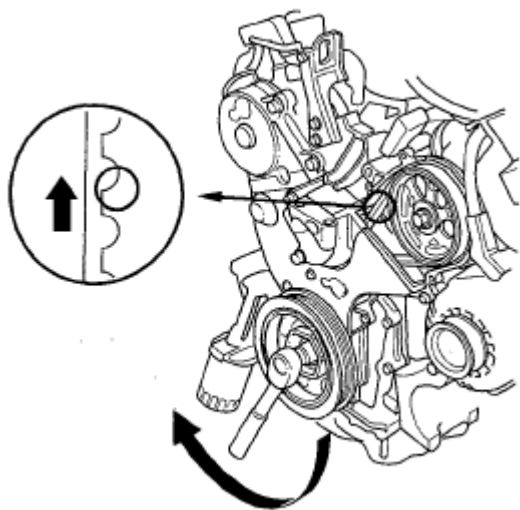


Fig. 353: Identifying Timing Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT REMOVAL

1. Turn the crankshaft so its white mark (A) on the crankshaft pulley lines up with the pointer (B).

NOTE: The other pointer (C) is not used.

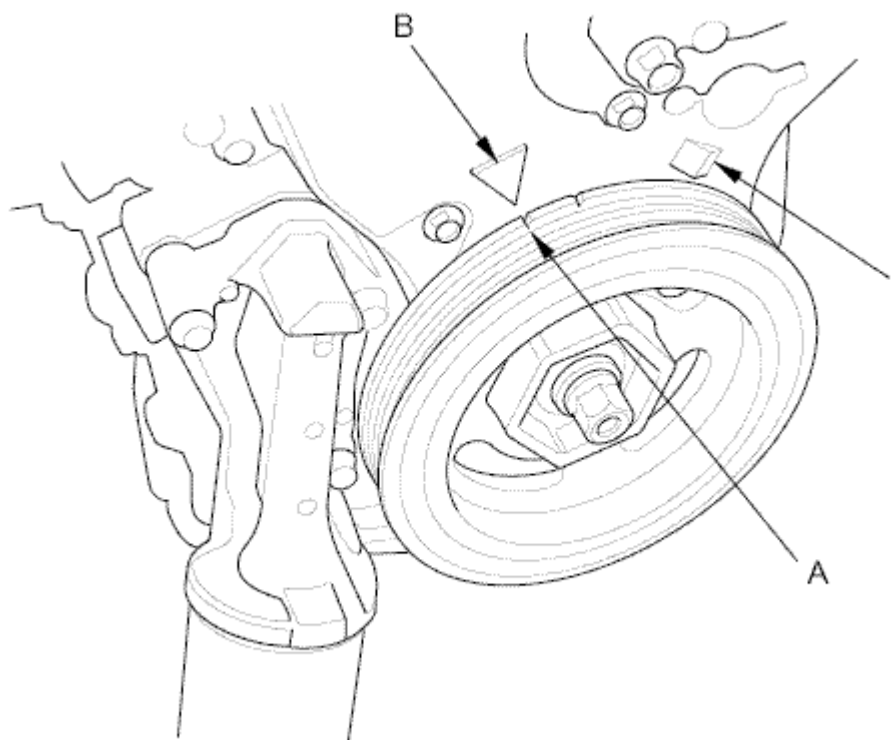


Fig. 354: Identifying Timing Mark On Crankshaft Pulley
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Check that the No. 1 piston top dead center (TDC) mark (A) on the front camshaft pulley and the pointer (B) on the front upper cover are aligned.

NOTE: If the marks are not aligned, rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark.

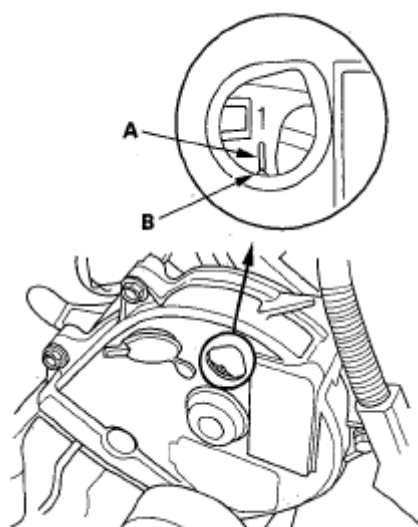


Fig. 355: Identifying No. 1 Piston Top Dead Center (TDC) Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Raise the vehicle on the lift, then remove the right front wheel.
4. Remove the splash shield.

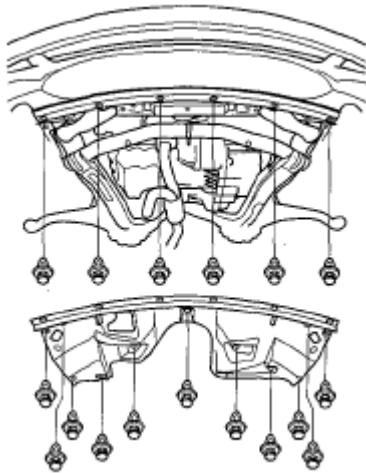


Fig. 356: Identifying Splash Shield And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
6. Support the engine with a jack and a wood block under the oil pan.
7. Remove the upper half of the side engine mount bracket.

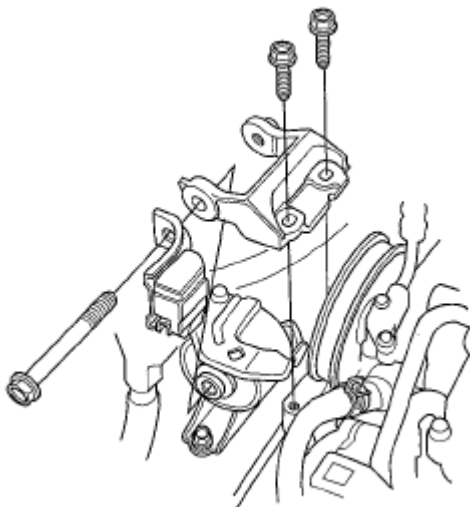


Fig. 357: Identifying Upper Half Of Side Engine Mount Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**).

9. Remove the front upper cover (A) and the rear upper cover (B).

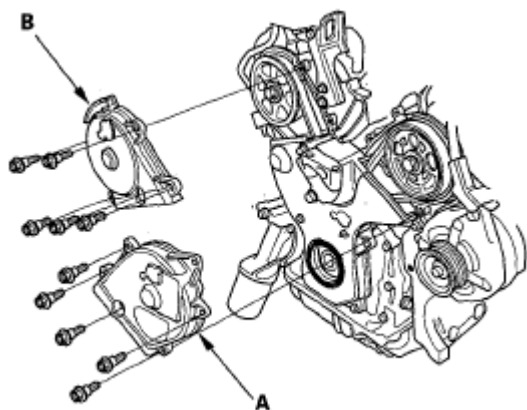


Fig. 358: Identifying Front Upper Cover And Rear Upper Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the lower cover.

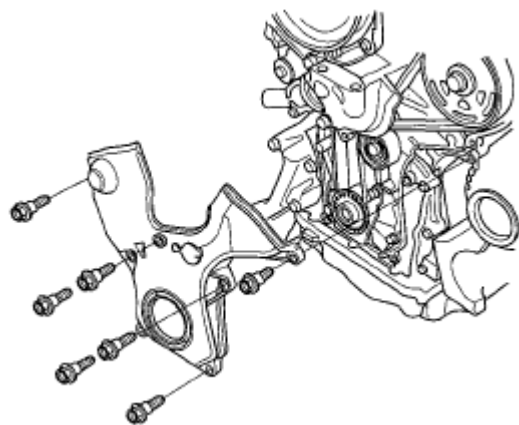


Fig. 359: Identifying Lower Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove one of the battery clamp bolts from the battery tray, and grind the end of it as shown.

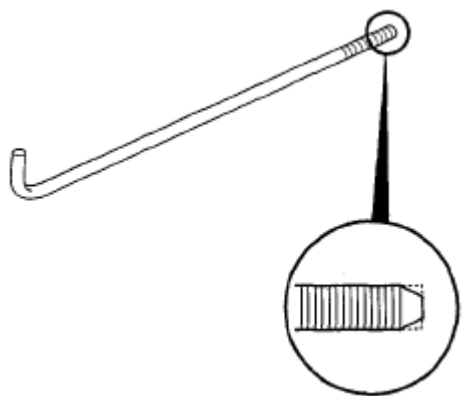


Fig. 360: Identifying Battery Clamp Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Thread the battery clamp bolt in as shown to hold the timing belt adjuster in its current position. Tighten it by hand, do not use a wrench.

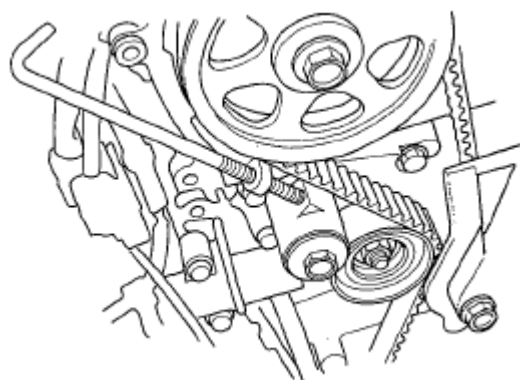


Fig. 361: Identifying Battery Clamp Bolt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the timing belt guide plate (A).

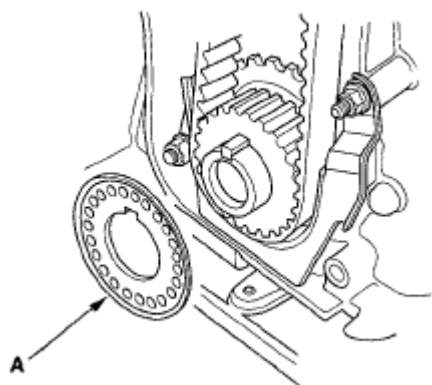


Fig. 362: Identifying Timing Belt Guide Plate

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the lower half of the side engine mount bracket.

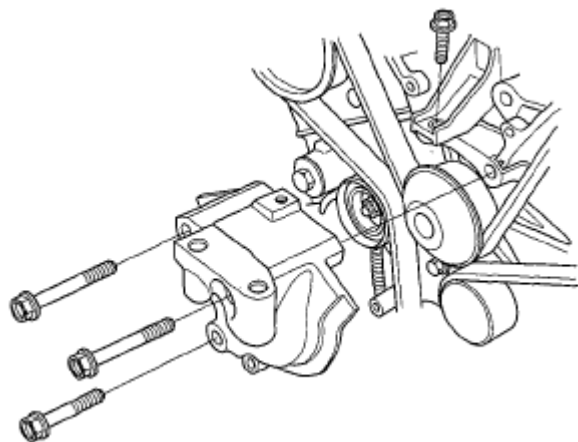


Fig. 363: Identifying Lower Half Of Side Engine Mount Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the idler pulley bolt (A) and the idler pulley (B), then remove the timing belt. Discard the idler pulley bolt.

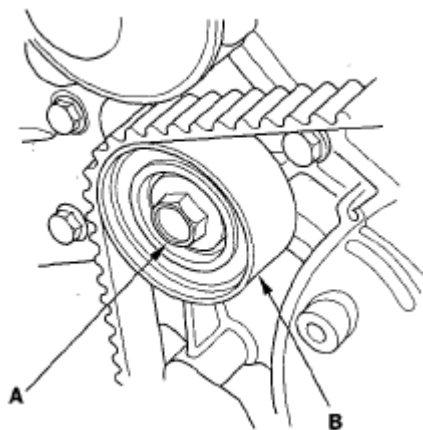


Fig. 364: Identifying Idler Pulley And Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT INSTALLATION

NOTE: The following procedure is the installation procedure for a used timing belt. If you are installing a new belt, refer to the **TIMING BELT REPLACEMENT procedure**.

1. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
2. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of

the timing belt drive pulley with the pointer (B) on the oil pump.

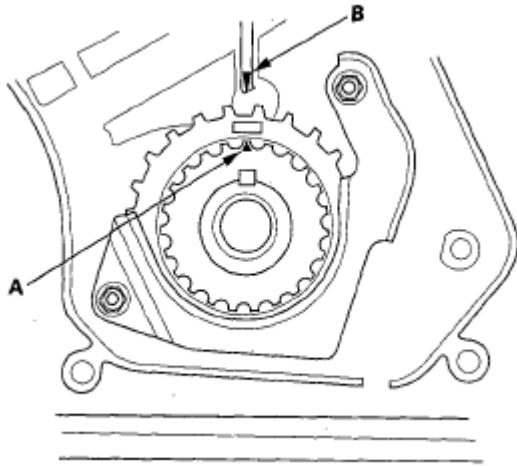


Fig. 365: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley With Pointer On Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

FRONT

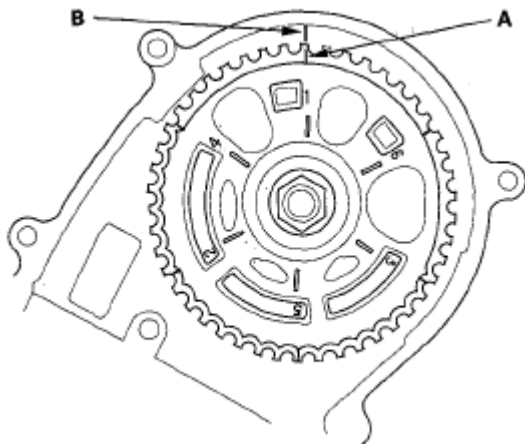


Fig. 366: Identifying TDC Marks On Camshaft Pulleys With Back Covers - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

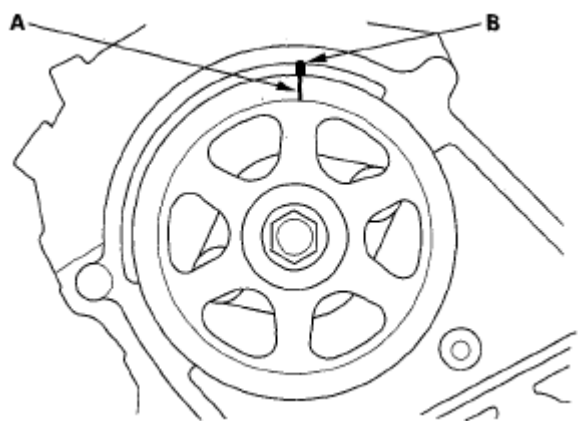


Fig. 367: Identifying TDC Marks On Camshaft Pulleys With Back Covers - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Loosely install the idler pulley with a new idler pulley bolt so the pulley can move but does not come off.
5. If the auto-tensioner has extended and the timing belt cannot be installed, do the **TIMING BELT REPLACEMENT** procedure .
6. Install the timing belt in a counterclockwise sequence starting with the drive pulley. Take care not to damage the timing belt during installation.
 1. Drive pulley (A)
 2. Idler pulley (B)
 3. Front camshaft pulley (C)
 4. Water pump pulley (D)
 5. Rear camshaft pulley (E)
 6. Adjusting pulley (F)

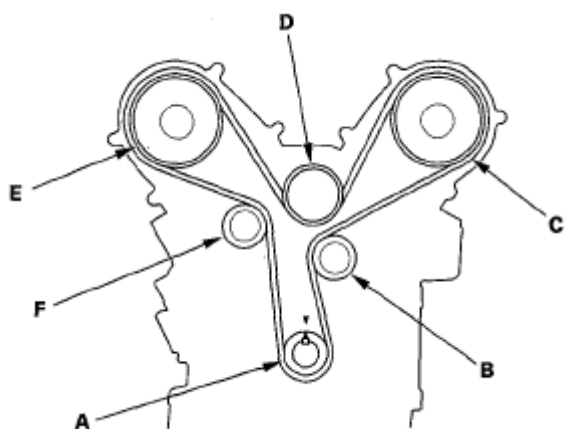


Fig. 368: Timing Belt Routing Diagram
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Tighten the idler pulley bolt.

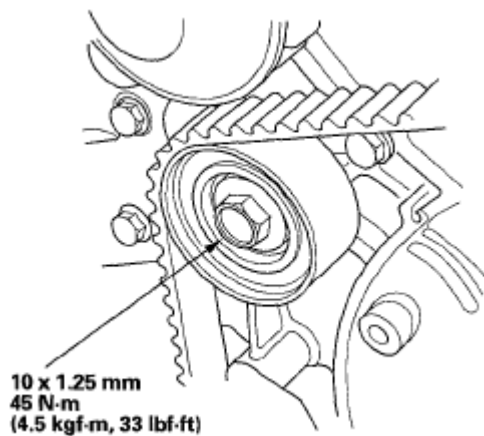


Fig. 369: Identifying Idler Pulley Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the battery clamp bolt from the back cover.

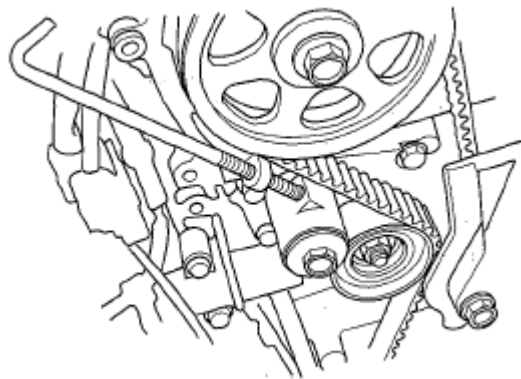


Fig. 370: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Install the lower half of the side engine mount bracket.

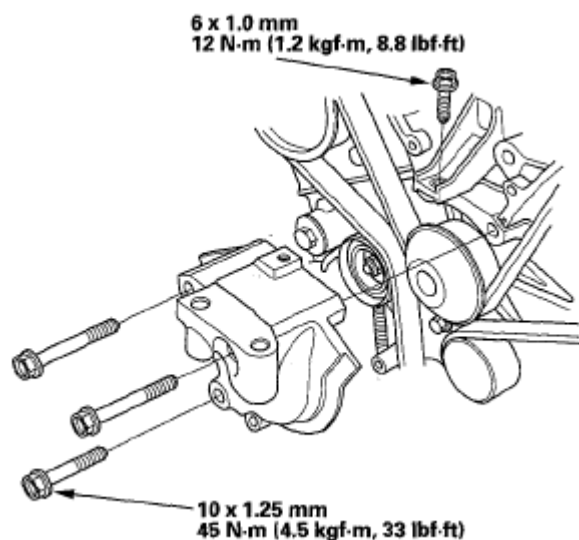


Fig. 371: Identifying Lower Half Of Side Engine Mount Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the timing belt guide plate as shown.

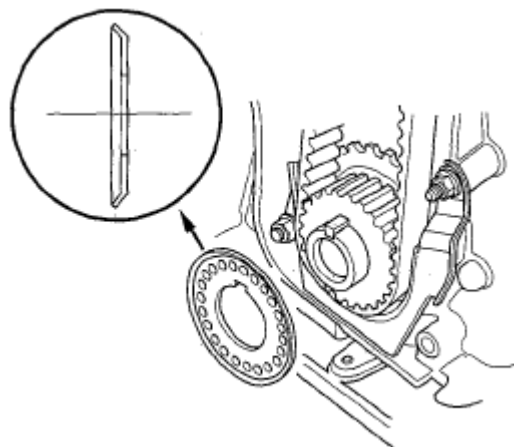


Fig. 372: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the lower cover.

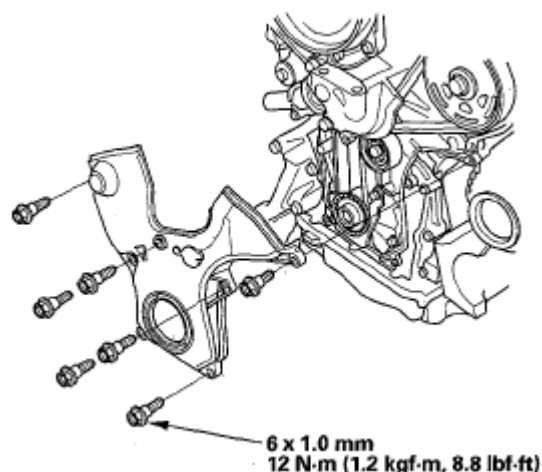


Fig. 373: Identifying Lower Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the front upper cover (A) and the rear upper cover (B).

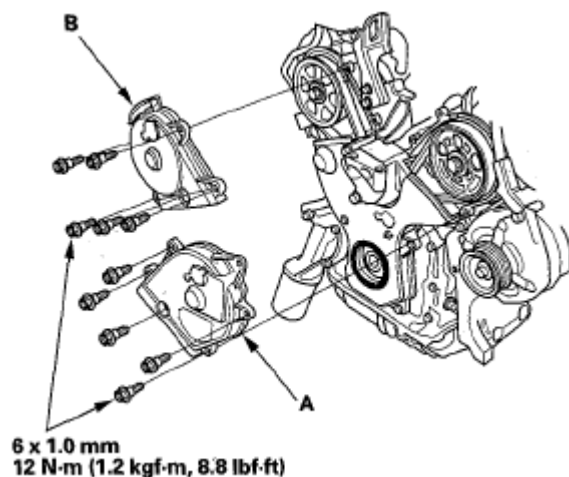


Fig. 374: Identifying Front Upper Cover And Rear Upper Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**).
14. Rotate the crankshaft pulley about six turns clockwise so the timing belt positions itself on the pulleys.
15. Turn the crankshaft pulley so its white mark (A) lines up with the pointer (B).

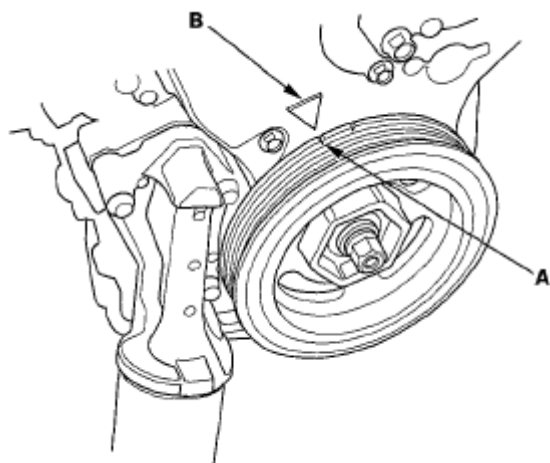


Fig. 375: Identifying Timing Mark On Crankshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Check the camshaft pulley marks.

NOTE: If the marks are not aligned, rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark.

- If the camshaft pulley marks are at TDC, go to step 17.
- If the camshaft pulley marks are not at TDC, remove the timing belt and repeat steps 2 through 16.

FRONT

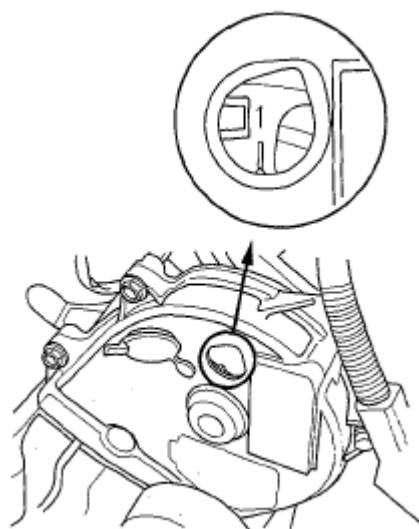


Fig. 376: Identifying Camshaft Pulley Marks - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

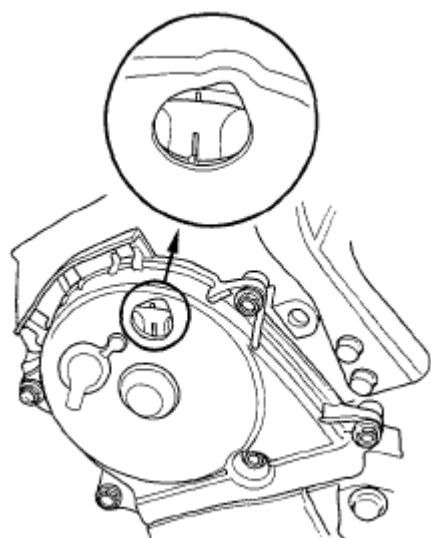


Fig. 377: Identifying Camshaft Pulley Marks - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Install the upper half of the side engine mount bracket, and tighten the new mounting bolts (A), then the mass damper mounting bolt (B).

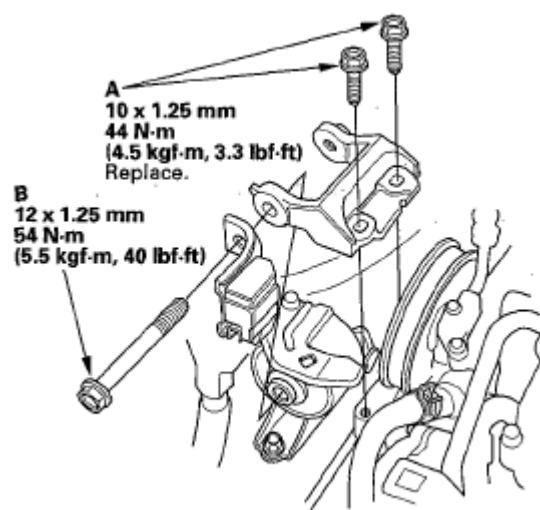


Fig. 378: Identifying Upper Half Of Side Engine Mount Bracket And Mounting Bolts with Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
19. Install the splash shield.

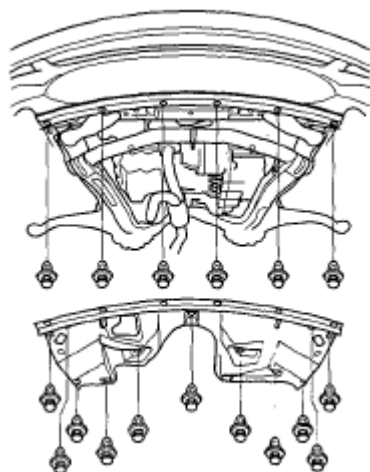


Fig. 379: Identifying Splash Shield And Bolts
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the right front wheel.
21. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

TIMING BELT REPLACEMENT

NOTE: The following procedure is for the installation of a new timing belt. If you are installing a used belt, refer to the **TIMING BELT INSTALLATION** procedure .

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
3. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.

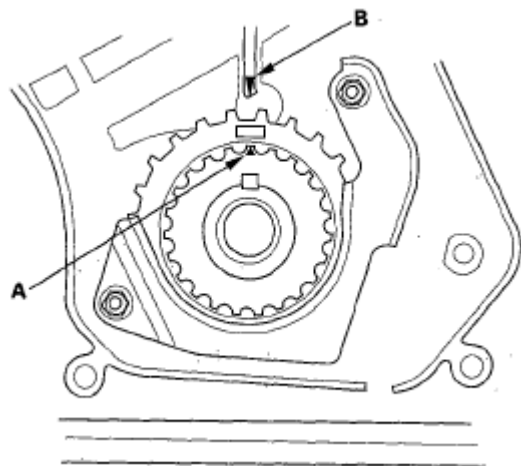


Fig. 380: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley With Oil Pump

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

FRONT

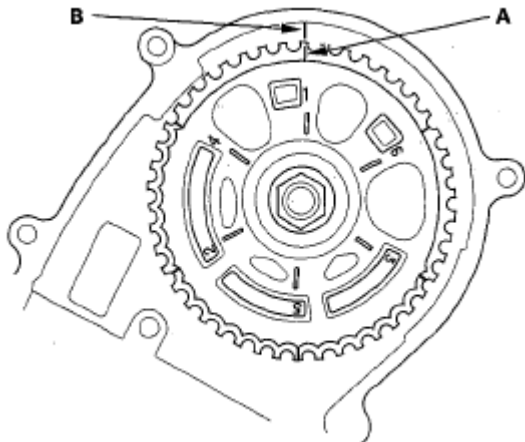


Fig. 381: Identifying TDC Marks On Camshaft Pulleys With Back Covers - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

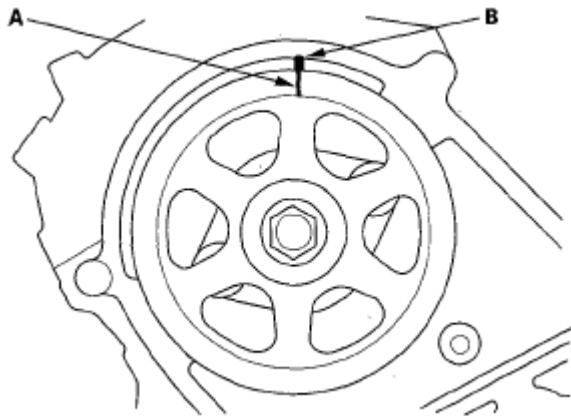


Fig. 382: Identifying TDC Marks On Camshaft Pulleys With Back Covers - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the battery clamp bolt from the back cover.
6. Remove the auto-tensioner.

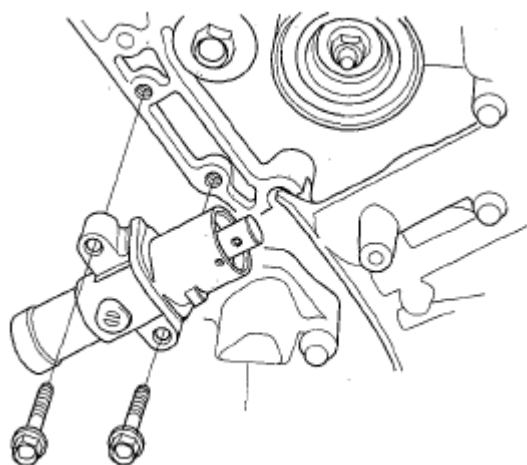


Fig. 383: Identifying Auto-Tensioner

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Align the holes on the rod and the housing of the auto-tensioner.

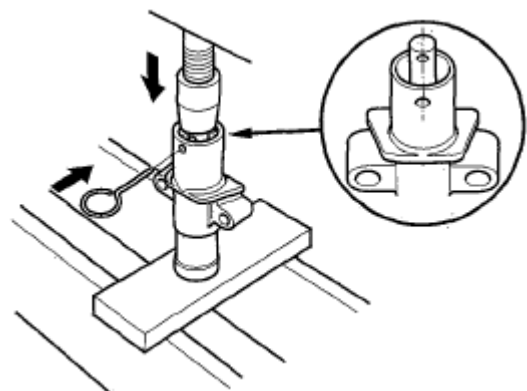


Fig. 384: Identifying Holes On Rod And Housing Of Auto-Tensioner

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Use a hydraulic press to slowly compress the auto-tensioner. Insert a 2.0 mm (0.08 in.) pin through the housing and the rod.

NOTE: The compression pressure should not exceed 9,800 N (1,000 kgf, 2,200 lbf).

9. Install the auto-tensioner.

NOTE: Make sure the pin stays in place.

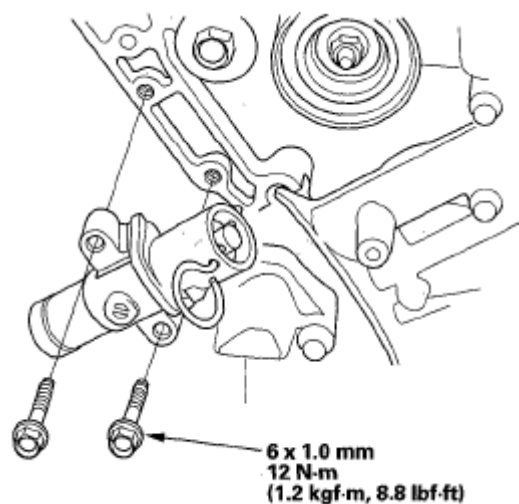


Fig. 385: Identifying Auto-Tensioner With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Thread the battery clamp bolt in as shown to hold the timing belt adjuster. Tighten it by hand, do not use a wrench.

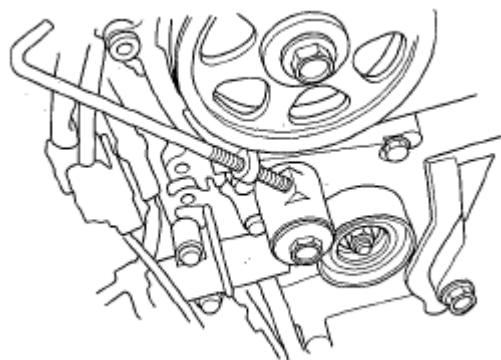


Fig. 386: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Loosely install the idler pulley with a new idler pulley bolt so the pulley can move but does not come off.
12. Install the timing belt in a counterclockwise sequence starting with the drive pulley.
 1. Drive pulley (A)
 2. Idler pulley (B)
 3. Front camshaft pulley (C)
 4. Water pump pulley (D)
 5. Rear camshaft pulley (E)
 6. Adjusting pulley (F)

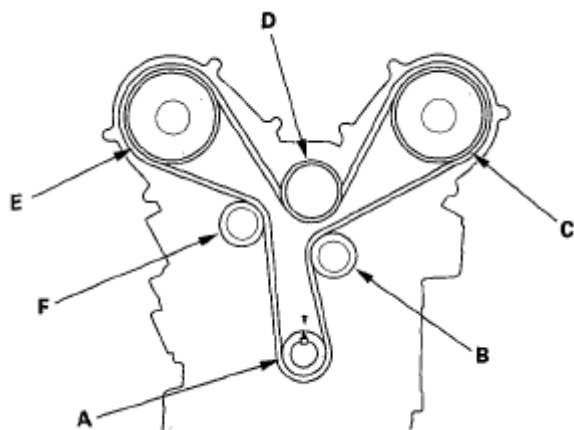


Fig. 387: Timing Belt Routing Diagram

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Tighten the idler pulley bolt.

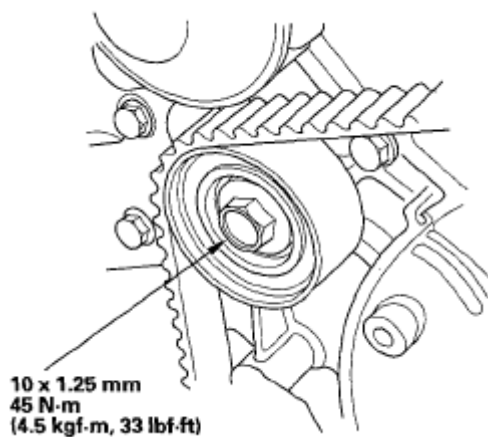


Fig. 388: Identifying Idler Pulley Bolt With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the pin from the auto-tensioner.

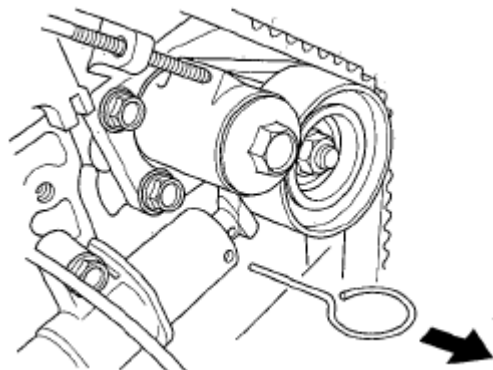
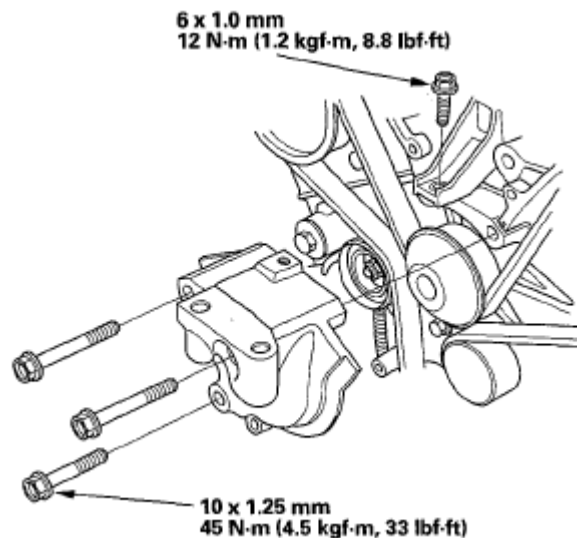


Fig. 389: Identifying Auto-Tensioner Pin

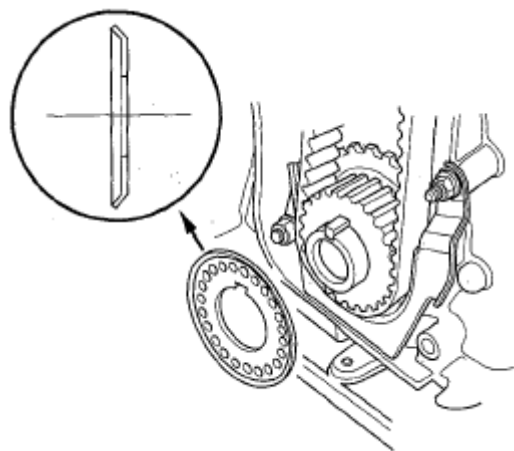
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the battery clamp bolt from the back cover.
16. Install the lower half of the side engine mount bracket.

**Fig. 390: Identifying Lower Half Of Side Engine Mount Bracket With Torque Specification**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Install the timing belt guide plate as shown.

**Fig. 391: Identifying Timing Belt Guide Plate**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the lower cover.

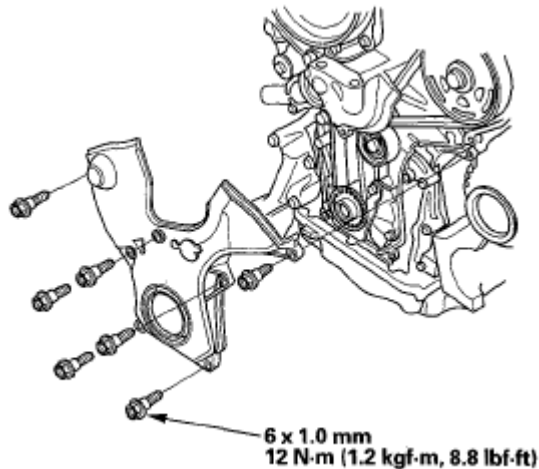


Fig. 392: Identifying Lower Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the front upper cover (A) and the rear upper cover (B).

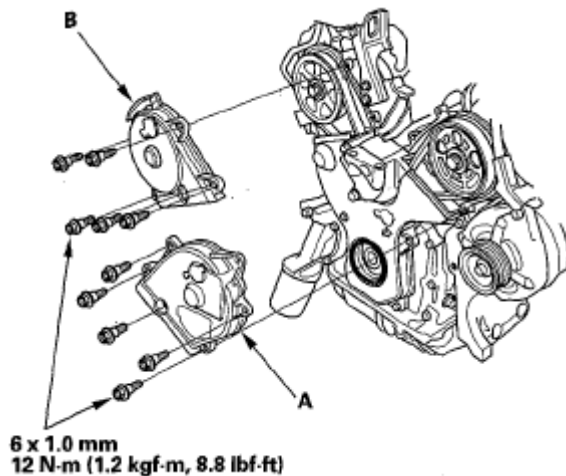


Fig. 393: Identifying Front Upper Cover And Rear Upper Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**).
21. Rotate the crankshaft pulley about six turns clockwise so the timing belt positions itself on the pulleys.
22. Turn the crankshaft pulley so its white mark (A) lines up with the pointer (B).

NOTE: The other pointer (C) is not used.

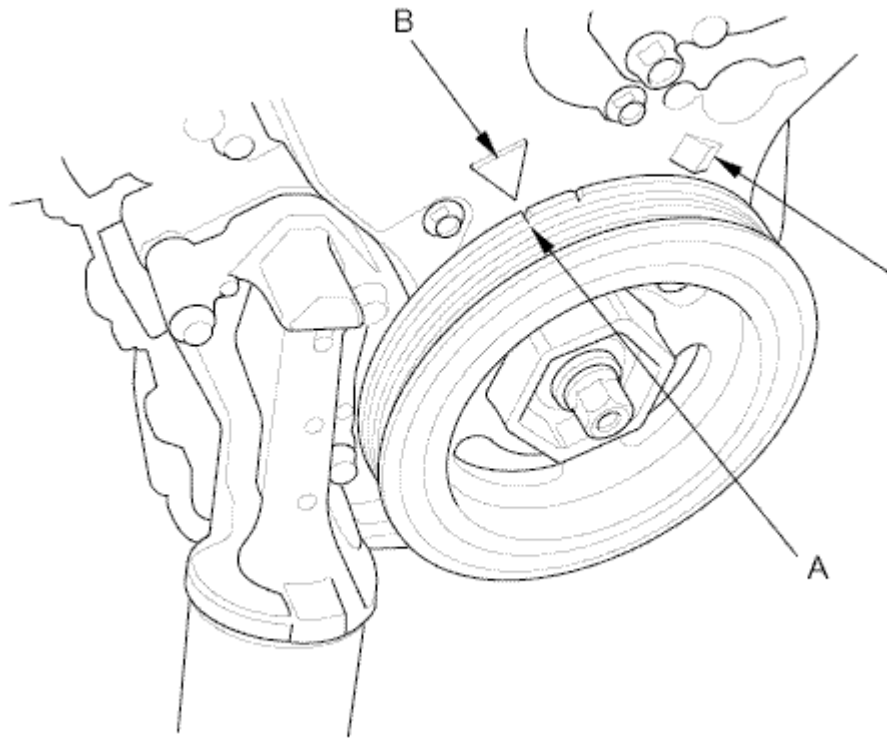


Fig. 394: Identifying Timing Mark On Crankshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Check the camshaft pulley marks.

NOTE: If the marks are not aligned, rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark.

- If the camshaft pulley marks are at TDC, go to step 24.
- If the camshaft pulley marks are not at TDC, remove the timing belt and repeat steps 3 through 23.

FRONT

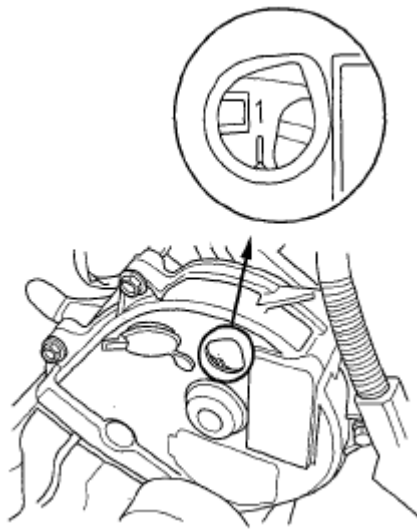


Fig. 395: Identifying Camshaft Pulley Marks - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

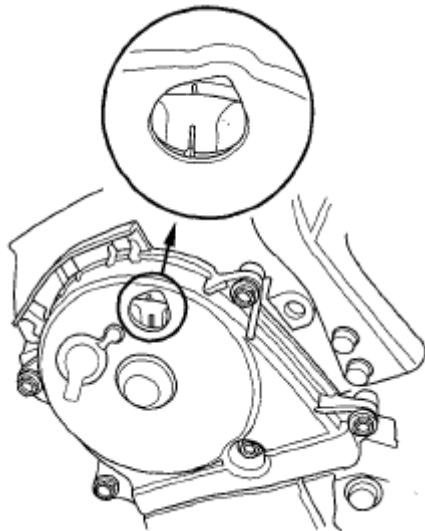


Fig. 396: Identifying Camshaft Pulley Marks - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Install the upper half of the side engine mount bracket, and tighten the new mounting bolts (A), then the mass damper mounting bolt (B).

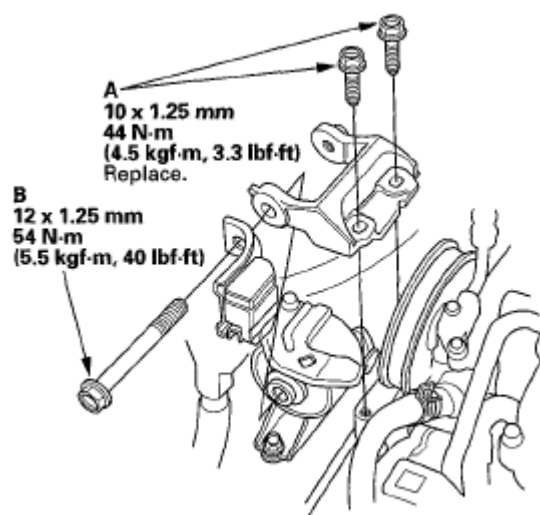


Fig. 397: Identifying Upper Half Of Side Engine Mount Bracket And Mounting Bolts With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Install the ground cable (B).
26. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
27. Install the splash shield.

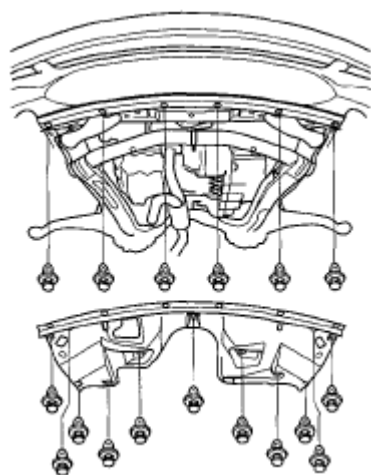


Fig. 398: Identifying Splash Shield And Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

28. Install the right front wheel.
29. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

TIMING BELT ADJUSTER REPLACEMENT

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Remove the battery clamp bolt from the back cover.
3. Remove the auto-tensioner.
4. Remove the bolt (A), then remove the timing belt adjuster (B) and the collar (C).

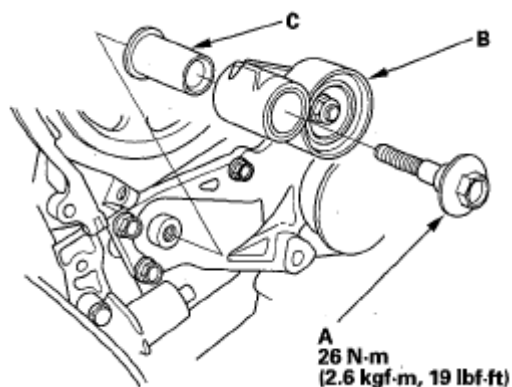


Fig. 399: Identifying Timing Belt Adjuster And Collar With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the timing belt adjuster in the reverse order of removal.
6. Install the timing belt (see **TIMING BELT INSTALLATION**).

TIMING BELT DRIVE PULLEY REPLACEMENT

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Remove the timing belt stopper (A), then remove the timing belt drive pulley (B) and the key (C).

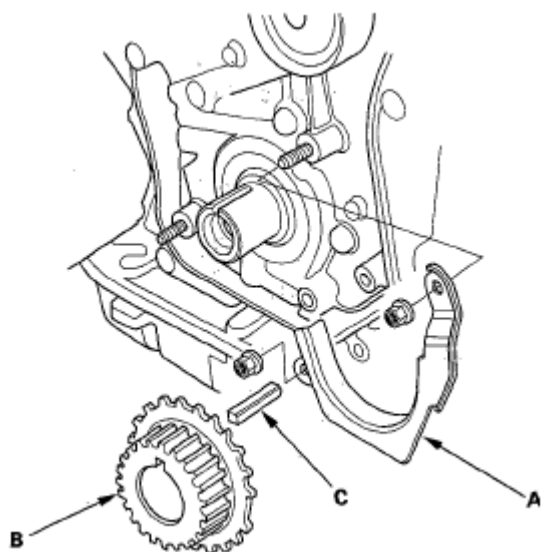


Fig. 400: Identifying Timing Belt Stopper, Timing Belt Drive Pulley And Key
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Inspect the timing belt drive pulley and the key for damage. If it is cracked or damaged, replace the timing belt drive pulley.
4. Install the new timing belt drive pulley and the key, then install the timing belt stopper.
5. Install the timing belt (see **TIMING BELT INSTALLATION**).
6. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

CYLINDER HEAD COVER REMOVAL

Front

1. Remove the intake manifold (see **REMOVAL**).
2. Remove the three ignition coils from the front cylinder head (see **IGNITION COIL REMOVAL/INSTALLATION**).
3. Disconnect the front secondary heated oxygen sensor 2 (secondary HO2S) connector (A), the front air fuel ratio (A/F) sensor 2 connector (B), the rocker arm oil control solenoid A (BANK 2) connector (C), the front rocker arm oil pressure switch connector (D), and the harness clamp (E) securing the harness holder, and remove the dipstick (F).

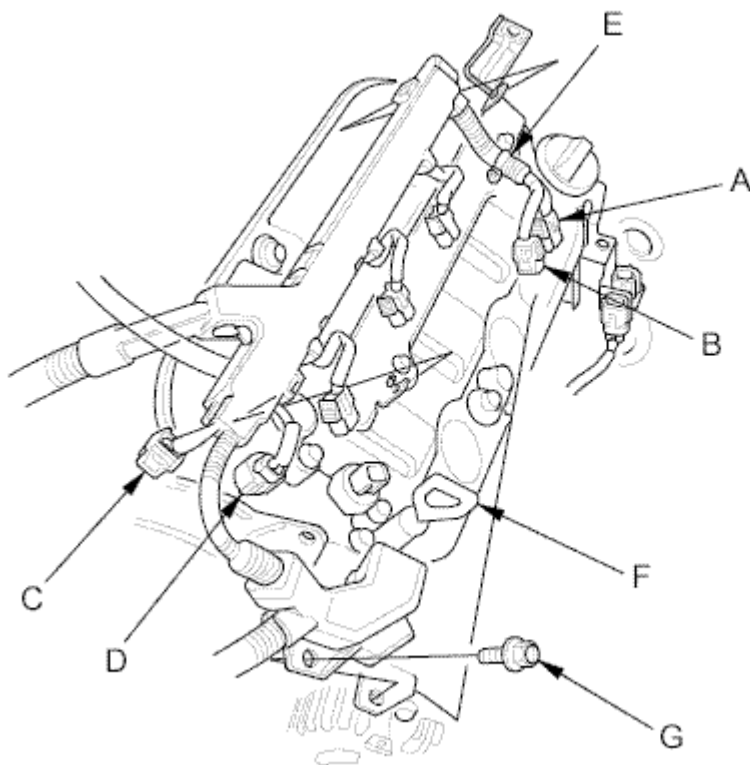


Fig. 401: Identifying Cylinder Head Cover, Harness Clamp, Dipstick And Connectors
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the bolt (G) securing the harness holder.

5. Remove the front cylinder head cover.

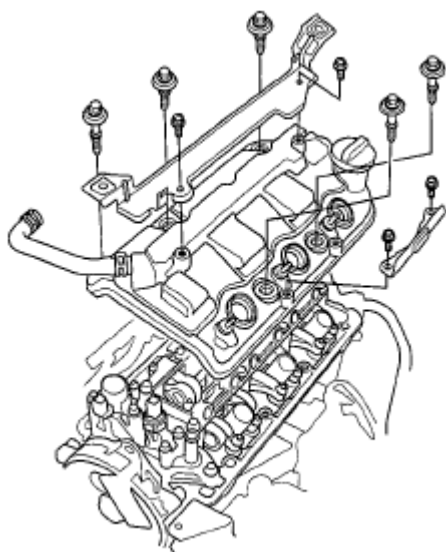


Fig. 402: Identifying Front Cylinder Head Cover With Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rear

1. Remove the intake manifold (see **REMOVAL**).
2. Remove the three ignition coils from the rear cylinder head (see **IGNITION COIL REMOVAL/INSTALLATION**).
3. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
4. Remove the power steering (P/S) pump and the P/S hose bracket with its hoses connected.
5. Remove the harness holder mounting bolts (A) and the engine ground cable bolt (B).

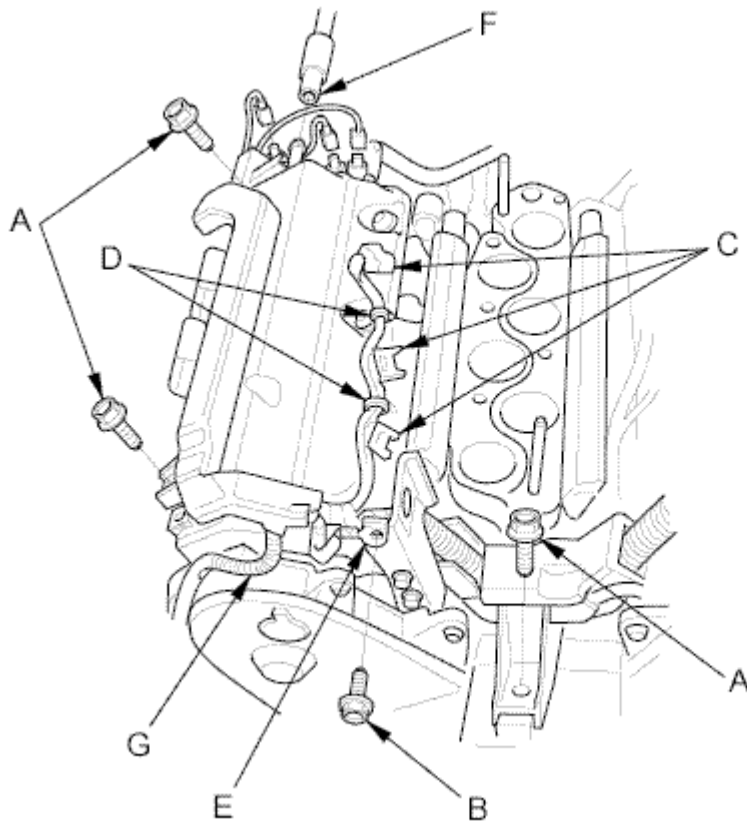


Fig. 403: Removing Rear Cylinder Head Engine Ground Cable
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Disconnect the three injector connectors (C) and the two harness clips (D).
7. Remove the engine ground cable (E) and disconnect the breather hose (F).
8. Remove the harness (G) from the upper cover.
9. Disconnect the rear rocker arm oil pressure switch connector (A), the rocker arm oil control solenoid B (BANK 1) connector (B), the rocker arm oil control solenoid A (BANK 1) connector (C), the rear air fuel ratio (A/F) sensor 1 connector (D), the rear secondary heated oxygen sensor 2 (secondary HO2S) connector (E), and the harness clamps (F), then remove the harness holder (G).

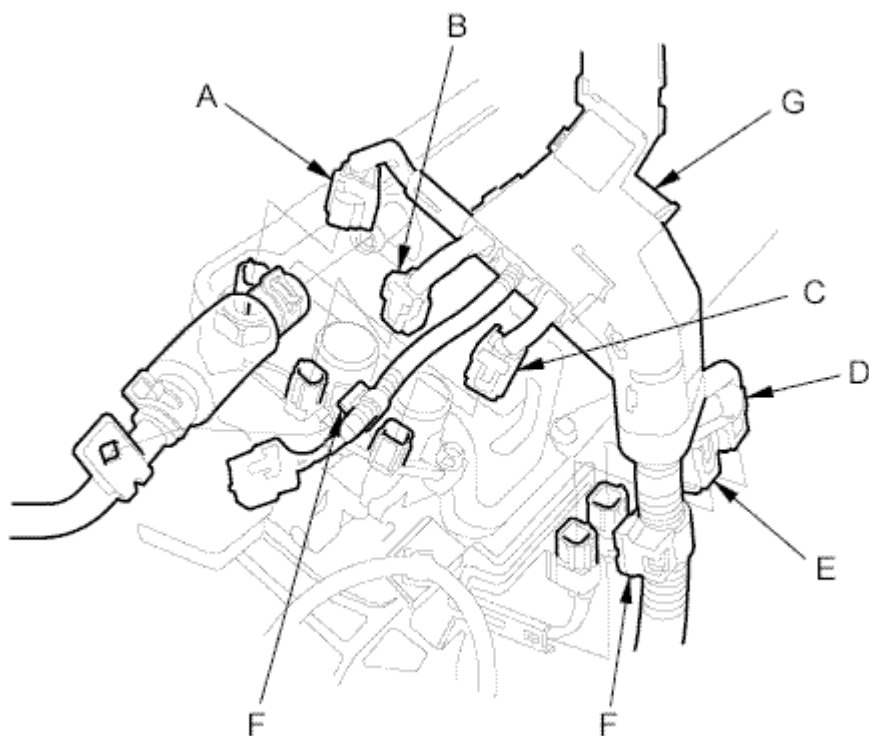


Fig. 404: Identifying Rear Cylinder Head Cover And Wiring Harness
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove rear cylinder head cover.

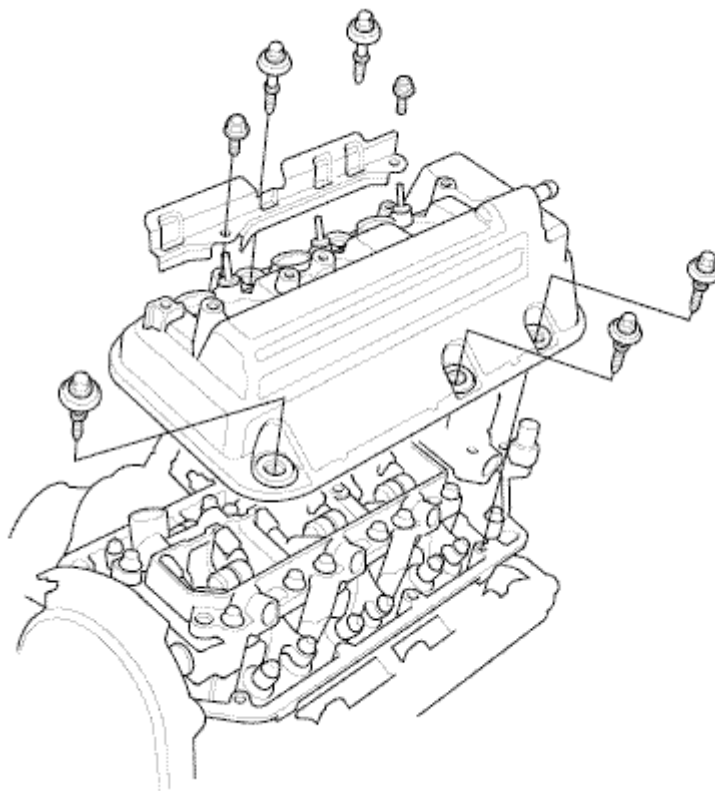


Fig. 405: Identifying Rear Cylinder Head Cover With Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HEAD COVER INSTALLATION

Front

1. Check the spark plug seals for damage. If any seal is damaged, replace it.
2. Thoroughly clean the head cover gasket and the groove.
3. Install the head cover gasket (A) in the groove of the cylinder head cover (B). Make sure the head cover gasket is seated securely.

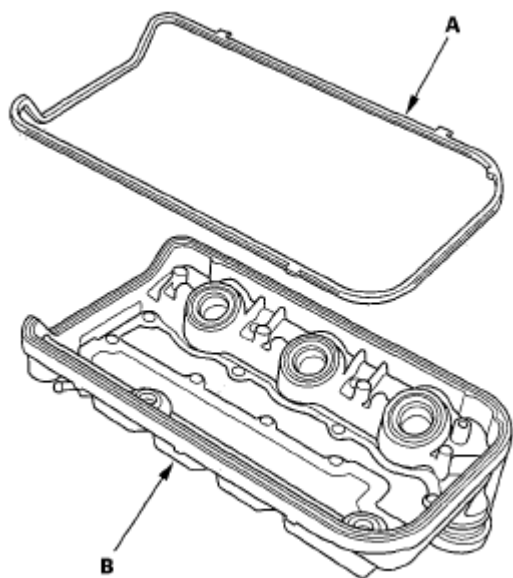


Fig. 406: Identifying Cylinder Head Cover And Head Cover Gasket
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head.
5. Clean the head cover contacting surfaces with a shop towel.
6. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the rocker shaft holder mating areas (A). Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

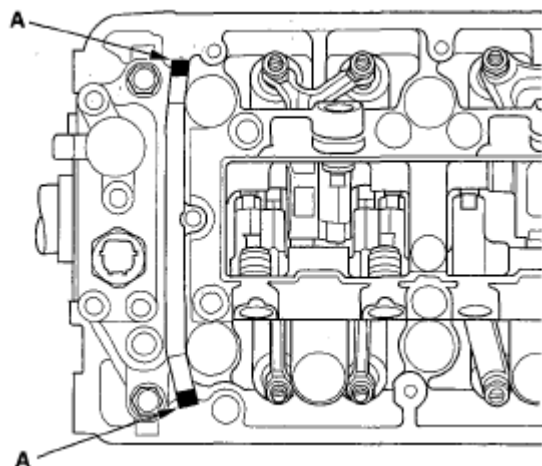


Fig. 407: Identifying Liquid Gasket Applying Area
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Set the spark plug seals (A) on the spark plug tubes, and install the front cylinder head cover (B).

NOTE:

- Wait at least 30 minutes before filling the engine with oil.
- Do not run the engine for at least 3 hours after installing the cylinder head cover.

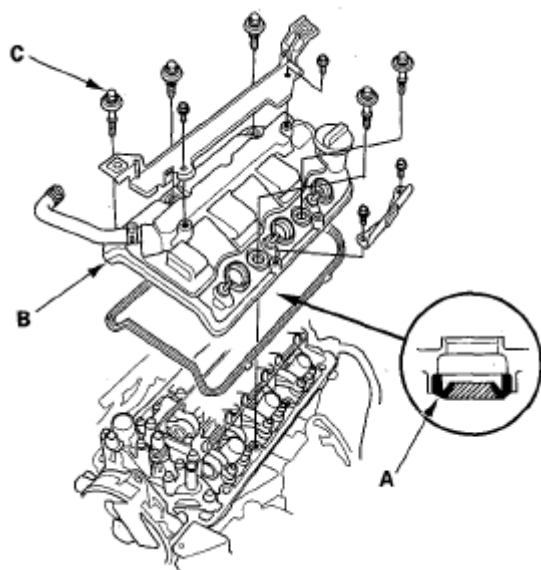


Fig. 408: Identifying Front Cylinder Head Cover And Spark Plug Seals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Inspect the spark plug seals for damage.
9. Inspect the cover washers (C). Replace any washer that is damaged or deteriorated.
10. Tighten the bolts in three steps. In the final step torque all bolts, in sequence, 12 N.m (1.2 kgf.m, 8.8 lbf.ft).

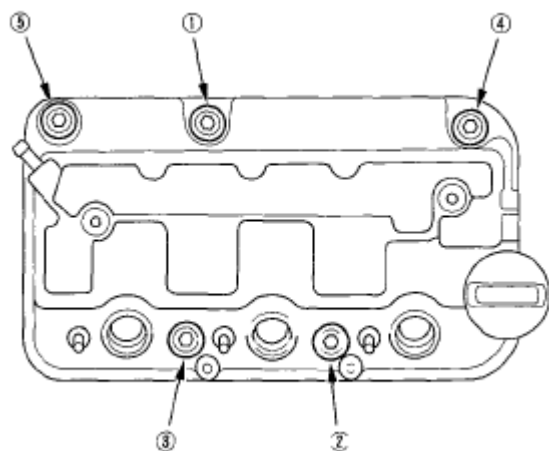


Fig. 409: Identifying Tightening Sequence Of Cylinder Head Cover Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the bolt (A) securing the harness holder.

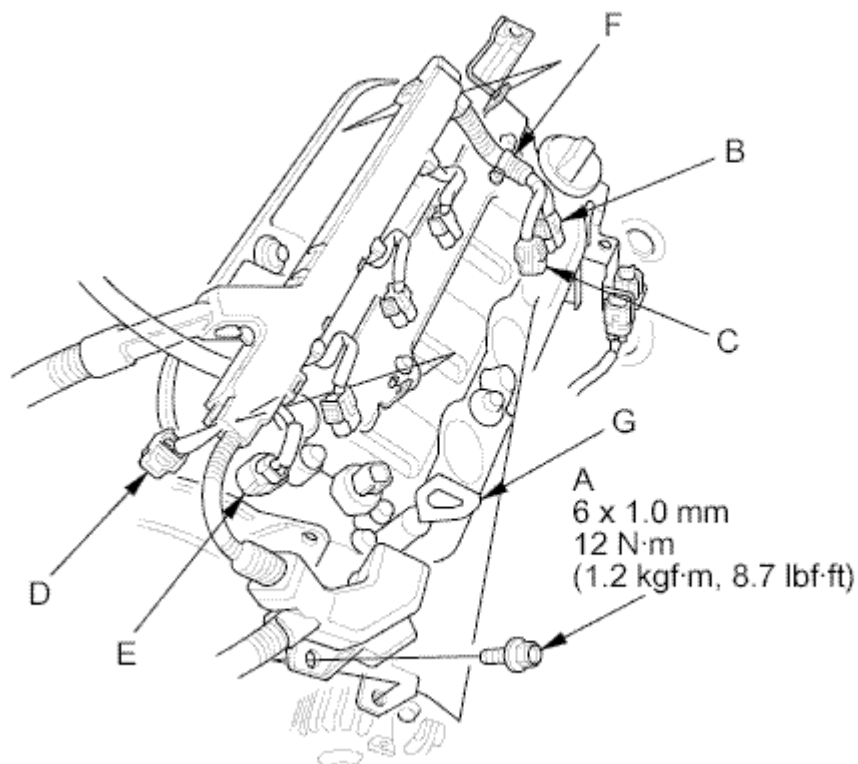


Fig. 410: Identifying Dipstick, Connectors And Harness Clamp With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Connect the front secondary heated oxygen sensor 2 (secondary HO2S) connector (B), the front air fuel ratio (A/F) sensor 2 connector (C), the rocker arm oil control solenoid A (BANK 2) connector (D), the front rocker arm oil pressure switch connector (E), and the harness clamp (F) securing the harness holder, and install the dipstick (G).
13. Install the three ignition coils to the front cylinder head (see **IGNITION COIL REMOVAL/INSTALLATION**).
14. Install the intake manifold (see **INSTALLATION**).

Rear

1. Check the spark plug seals for damage. If any seal is damaged, replace it.
2. Thoroughly clean the head cover gasket and the groove.
3. Install the head cover gasket (A) in the groove of the cylinder head cover (B). Make sure the head cover gasket is seated securely.

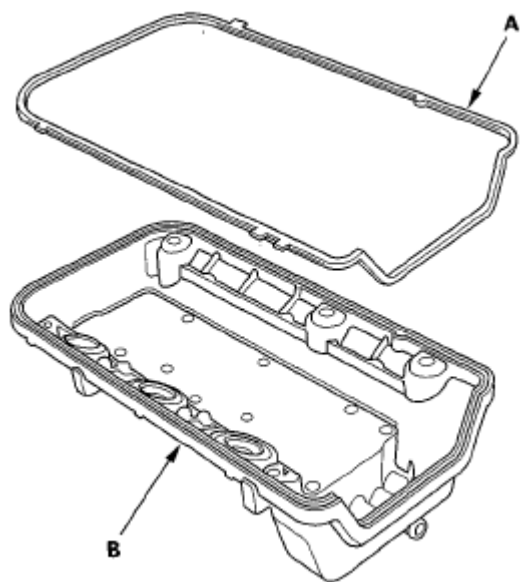


Fig. 411: Identifying Front Cylinder Head Cover And Head Cover Gasket
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head.
5. Clean the head cover contacting surfaces with a shop towel.
6. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the rocker shaft holder mating areas (A). Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

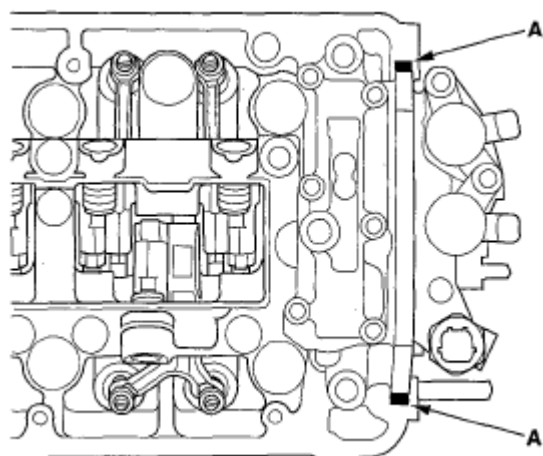


Fig. 412: Identifying Timing Mark On Crankshaft Pulley
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Set the spark plug seals (A) on the spark plug tubes, and install the rear cylinder head cover (B).

NOTE:

- Wait at least 30 minutes before filling the engine with oil.
- Do not run the engine for at least 3 hours after installing the cylinder head cover.

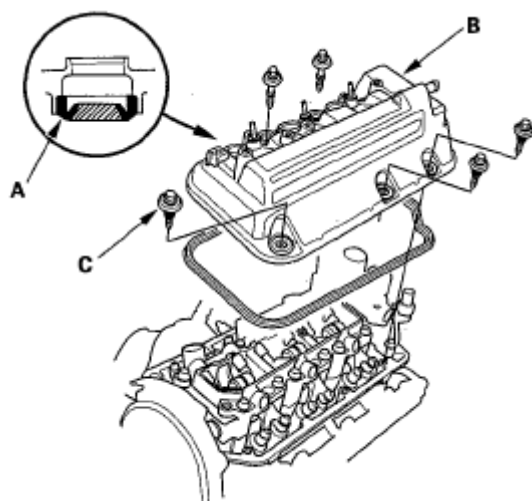


Fig. 413: Identifying Rear Cylinder Head Cover And Spark Plug Seals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Inspect the spark plug seals for damage.
9. Inspect the cover washers (C). Replace any washer that is damaged or deteriorated.
10. Tighten the bolts in three steps. In the final step torque all bolts, in sequence, 12 N.m (1.2 kgf.m, 8.8 lbf.ft).

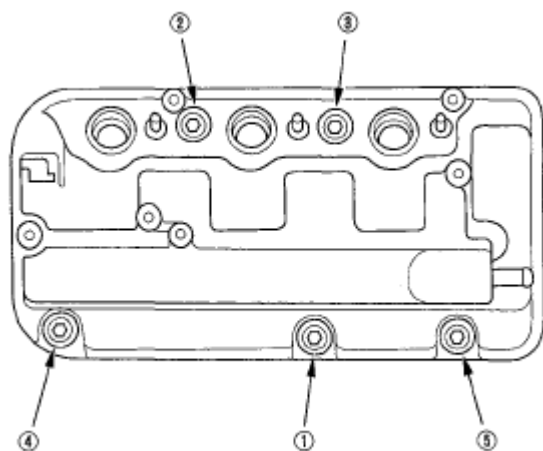


Fig. 414: Identifying Tightening Sequence Of Rear Cylinder Head Cover Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Connect the rear rocker arm oil pressure switch connector (A), the rocker arm oil control solenoid B (BANK 1) connector (B), the rocker arm oil control solenoid A (BANK 1) connector (C), the rear air fuel ratio (A/F) sensor 1 connector (D), the rear secondary heated oxygen sensor 2 (secondary HO2S) connector (E), and the harness clamps (F), then install the harness holder (G).

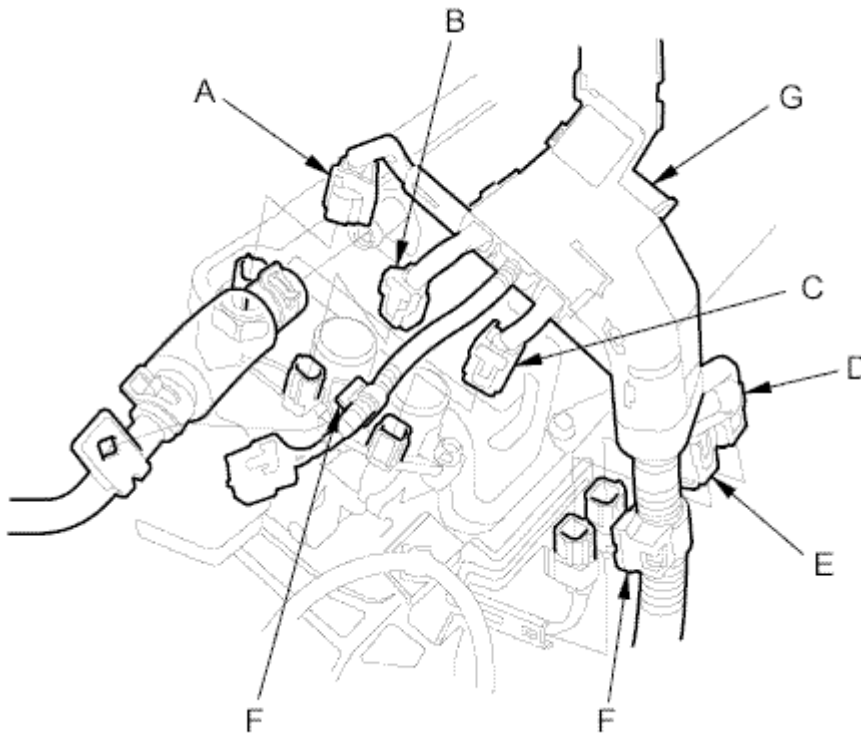


Fig. 415: Identifying Rear Cylinder Head Cover And Wiring Harness
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Tighten the harness holder mounting bolts (A).

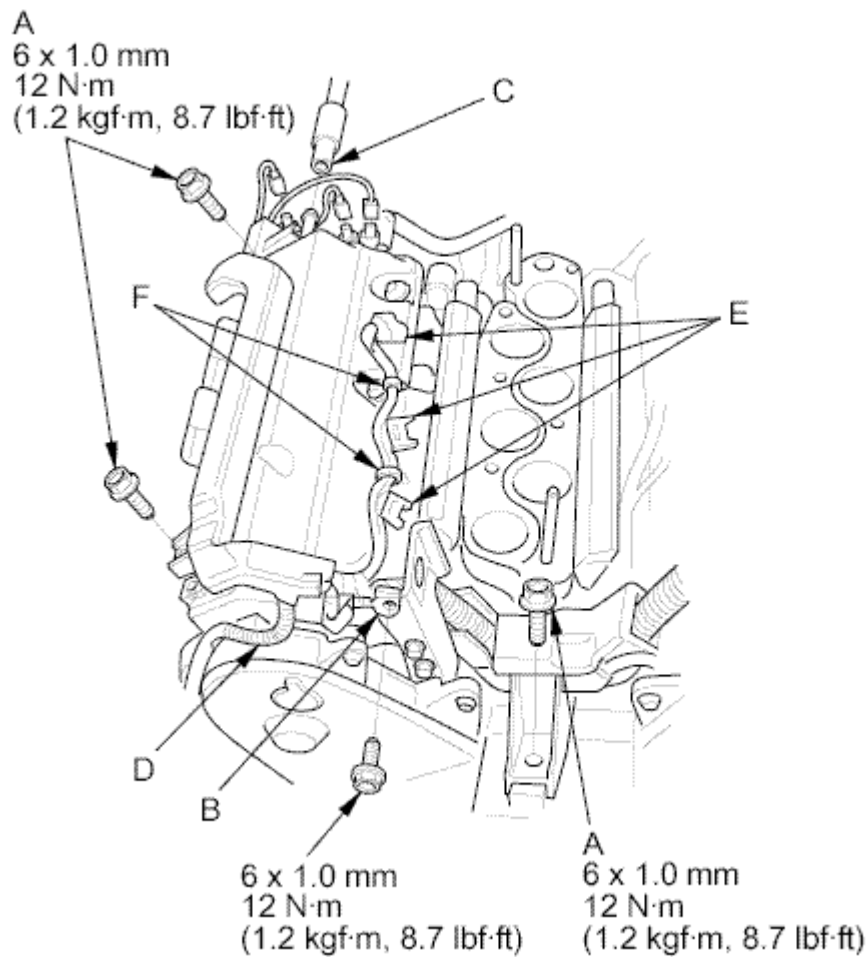


Fig. 416: Identifying Breather Hose, Harness Connectors And Harness Holder Mounting Bolts With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the engine ground cable (B) and connect the breather hose (C), then install the harness (D) to the upper cover.
14. Reconnect the three injector connectors (E) and the two harness clips (F).
15. Install the power steering (P/S) pump and (P/S) hose bracket.

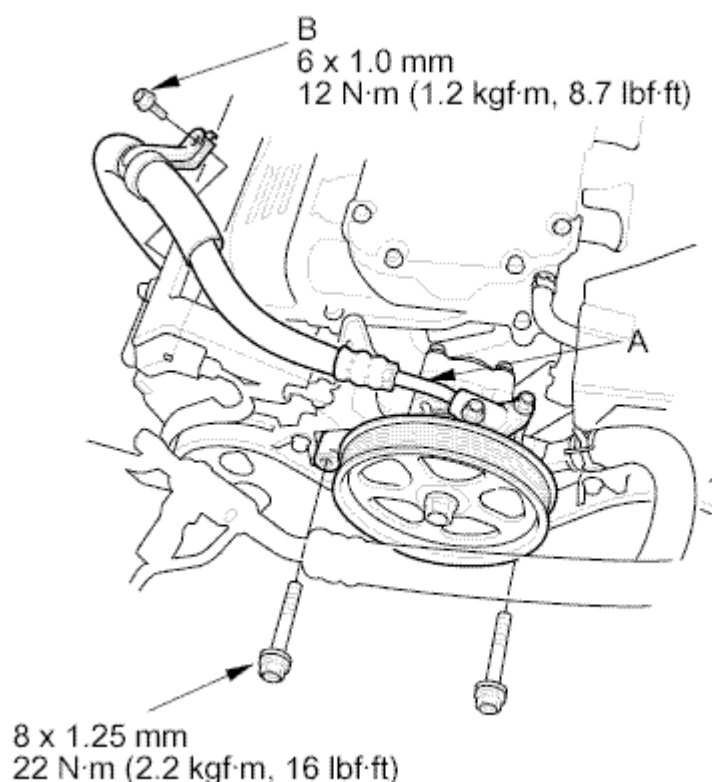


Fig. 417: Identifying Power Steering Hose And Pump Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
17. Install the three ignition coils to the rear cylinder head (see **IGNITION COIL REMOVAL/INSTALLATION**).
18. Install the intake manifold (see **INSTALLATION**).

CYLINDER HEAD REMOVAL

NOTE:

- Use fender covers to avoid damaging painted surfaces.
- To avoid damaging the wires and terminals, unplug the wiring connectors carefully while holding the connector portion.
- Connect the Honda Diagnostic System (HDS) to the data link connector (DLC), and monitor the engine coolant temperature (ECT). To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 100°F (38°C) before loosening the cylinder head bolts.
- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact any other wiring or hoses, or interfere with any other parts.

1. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING**).
2. Do the battery terminal disconnection procedure (see **BATTERY TERMINAL DISCONNECTION**).

AND RECONNECTION).

3. Drain the engine coolant (see **COOLANT CHECK**).
4. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
5. Remove the power steering (P/S) pump (A) and the bolt (B) securing the P/S hose bracket.

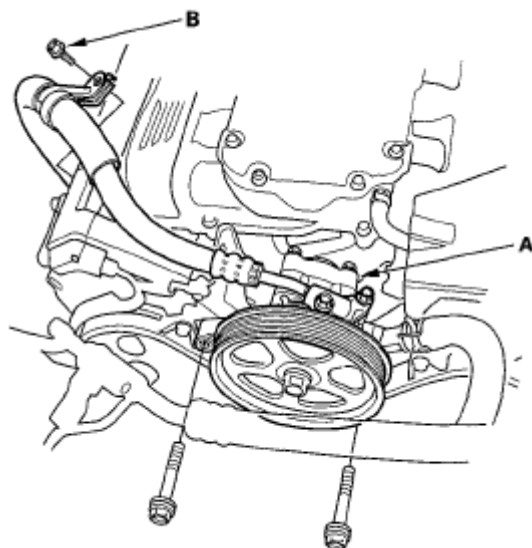


Fig. 418: Identifying Power Steering Pump And Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the alternator (see **REMOVAL ('08-09 MODEL)**).
7. Remove the intake manifold (see **REMOVAL**).
8. Remove the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
9. Remove the timing belt (see **TIMING BELT REMOVAL**).
10. Disconnect the following engine wire harness connectors and wire harness clamps from the cylinder head:
 - Six injector connectors
 - Engine coolant temperature (ECT) sensor 1 connector
 - Engine coolant temperature (ECT) sensor 2 connector
 - Exhaust gas recirculation (EGR) valve connector
 - Rocker arm oil pressure sensor connector
 - Camshaft position (CMP) sensor connector
 - Rear air fuel ratio (A/F) sensor connector
 - Rear secondary heated oxygen sensor (secondary HO2S) connector
11. Remove the front warm up three way catalytic converter (front WU-TWC) (see **FRONT**) and the rear warm up three way catalytic converter (rear WU-TWC) (see **REAR**).
12. Remove the quick-connect fitting cover (A), then disconnect the fuel feed hose (B) (see **FUEL LINE/QUICK-CONNECT FITTING REMOVAL**).

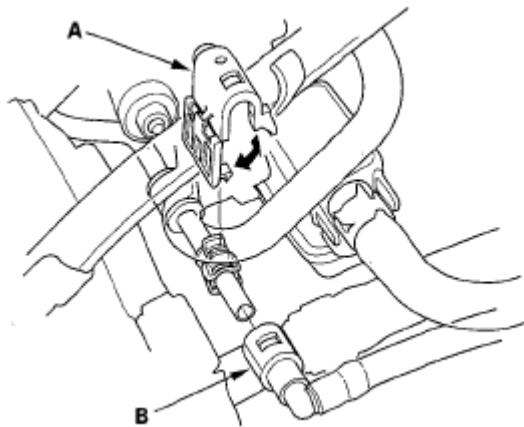


Fig. 419: Identifying Quick-Connect Fitting Cover And Fuel Feed Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the evaporative emission (EVAP) canister purge joint (A) with the bracket.

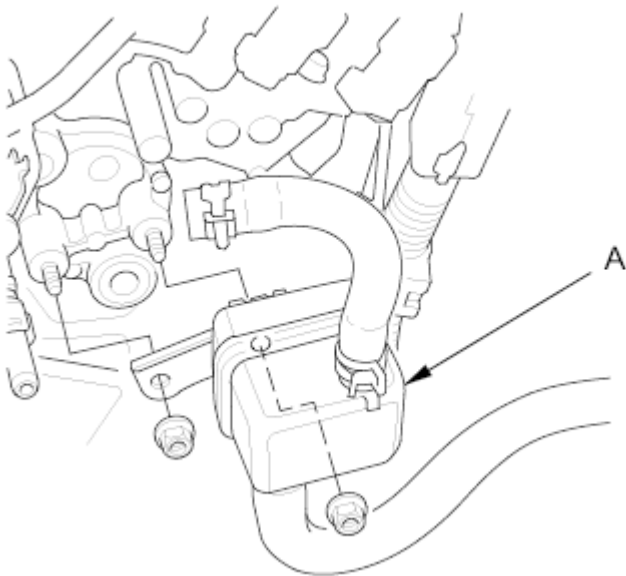


Fig. 420: Removing Evaporative Emission (Evap) Canister Purge Joint (A)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the connector bracket from the front cylinder head.



Fig. 421: Identifying Connector Bracket Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the harness clamp bracket from the rear cylinder head.

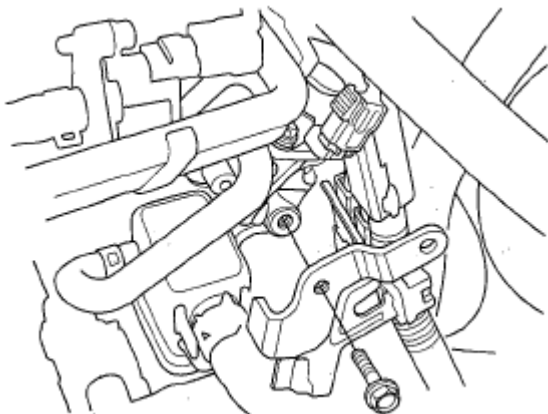


Fig. 422: Identifying Harness Clamp Bracket And Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Remove the injector base (see **INJECTOR BASE REMOVAL AND INSTALLATION**).
17. Remove the water passage (see **WATER PASSAGE REPLACEMENT**).
18. Remove the front and rear camshaft pulleys (A) and the front and rear back covers (B).

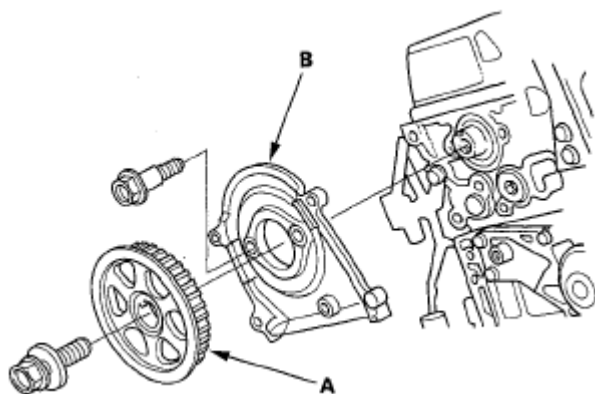


Fig. 423: Identifying Back Covers And Camshaft Pulleys
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Remove the cylinder head covers (see **CYLINDER HEAD COVER REMOVAL**).
20. Remove the cylinder head bolts. To prevent warpage, loosen the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

FRONT

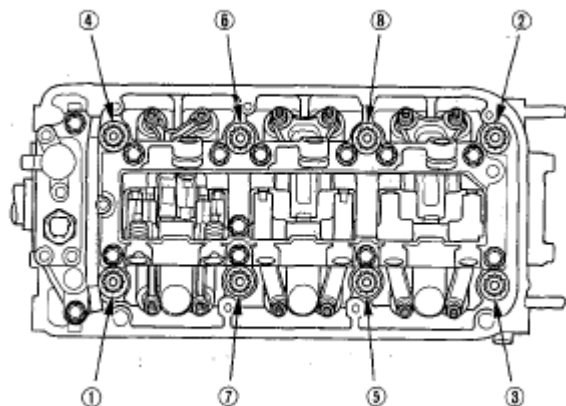


Fig. 424: Identifying Removing Sequence Of Cylinder Head Bolts - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

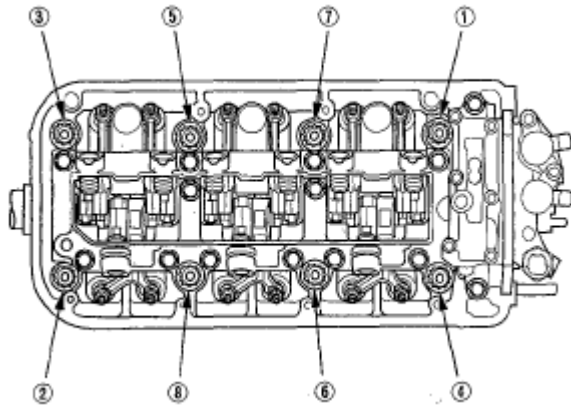


Fig. 425: Identifying Removing Sequence Of Cylinder Head Bolts - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Remove the cylinder heads.

CAMSHAFT REPLACEMENT

Front

1. Do the battery removal procedure (see **REMOVAL**).
2. Drain the engine coolant (see **COOLANT REPLACEMENT**).
3. Remove the radiator hoses (A).

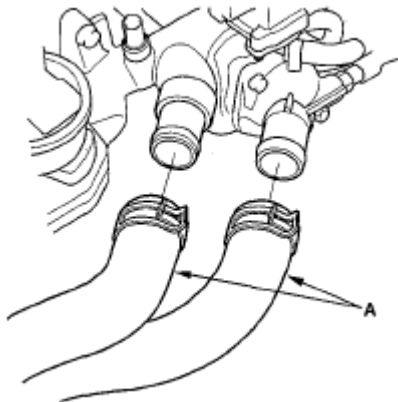


Fig. 426: Identifying Radiator Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the exhaust gas recirculation (EGR) valve (see **EGR VALVE REPLACEMENT**).
5. Remove the stud bolts (A).

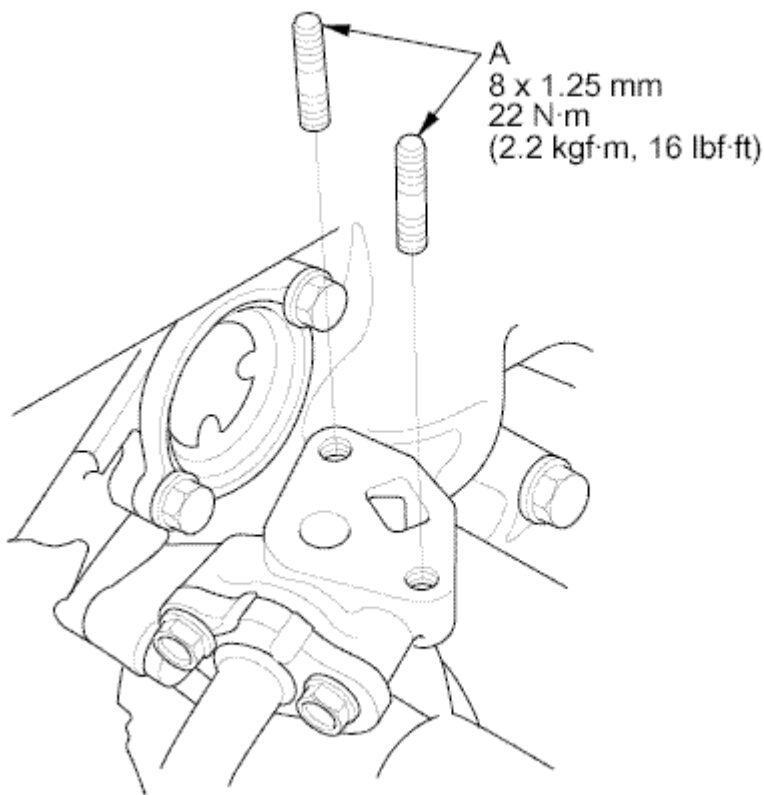


Fig. 427: Identifying Stud Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

NOTE: Double nutting (A) the studs may aide stud removal.

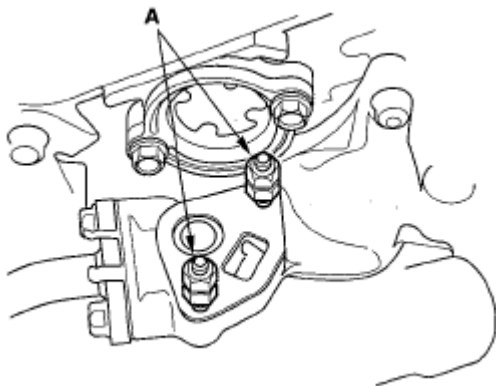


Fig. 428: Identifying Stud Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the timing belt (see **TIMING BELT REMOVAL**).
7. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
8. Remove the front camshaft pulley.

9. Remove the thrust cover (A), then remove the front camshaft (B).

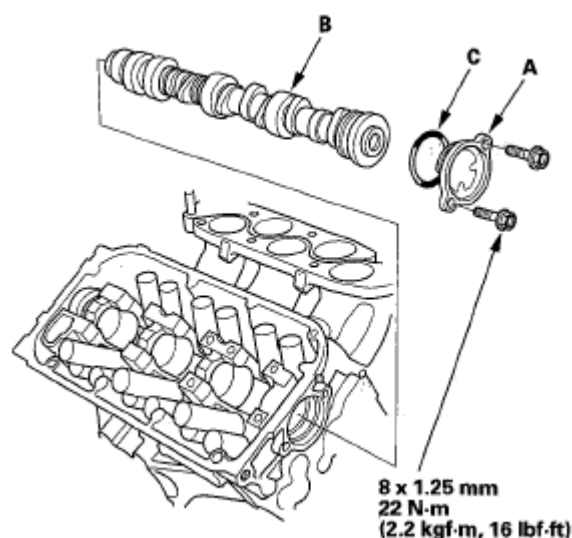


Fig. 429: Identifying Thrust Cover And Camshaft With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the front camshaft in the reverse order of removal. Always use a new O-ring (C). Apply new engine oil to the journals and the cam lobes.
11. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the front camshaft pulley (see step 13 under **REAR** "Camshaft, Rocker Arm Assembly, Camshaft Seal, and Pulley Installation").
12. Install the rocker arm assembly, then tighten the mounting bolts (see step 11 under **REAR** "Camshaft, Rocker Arm Assembly, Camshaft Seal, and Pulley Installation").
13. Install the timing belt (see **TIMING BELT INSTALLATION**).
14. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
15. Install the EGR valve (see **EGR VALVE REPLACEMENT**), then install the radiator hoses.
16. Connect the radiator hoses.
17. Do battery installation procedure (see **INSTALLATION**).
18. Fill the radiator with engine coolant and bleed the air out (see step 8 on **THERMOSTAT REPLACEMENT**).
19. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

Rear

1. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING**).
2. Remove the air cleaner assembly (see **AIR CLEANER REMOVAL/INSTALLATION**).
3. Drain the engine coolant (see **COOLANT REPLACEMENT**).
4. Remove the quick-connector fitting cover (A), then disconnect the fuel feed hose (B) (see **FUEL**

LINE/QUICK-CONNECT FITTING REMOVAL).

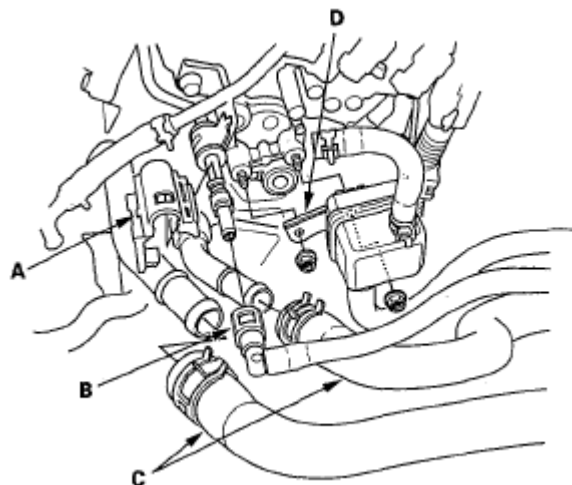


Fig. 430: Identifying Quick-Connector Fitting Cover And Fuel Feed Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Disconnect the heater hoses (C) and remove the evaporative emission (EVAP) canister purge joint (D) with the bracket.
6. Remove the brake lines from the master cylinder (see **MASTER CYLINDER REPLACEMENT**).
7. Remove the timing belt (see **TIMING BELT REMOVAL**).
8. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
9. Remove the rear camshaft pulley.
10. Remove the thrust cover (A), then remove the rear camshaft (B).

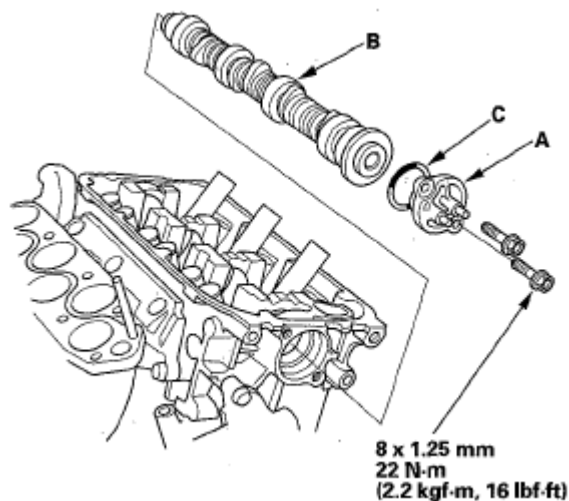


Fig. 431: Identifying Thrust Cover And Rear Camshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the rear camshaft in the reverse order of removal. Always use a new O-ring (C). Apply new engine

oil to the journals and the cam lobes.

12. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the rear camshaft pulley (see step 13 under **REAR** "Camshaft, Rocker Arm Assembly, Camshaft Seal, and Pulley Installation").
13. Install the rocker arm assembly, then tighten the mounting bolts (see step 11 under **REAR** "Camshaft, Rocker Arm Assembly, Camshaft Seal, and Pulley Installation").
14. Install the timing belt (see **TIMING BELT INSTALLATION**).
15. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
16. Install the brake lines (see **MASTER CYLINDER REPLACEMENT**) and do the brake system bleeding procedure (see **BRAKE SYSTEM BLEEDING**).
17. Connect the heater hoses and install the EVAP canister purge joint with the bracket.
18. Connect the fuel feed hose (see **FUEL LINE/QUICK-CONNECT FITTING INSTALLATION**), then install the quick-connect fitting cover.
19. Install the air cleaner assembly (see **AIR CLEANER REMOVAL/INSTALLATION**).
20. Inspect for fuel leaks. Turn the ignition switch to ON (II) (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation three times, then check for fuel leakage at any point in the fuel line.
21. Fill the radiator with engine coolant and bleed the air out (see step 8 **THERMOSTAT REPLACEMENT**).
22. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

CYLINDER HEAD INSPECTION FOR WARPAGE

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
2. Inspect the camshaft (see **CAMSHAFT INSPECTION**).
3. Check the cylinder head for warpage. Measure along the edges, and three ways across the center.
 - 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 the cylinder head.
 - Maximum resurface limit is 0.2 mm (0.008 in.) based on a height of 121 mm (4.76 in.).

Cylinder Head Height

Standard (New): 120.95-121.05 mm (4.762-4.766 in.)

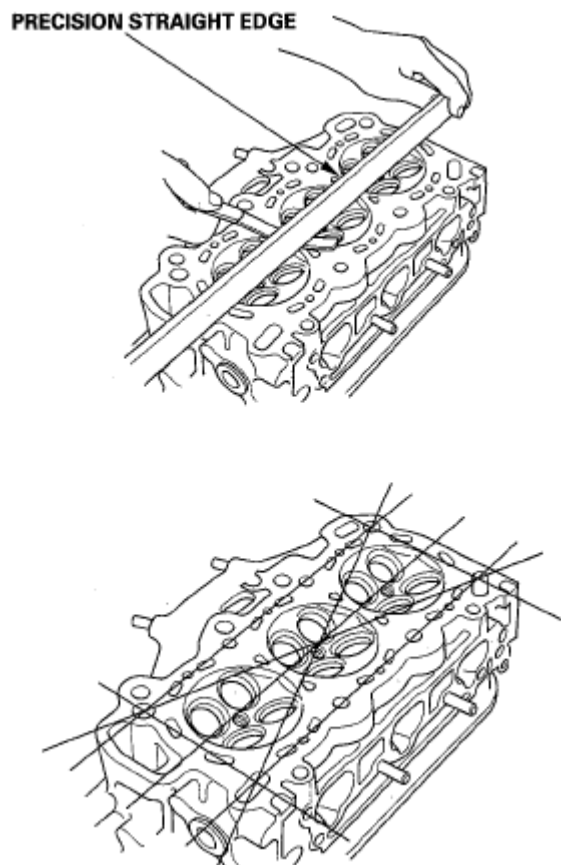


Fig. 432: Identifying Cylinder Head Height
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM ASSEMBLY REMOVAL

Front

1. Remove the cylinder head cover (see CYLINDER HEAD COVER REMOVAL).
2. Loosen the locknuts and the adjusting screws (A).

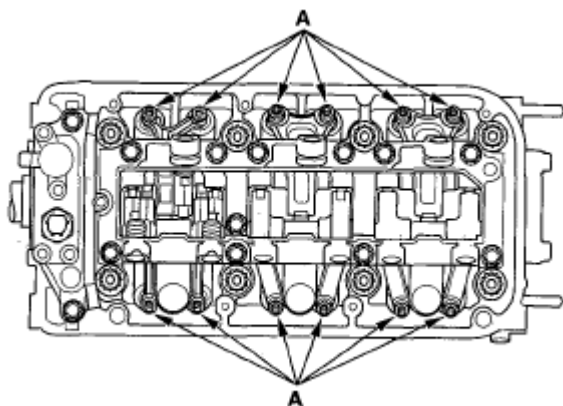
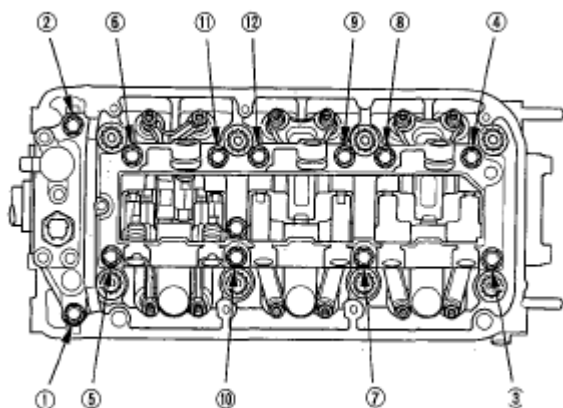


Fig. 433: Identifying Adjusting Screws

Courtesy of AMERICAN HONDA MOTOR CO., INC.

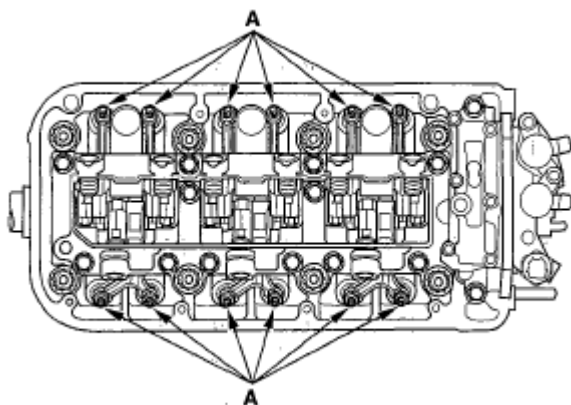
3. Remove the rocker shaft bridge mounting bolts, the rocker shaft holder mounting bolts, and the rocker arm assembly.
 1. Loosen the rocker shaft bridge mounting bolts and the rocker shaft holder mounting bolts in sequence two turns at a time, to prevent damaging the valves or the rocker arm assembly.
 2. When removing the rocker arm assembly, do not remove the rocker shaft bridge mounting bolts and the rocker shaft holder mounting bolts. The bolts will keep the springs and the rocker arms on the shafts.

**Fig. 434: Identifying Removing Sequence Of Rocker Shaft Holder Mounting Bolts - Front**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rear

4. Remove the cylinder head cover (see **CYLINDER HEAD COVER REMOVAL**).
5. Loosen the locknuts and the adjusting screws (A).

**Fig. 435: Identifying Adjusting Screws**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the rocker shaft bridge mounting bolts, the rocker shaft holder mounting bolts, and the rocker arm assembly.
1. Loosen the rocker shaft bridge mounting bolts and the rocker shaft holder mounting bolts in sequence two turns at a time, to prevent damaging the valves or the rocker arm assembly.
2. When removing the rocker arm assembly, do not remove the rocker shaft bridge mounting bolts and the rocker shaft holder mounting bolts. The bolts will keep the rocker arms on the shafts.

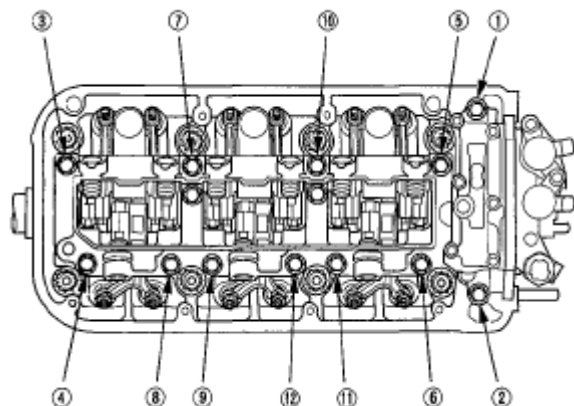


Fig. 436: Identifying Removing Sequence Of Rocker Shaft Holder Mounting Bolts - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY

Front

NOTE:

- Identify parts as they are removed so they can be reinstalled in their original locations.
- Inspect the rocker shafts and rocker arms (see ROCKER ARM AND SHAFT INSPECTION).
- If reused, the rocker arms must be installed in their original locations.
- When removing or installing the rocker arm assembly, do not remove the mounting bolts. The bolts will keep the rocker arms, the rocker shaft bridge, and the rocker shaft holder on the shaft.
- If the rocker shaft does not remove or does not install by hand, remove or install the rocker shaft by heating the rocker shaft bridge.
- Bundle the rocker arms with rubber bands to keep them together as a set, and remove the bands after the rocker arms have been installed.
- Prior to reassembling, clean all the parts in solvent, dry them, and apply new engine oil to any contact points.
- When replacing the rocker arm assembly, remove the fastening hardware from the new rocker arm assembly.
- Never remove any of the circlips that retain the lost motion assemblies in

the rocker shaft bridge. The circlips are not available separately, and are factory installed in the rocker shaft bridge. To remove the lost motion assemblies, first remove the rocker shafts and the rocker arms.

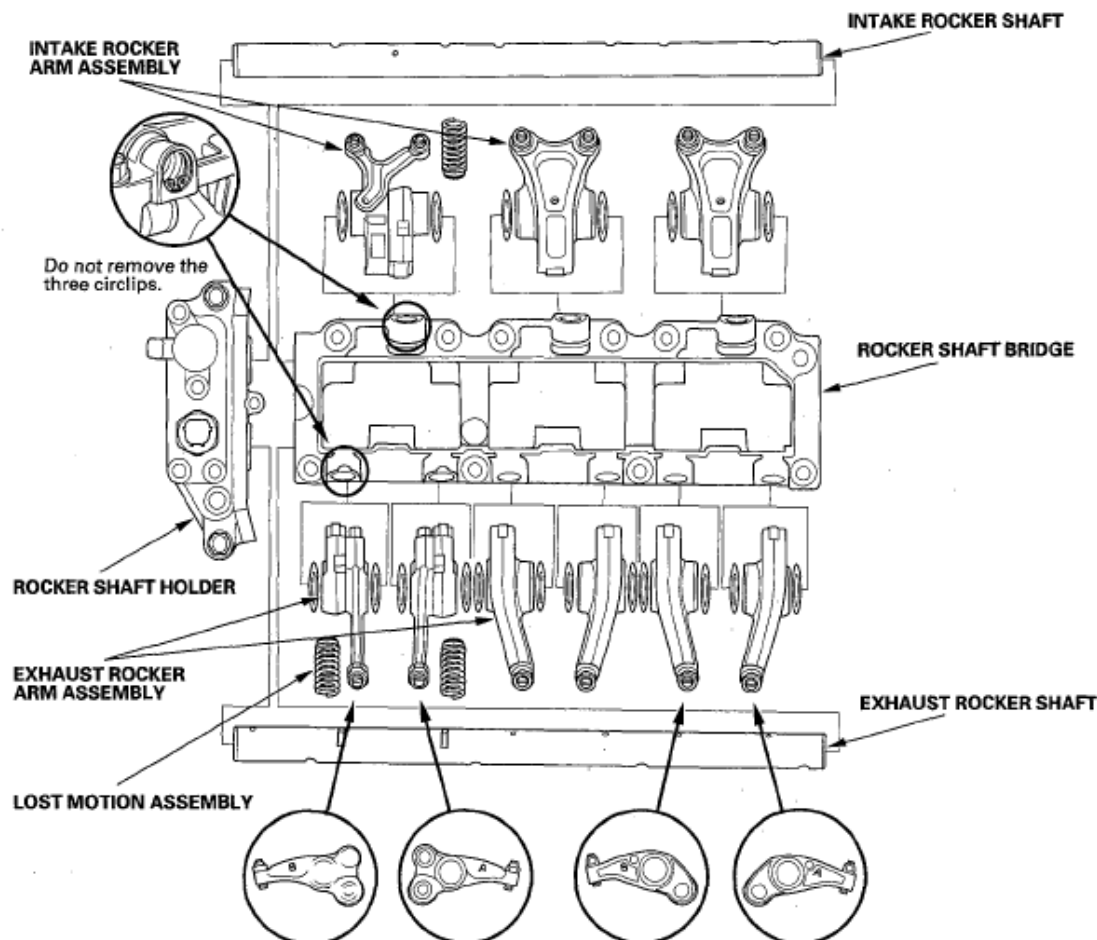


Fig. 437: Identifying Rocker Arm And Shaft Assembly Components - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rear

NOTE:

- Identify parts as they are removed so they can be reinstalled in their original locations.
- Inspect the rocker shafts and rocker arms (see **ROCKER ARM AND SHAFT INSPECTION**).
- If reused, the rocker arms must be installed in their original locations.
- When removing or installing the rocker arm assembly, do not remove the mounting bolts. The bolts will keep the rocker arms, the rocker shaft bridge, and the rocker shaft holder on the shaft.
- If the rocker shaft does not remove or does not install by hand, remove or install the rocker shaft by heating the rocker shaft bridge.

- Bundle the rocker arms with rubber bands to keep them together as a set, and remove the bands after the rocker arms have been installed.
- Prior to reassembling, clean all the parts in solvent, dry them, and apply new engine oil to any contact points.
- When replacing the rocker arm assembly, remove the fastening hardware from the new rocker arm assembly.
- Never remove any of the circlips that retain the lost motion assemblies in the rocker shaft bridge. The circlips are not available separately, and are factory installed in the rocker shaft bridge. To remove the lost motion assemblies, first remove the rocker shafts and the rocker arms.

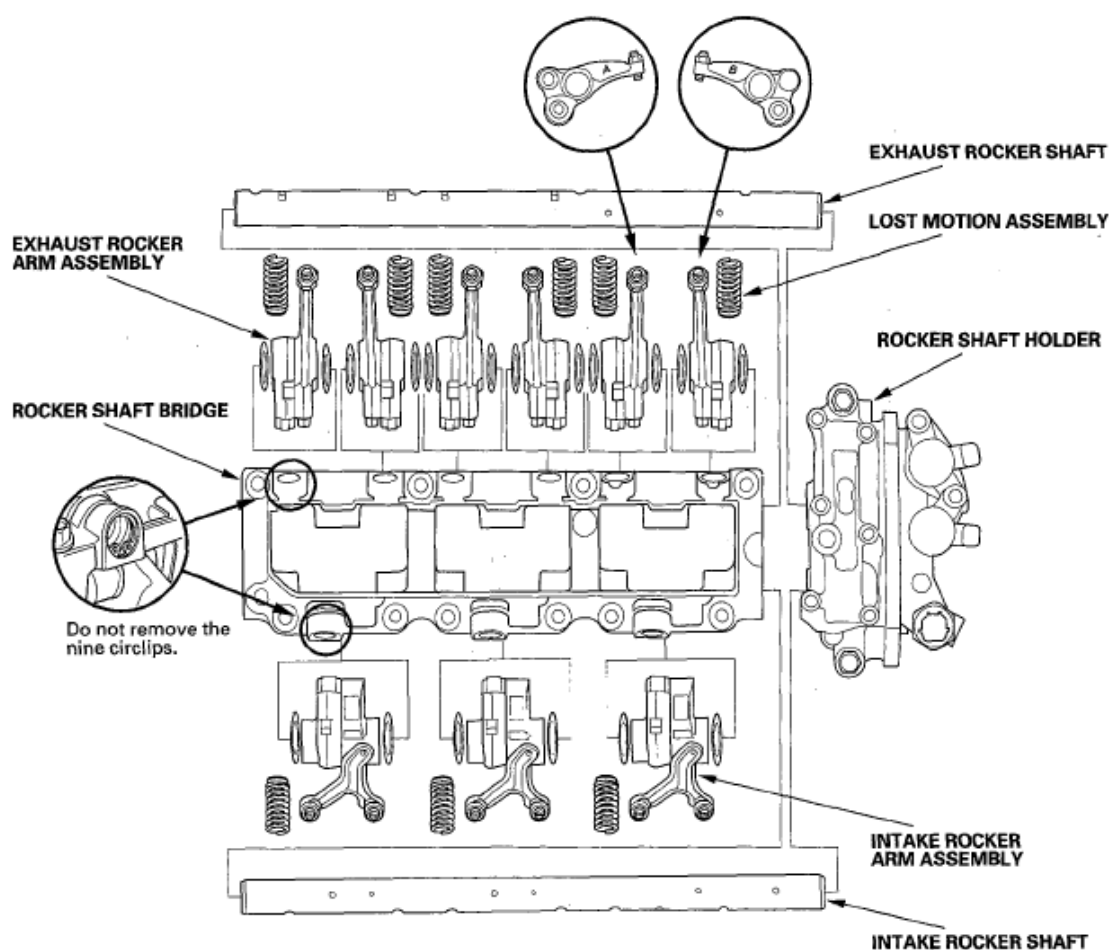


Fig. 438: Identifying Rocker Arm And Shaft Assembly Components - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT INSPECTION

1. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
2. Disassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).

3. Measure the diameter of the shaft at the first rocker location.

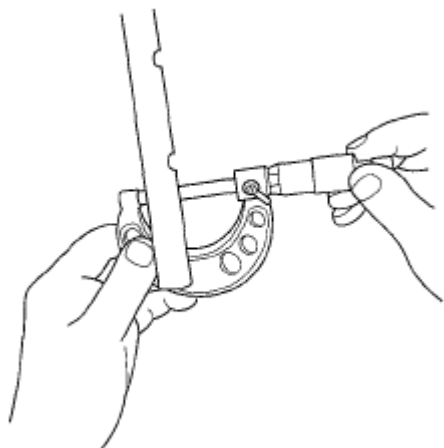


Fig. 439: Identifying Diameter Of Shaft

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Zero the gauge (A) to the shaft diameter.

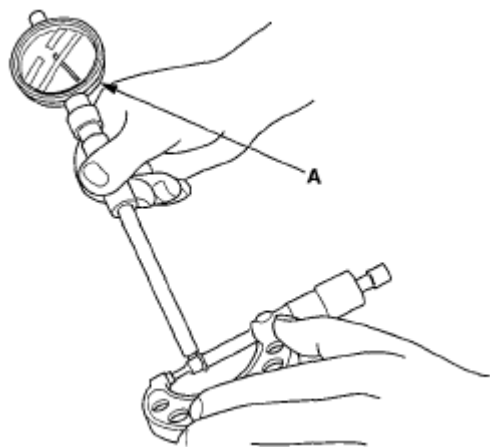


Fig. 440: Identifying Zero Gauge To Shaft Diameter

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the inside diameter of the rocker arm, and check it for an out-of-round condition.

FRONT

No. 4 CYLINDER Intake Rocker Arm-to-Shaft

Clearance:

Standard (New): 0.015-0.046 mm (0.0006-0.0018 in.)

Service Limit: 0.046 mm (0.0018 in.)

No. 5 and No. 6 CYLINDERS Intake Rocker Arm-to-Shaft Clearance:

Standard (New): 0.018-0.056 mm (0.0007-0.0022 in.)

Service Limit: 0.056 mm (0.0022 in.)

No. 4 CYLINDER Exhaust Rocker Arm-to-Shaft Clearance:

Standard (New): 0.015-0.046 mm (0.0006-0.0018 in.)

Service Limit: 0.046 mm (0.0018 in.)

No. 5 and No. 6 CYLINDERS Exhaust Rocker Arm-to-Shaft Clearance:

Standard (New): 0.018-0.047 mm (0.0007-0.0019 in.)

Service Limit: 0.047 mm (0.0019 in.)

REAR

Intake Rocker Arm-to-Shaft Clearance:

Standard (New): 0.015-0.046 mm (0.0006-0.0018 in.)

Service Limit: 0.046 mm (0.0018 in.)

Exhaust Rocker Arm-to-Shaft Clearance:

Standard (New): 0.015-0.046 mm (0.0006-0.0018 in.)

Service Limit: 0.046 mm (0.0018 in.)

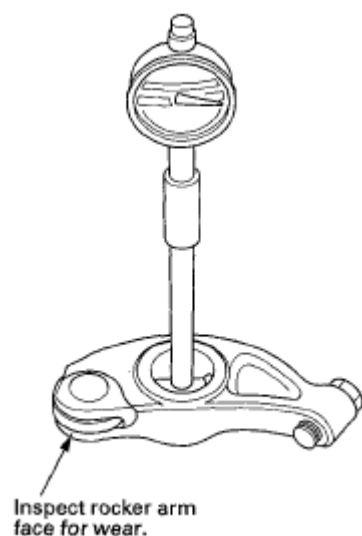


Fig. 441: Identifying Inside Diameter Of Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Repeat for all rockers and both shafts. If the clearance is over the limit, replace the rocker shaft and all over-tolerance rocker arms. If any variable cylinder management rocker arm needs replacement, replace all rocker arms in that set (primary and secondary).

Variable Cylinder Management Rocker Arms

7. Inspect the rocker arm pistons (A). Slide them into the rocker arms. If they do not move smoothly, replace the rocker arm set.

NOTE:

- Apply new engine oil to the rocker arm pistons when reassembling.
- When removing the rocker arm pistons from the intake primary rocker arm (B) and the exhaust primary rocker arms (C), carefully apply air pressure to the oil passage of the rocker arm.

INTAKE

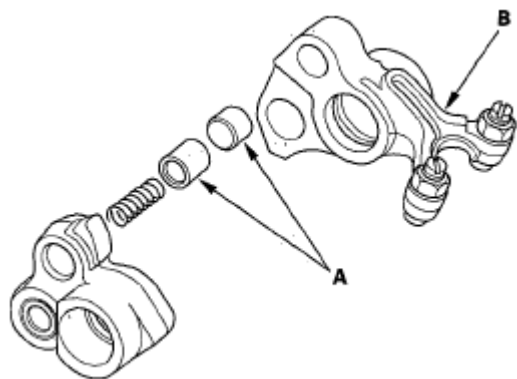


Fig. 442: Identifying Rocker Arm Pistons - Intake
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

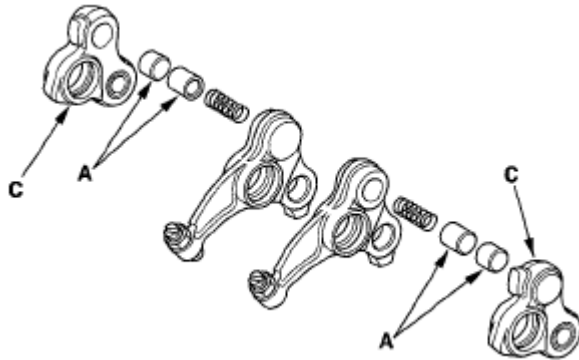


Fig. 443: Identifying Rocker Arm Pistons - Exhaust
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Install the rocker arm assembly (see **CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION**).

CAMSHAFT INSPECTION

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
2. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
3. Front: Put the rocker shafts bridge and the rocker shaft holder on the front cylinder head, then tighten the bolts to the specified torque.

Specified Torque

8 x 1.25 mm: 22 N.m (2.2 kgf.m, 16 lbf.ft)

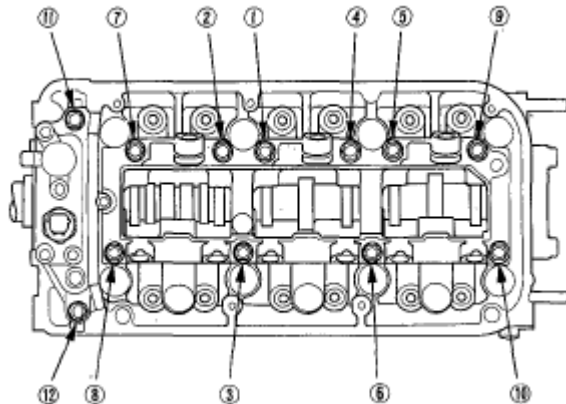


Fig. 444: Identifying Tightening Sequence Of Cylinder Head Bolts - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Rear: Put the rocker shaft bridge and the rocker shaft holder on the rear cylinder head, then tighten the bolts to the specified torque.

Specified Torque

8 x 1.25 mm: 22 N.m (2.2 kgf.m, 16 lbf.ft)

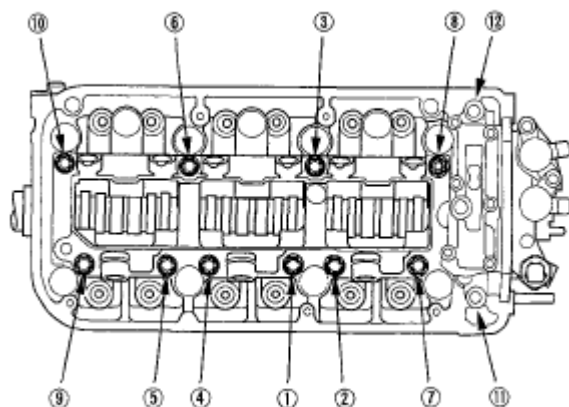


Fig. 445: Identifying Tightening Sequence Of Cylinder Head Bolts - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Seat the camshaft by pushing it toward the rear of the cylinder head.
6. Zero the dial indicator against the end of the camshaft. Push the camshaft back and forth and read the end play. If the end play is beyond the service limit, replace the thrust cover and recheck. If it is still beyond the service limit, replace the camshaft.

Camshaft End Play

Standard (New): 0.05-0.20 mm (0.002-0.008 in.)

Service Limit: 0.20 mm (0.008 in.)

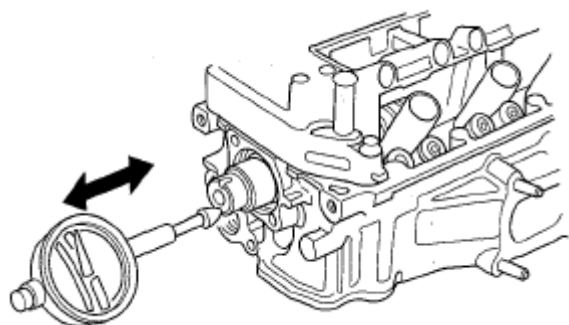


Fig. 446: Identifying Camshaft End Play
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the camshaft thrust cover (A), then pull out the camshaft (B).

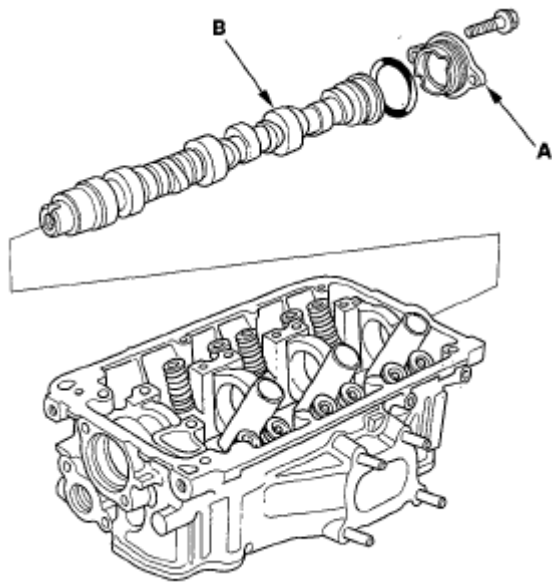


Fig. 447: Identifying Camshaft Thrust Cover And Camshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Wipe the camshaft clean, then inspect the lift ramps. Replace the camshaft if any lobes are pitted, scored, or excessively worn.
9. Measure the diameter of each camshaft journal.

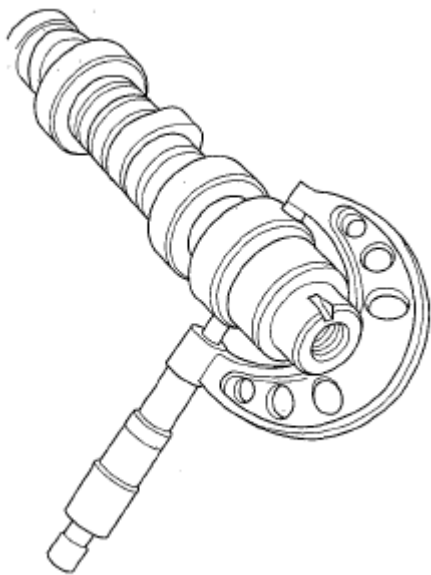


Fig. 448: Identifying Diameter Of Camshaft Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Zero the gauge to the journal diameter.

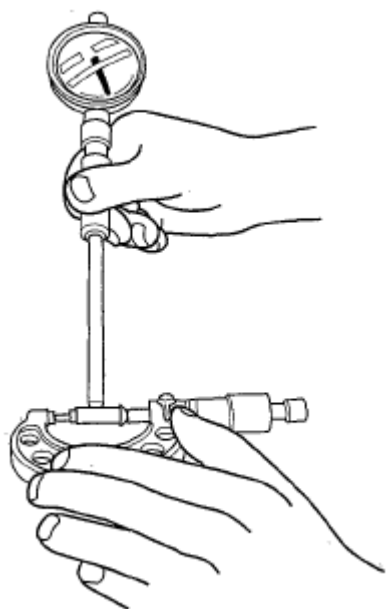


Fig. 449: Identifying Zero Gauge To Journal Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Clean the camshaft bearing surfaces in the cylinder head. Measure the inside diameter of each camshaft bearing surface, and check for an out-of-round condition.
 - If the camshaft-to-holder clearance is within limits, go to step 13.
 - If the camshaft-to-holder clearance is beyond the service limit and the camshaft has been replaced, replace the cylinder head.
 - If the camshaft-to-holder clearance is beyond the service limit and the camshaft has not been replaced, go to step 12.

Camshaft-to-Holder Oil Clearance

Standard (New): 0.050-0.089 mm (0.0020-0.0035 in.)

Service Limit: 0.15 mm (0.006 in.)

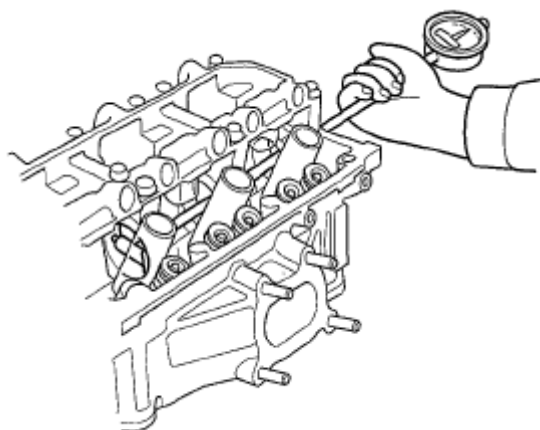


Fig. 450: Identifying Inside Diameter Of Camshaft Bearing Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Check total runout with the camshaft supported on V-blocks.
- If the total runout of the camshaft is within the service limit, replace the cylinder head.
 - If the total runout is beyond the service limit, replace the camshaft and recheck the oil clearance. If the oil clearance is still out of tolerance, replace the cylinder head.

Camshaft Total Runout

Standard (New): 0.03 mm (0.001 in.) max.

Service Limit: 0.04 mm (0.002 in.)

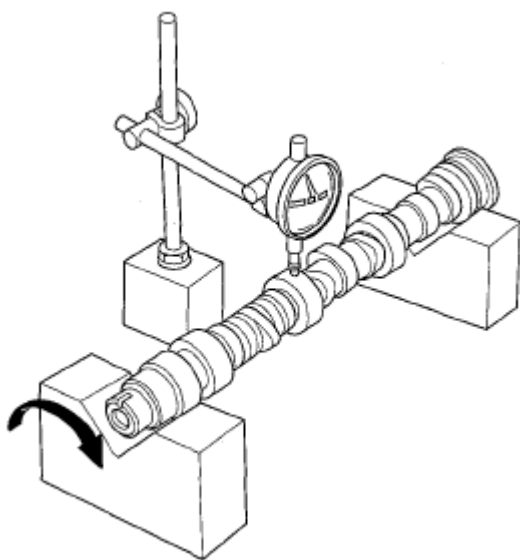


Fig. 451: Identifying Camshaft Total Runout
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Measure the cam lobe height.

NOTE:

- When measuring the No. 1, No. 2, No. 3, and No. 4 cylinders intake cam lobe height of the camshaft, measure the secondary cam lobes.
- When measuring the No. 1, No. 2, No. 3, and No. 4 cylinders exhaust cam lobe height of the camshaft, measure the secondary cam lobes.

Cam Lobe Height Standard (New)**No. 1, No. 2, No. 3, and No. 4 CYLINDERS:**

Intake: 35.162 mm (1.3843 in)

Exhaust: 36.537 mm (1.4385 in)

No. 5 and No. 6 CYLINDERS:

Intake: 35.155 mm (1.3841 in)

Exhaust: 36.512 mm (1.4375 in)

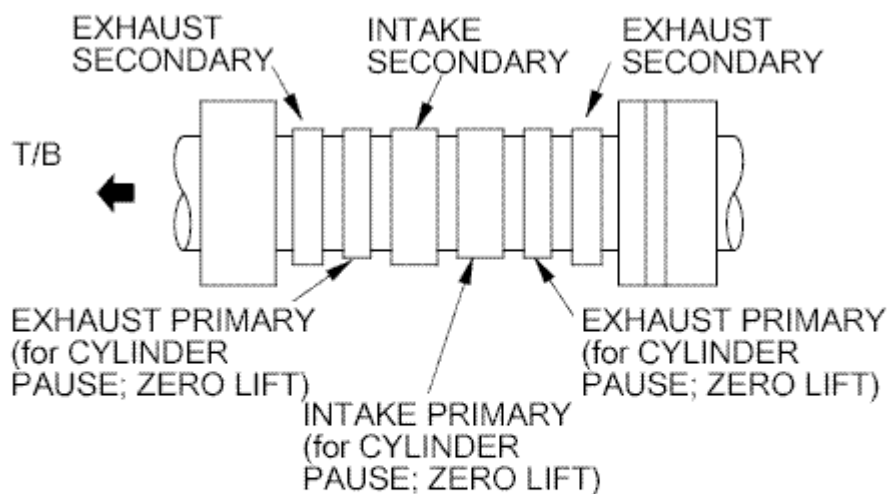
[No. 1, No. 2, No. 3 and No. 4 CYLINDERS]

Fig. 452: Identifying Cam Lobe Height - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

[No. 4 CYLINDER]

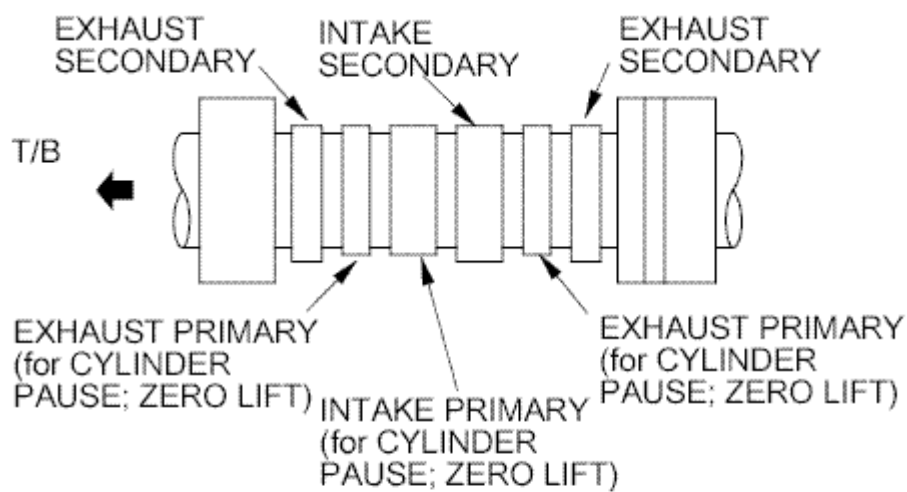


Fig. 453: Identifying Cam Lobe Height - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

[No. 5 and No. 6 CYLINDERS]

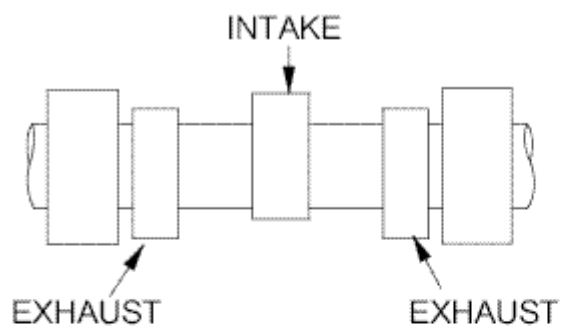


Fig. 454: Identifying Cam Lobe Height - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE, SPRING, AND VALVE SEAL REMOVAL

Special Tools Required

Valve spring compressor attachment 07757-PJ1010A

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

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
2. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
3. Using an appropriate-sized socket (A) and a plastic mallet (B), lightly tap the spring retainer to loosen the valve cotters.

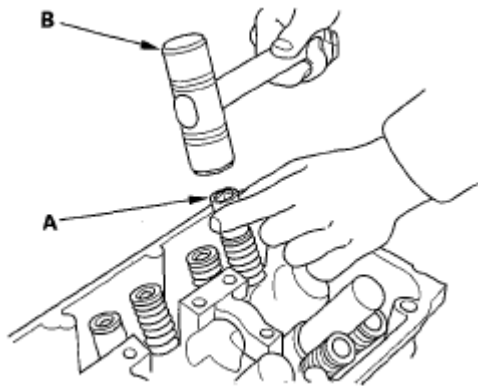


Fig. 455: Identifying Spring Retainer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the valve spring compressor attachment and the valve spring compressor. Compress the spring and remove the valve cotters.

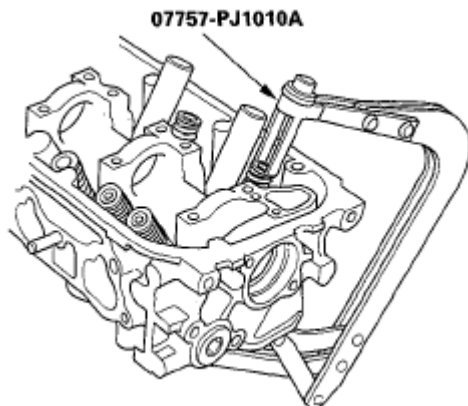


Fig. 456: Identifying Valve Cotters

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the valve spring compressor and the valve spring compressor attachment, then remove the spring retainer, the valve spring, and the valve.
6. Install the valve guide seal remover (A).

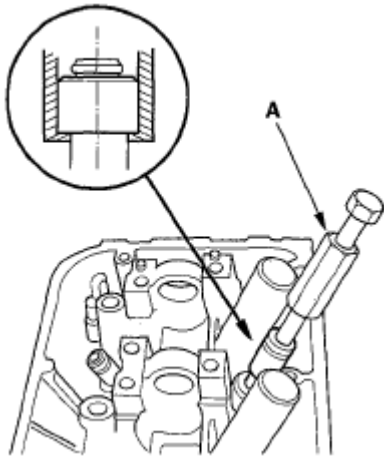


Fig. 457: Identifying Valve Guide Seal Remover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve seal.

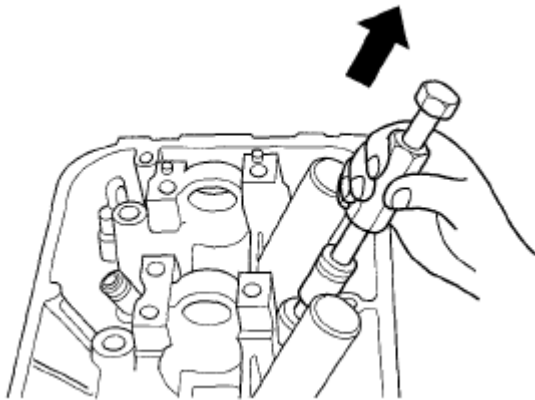


Fig. 458: Identifying Valve Seal

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the valve spring seat.

VALVE INSPECTION

1. Remove the valves (see **VALVE, SPRING, AND VALVE SEAL REMOVAL**).
2. Measure the valve in these areas.

Intake Valve Dimensions

A Standard (New): 35.90-36.10 mm (1.413-1.421 in.)

B Standard (New): 116.55-117.15 mm (4.589-4.612 in.)

C Standard (New): 5.485-5.495 mm (0.2159-0.2163 in.)

C Service Limit: 5.455 mm (0.2148 in.)

Exhaust Valve Dimensions

A Standard (New): 29.90-30.10 mm (1.177-1.185 in.)

B Standard (New): 113.90-114.50 mm (4.484-4.508 in.)

C Standard (New): 5.450-5.460 mm (0.2146-0.2150 in.)

C Service Limit: 5.420 mm (0.2134 in.)

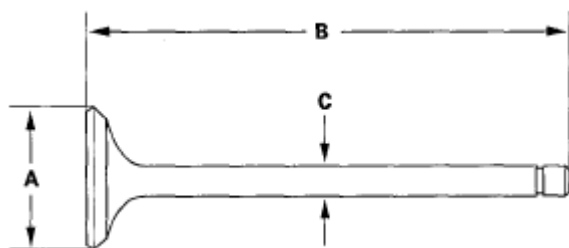


Fig. 459: Identifying Valve Dimension

Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE STEM-TO-GUIDE CLEARANCE INSPECTION

1. Remove the valves (see **VALVE, SPRING, AND VALVE SEAL REMOVAL**).
2. Slide the valve out of its guide about 10 mm (0.39 in.), then measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).
 - If the measurement exceeds the service limit, recheck it using a new valve.
 - If the measurement is now within the service limit, reassemble using a new valve.
 - If the measurement with a new valve still exceeds the service limit, go to step 3.

Intake Valve Stem-to-Guide Clearance

Standard (New): 0.04-0.09 mm (0.002-0.004 in.)

Service Limit: 0.16 mm (0.006 in.)

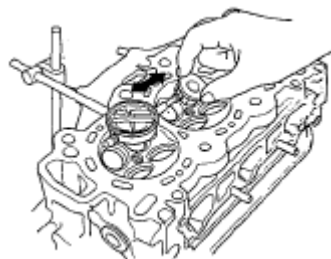
Exhaust Valve Stem-to-Guide Clearance**Standard (New): 0.11-0.16 mm (0.004-0.006 in.)****Service Limit: 0.22 mm (0.009 in.)**

Fig. 460: Identifying Valve Stem-To-Guide Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. 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 a ball gauge.

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): 0.020-0.045 mm (0.0008-0.0018 in.)****Service Limit: 0.08 mm (0.003 in.)****Exhaust Valve Stem-to-Guide Clearance****Standard (New): 0.055-0.080 mm (0.0022-0.0031 in.)****Service Limit: 0.11 mm (0.004 in.)****VALVE GUIDE REPLACEMENT****Special Tools Required**

- Valve guide driver, 5.5 mm 07742-0010100
 - Valve guide reamer, 5.5 mm 07HAH-PJ7A100
1. Inspect the valve stem-to-guide clearance (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**).

2. As illustrated, use a commercially available air-impact valve guide driver (A) modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using the valve guide driver and a conventional hammer.

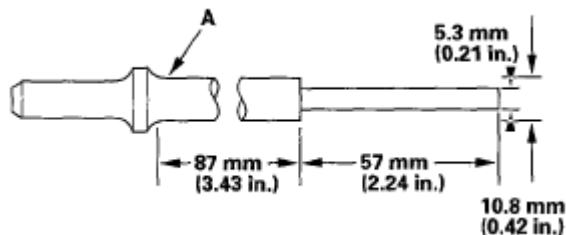


Fig. 461: Identifying Valve Guide Driver Dimension
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Select the proper replacement guides, and chill them in the freezer section of a refrigerator for about an hour.
4. Use a hot plate or oven to evenly heat the cylinder head to 300°F (150°C). Monitor the temperature with a cooking thermometer. Do not get the head hotter than 300°F (150°C); excessive heat may loosen the valve seats.

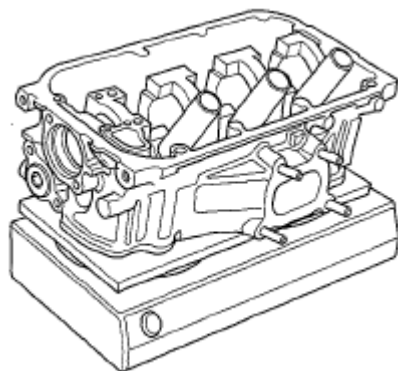


Fig. 462: Identifying Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.1 in.) towards the combustion chamber. This will knock off some of the carbon and make removal easier. Hold the air hammer directly in line with the valve guide to prevent damaging the driver. Wear safety goggles or a face shield.
6. Turn the head over, and drive the guide out toward the camshaft side of the head.

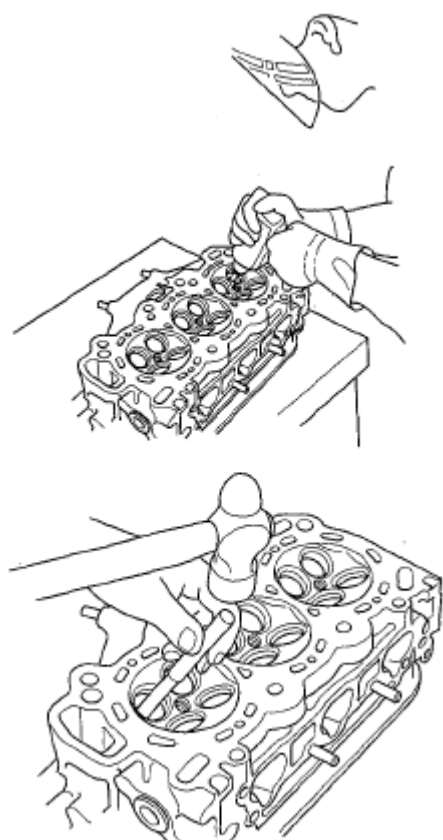


Fig. 463: Identifying Valve Guide

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. If a valve guide still won't move, drill it out with a 8 mm (5/16 in.) bit, then try again.

NOTE: **Drill guides only in extreme cases; you could damage the cylinder head if the guide breaks.**

8. Remove the new guide(s) from the freezer, one at a time, as you need them.
9. Apply a thin coat of new engine oil to the outside of the new valve guide. Install the guide from the camshaft side of the head; use the valve guide driver to drive the guide to the specified installed height (A) of the guide (B). If you have all 12 guides to do, you may have to reheat the head.

Valve Guide Installed Height

Intake: 21.20-22.20 mm (0.835-0.874 in.)

Exhaust: 20.60-21.60 mm (0.811-0.850 in.)

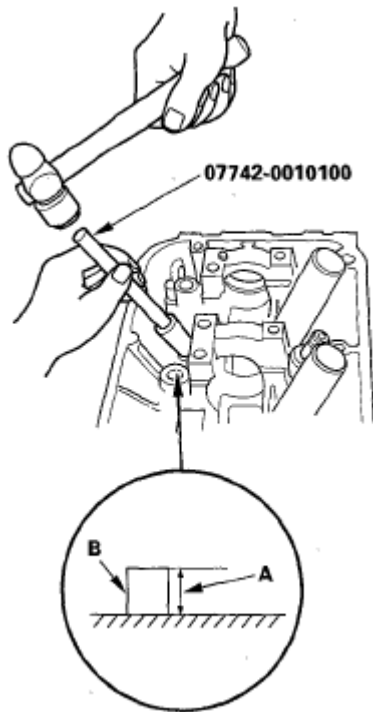


Fig. 464: Identifying Valve Guide Installed Height
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Coat both the reamer and the valve guide with cutting oil.
11. Rotate the reamer clockwise the full length of the valve guide bore.

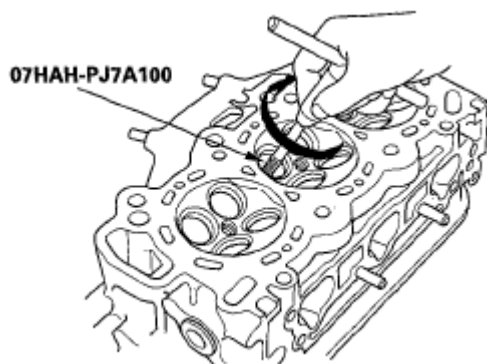


Fig. 465: Identifying Reaming Valve Guide
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Continue to rotate the reamer clockwise while removing it from the bore.
13. Thoroughly wash the guide in detergent and water to remove any cutting residue.
14. Check the clearance with a valve (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**). Verify that a valve slides in the intake and exhaust valve guides without sticking.
15. Inspect the valve seating . If necessary renew the valve seat using a valve seat cutter.

VALVE SEAT RECONDITIONING

1. Inspect valve stem-to-guide clearance (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**). If the valve guides are worn, replace them (see **VALVE GUIDE REPLACEMENT**) before cutting the valve seats.
2. Renew the valve seats in the cylinder head using a valve seat cutter.

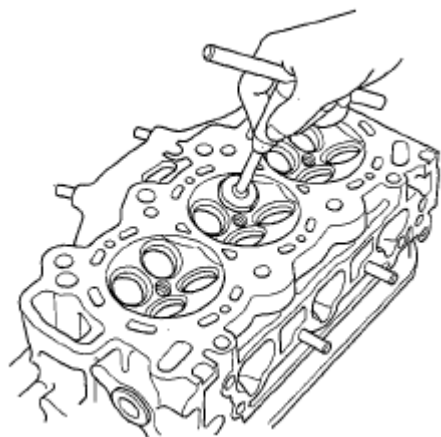


Fig. 466: Identifying Reaming Valve Seats

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.
4. Bevel the upper and lower edges at the angles shown in the illustration. Check the width of the seat and adjust accordingly.

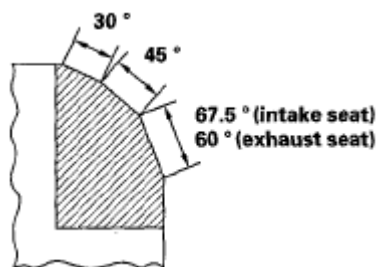


Fig. 467: Identifying Valve Seat Cutting Angle

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

Valve Seat Width

Standard (New): 1.25-1.55 mm (0.049-0.061 in.)

Service Limit: 2.00 mm (0.079 in.)

6. After resurfacing the seat, inspect it for even valve seating. Apply Prussian Blue compound (A) to the valve face. Insert the valve in its original location in the head, then lift it and snap it closed against the seat several times.

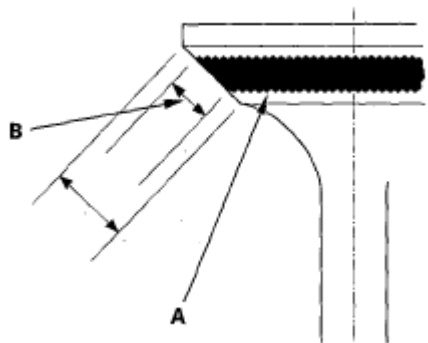


Fig. 468: Identifying Actual Valve Seating Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. The actual valve seating surface (B), 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 67.5° cutter (intake seat) or the 60° cutter (exhaust seat) 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.

8. Insert the intake and exhaust valves in the head, and measure the valve stem installed height (A).

Intake Valve Stem Installed Height

Standard (New): 46.75-47.55 mm (1.841-1.872 in.)

Service Limit: 47.80 mm (1.882 in.)

Exhaust Valve Stem Installed Height

Standard (New): 46.68-47.48 mm (1.838-1.869 in.)

Service Limit: 47.73 mm (1.879 in.)

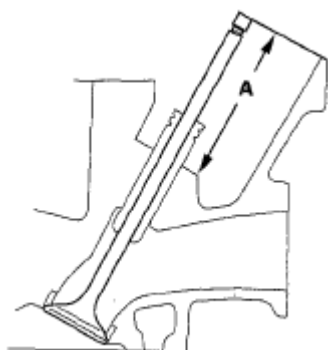


Fig. 469: Identifying Intake Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

VALVE, SPRING, AND VALVE SEAL INSTALLATION

Special Tools Required

- Stem seal driver 07PAD-0010000
 - Valve spring compressor attachment 07757-PJ1010A
1. Coat the valve stems with new engine oil. Install the valves in the valve guides.
 2. Check that the valves move up and down smoothly.
 3. Install the spring seats on the cylinder head.
 4. Install the new valve seals (A) using the 5.5 mm side of the stem seal driver, 30 mm (B).

NOTE: Exhaust valve seals (C) have a black spring (D) and intake valve seals (E) have a white spring (F); they are not interchangeable.

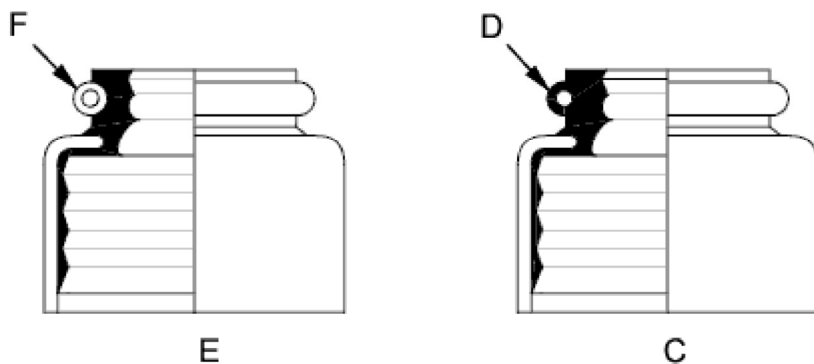


Fig. 470: Identifying Valve Seals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

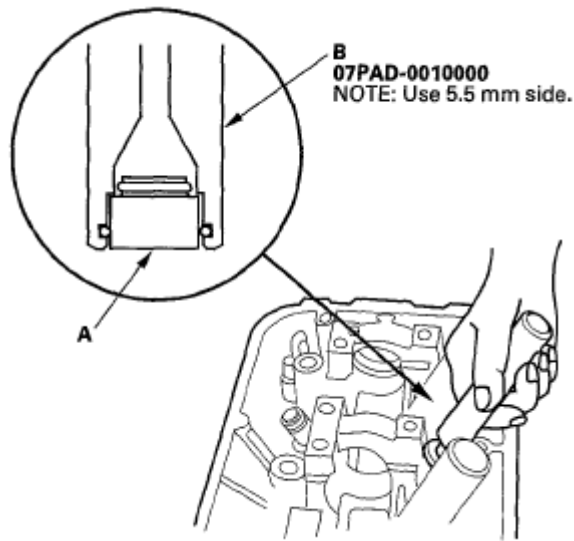


Fig. 471: Identifying Valve Seal And Stem Seal Driver
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the valve spring and spring retainer. Place the end of the valve spring with closely wound coils toward the cylinder head.
6. Install the valve spring compressor attachment and the valve spring compressor. Compress the spring and install the valve cotters.

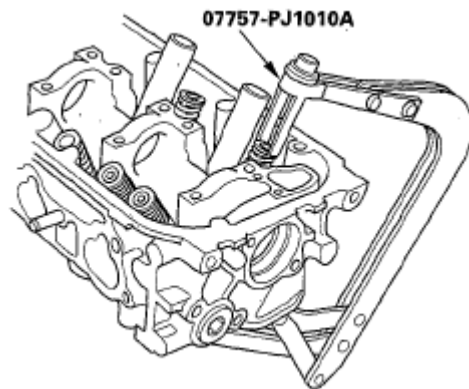


Fig. 472: Identifying Valve Cotters
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve spring compressor and the valve spring compressor attachment.
8. Lightly tap the end of each valve stem two or three times with a plastic mallet (A) to ensure proper seating of the valve and valve cotters. Tap the valve stem only along its axis so you do not bend the stem.

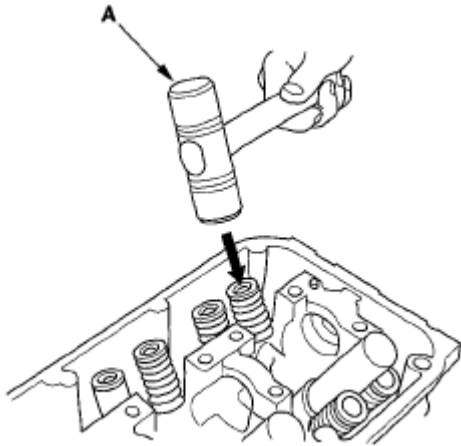


Fig. 473: Identifying End Of Valve Stem
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION

Front

1. Loosen the locknuts and the adjusting screws.
2. Clean and dry the camshaft oil seal housing.
3. Apply a light coat of new engine oil around the camshaft oil seal.
4. Gently tap the new camshaft oil seal (A) into the cylinder head.
 1. Tap the camshaft oil seal in squarely.
 2. Install the oil seal about 0.5-1.5 mm (0.02-0.06 in.) below the surface of the cylinder head.

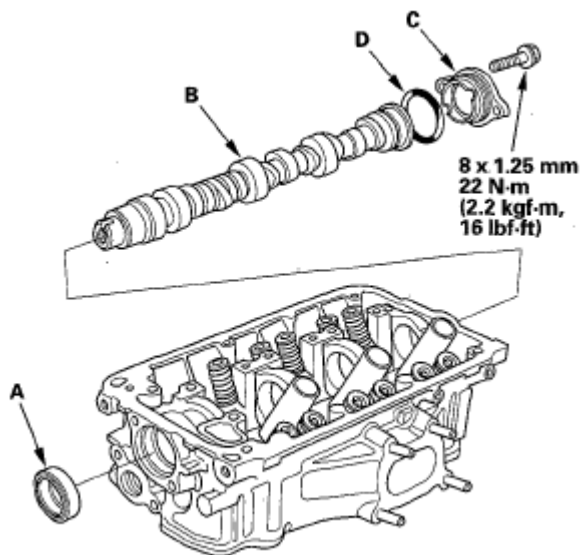


Fig. 474: Identifying Camshaft, Rocker Arm Assembly, Camshaft Seal And Pulley - Front With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Insert the camshaft (B) into the cylinder head, then install the camshaft thrust cover (C). Always use a new O-ring (D). Apply new engine oil to the camshaft journals and lobes.
6. Check that the oil seal lips are not distorted.
7. If the rocker arm assembly is disassembled, reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
8. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head.
9. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the rocker shaft holder mating surface of the cylinder head. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

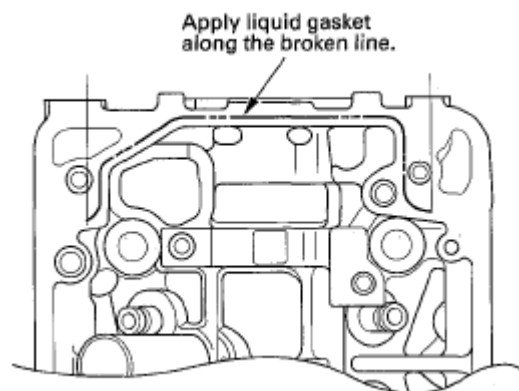


Fig. 475: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. 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.

NOTE:

- Wait at least 30 minutes before filling the engine with oil.
- Do not run the engine for at least 3 hours after installing the rocker arm assembly.

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

Specified Torque

8 x 1.25 mm: 22 N.m (2.2 kgf.m, 16 lbf.ft)

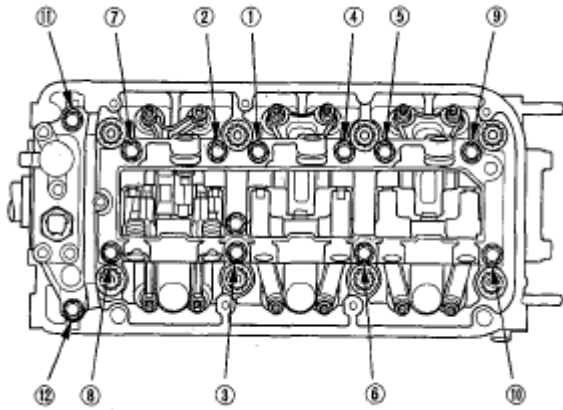


Fig. 476: Identifying Tightening Sequence Of Cylinder Head Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the injector base (A). Always use a new gasket (B).

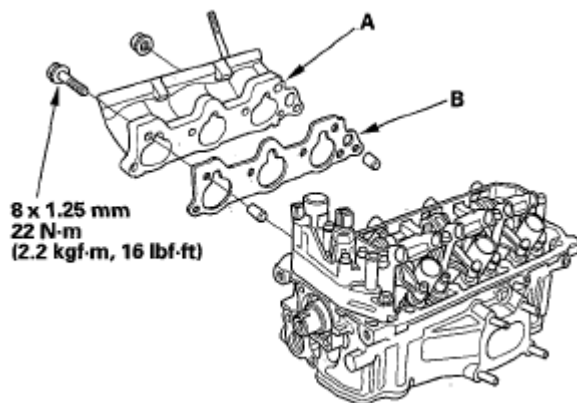


Fig. 477: Identifying Injector Base And Gasket With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Apply new engine oil to the threads of the camshaft pulley mounting bolt (A). Install the back cover (B), then install the camshaft pulley (C).

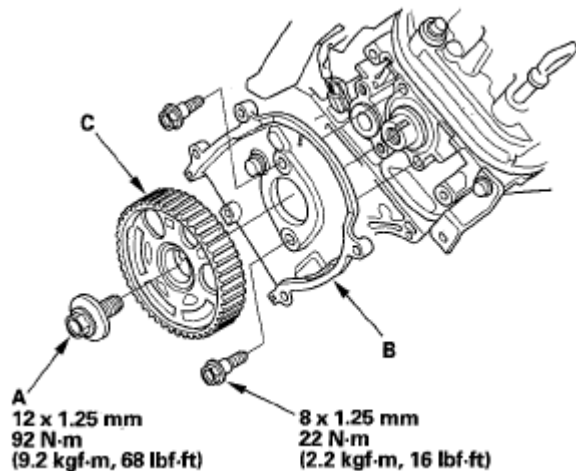


Fig. 478: Identifying Camshaft Pulley Mounting Bolt And Back Cover With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Set the camshaft pulley to top dead center (TDC) before bolting them onto the engine block (see step 6 **CYLINDER HEAD INSTALLATION**).

Rear

1. Loosen the locknuts and the adjusting screws.
2. Clean and dry the camshaft oil seal housing.
3. Apply a light coat of new engine oil to the lip of the camshaft oil seal.
4. Gently tap the new camshaft oil seal (A) into the cylinder head.
 1. Tap the camshaft oil seal in squarely.
 2. Install the oil seal about 0.5-1.5 mm (0.02-0.06 in.) below the surface of the cylinder head.

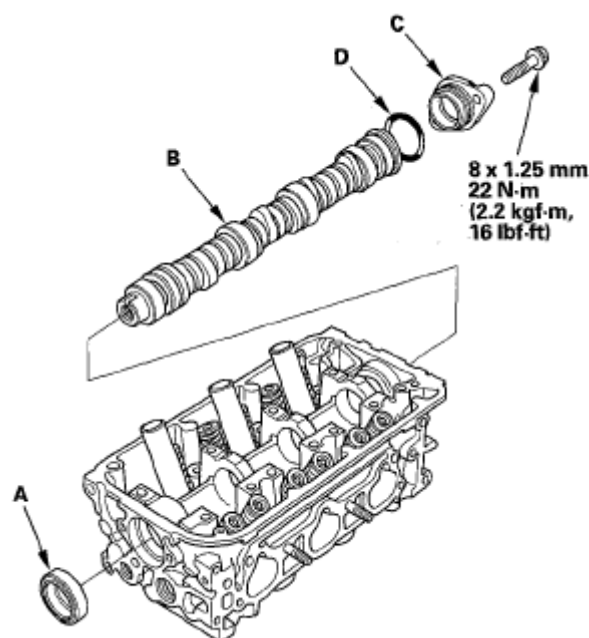


Fig. 479: Identifying Camshaft, Rocker Arm Assembly, Camshaft Seal And Pulley - Rear With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Insert the camshaft (B) into the cylinder head, then install the camshaft thrust cover (C). Always use a new O-ring (D). Apply new engine oil to the camshaft journals and lobes.
6. Check that the oil seal lips are not distorted.
7. If the rocker arm assembly is disassembled, reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
8. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head.
9. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the rocker shaft holder mating surface of the cylinder head. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

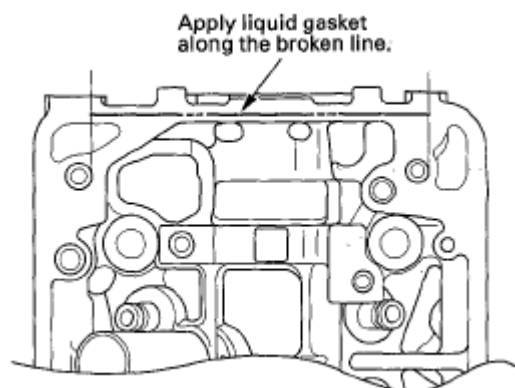


Fig. 480: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. 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.

NOTE:

- Wait at least 30 minutes before filling the engine with oil.
- Do not run the engine for at least 3 hours after installing the rocker arm assembly.

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

Specified Torque

8 x 1.25 mm: 22 N.m (2.2 kgf.m, 16 lbf.ft)

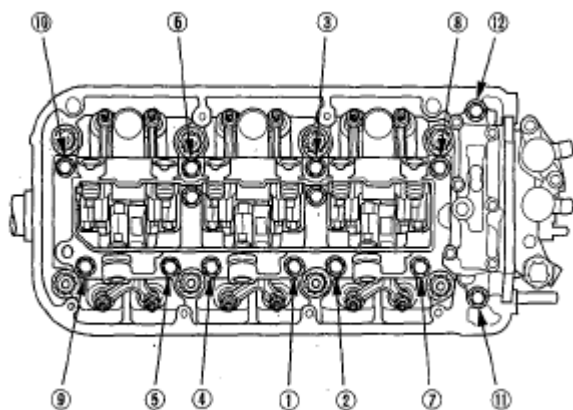


Fig. 481: Identifying Tightening Sequence Of Cylinder Head Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the injector base (A). Always use a new gasket (B).

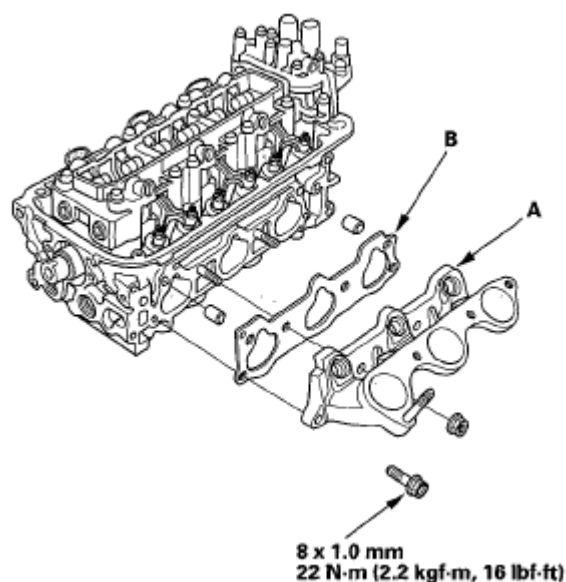


Fig. 482: Identifying Injector Base And Gasket With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Apply new engine oil to the threads of the camshaft pulley mounting bolt (A). Install the back cover (B), then install the camshaft pulley (C).

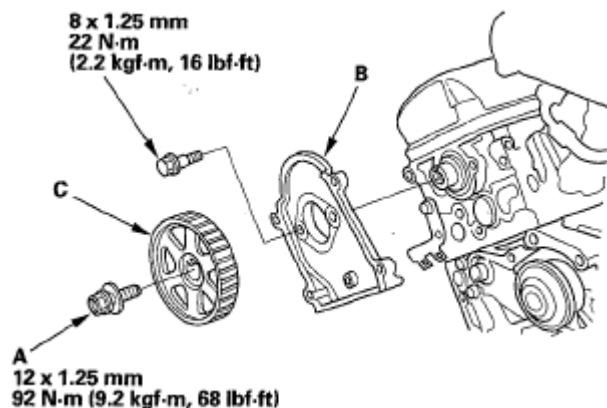


Fig. 483: Identifying Camshaft Pulley Mounting Bolt And Back Cover With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Set the camshaft pulley to top dead center (TDC) before bolting them onto the engine block (see step 6 **CYLINDER HEAD INSTALLATION**).

CYLINDER HEAD INSTALLATION

1. Clean the cylinder head and the engine block surface.
2. Clean and install the oil control orifices (A) with new O-rings (B).

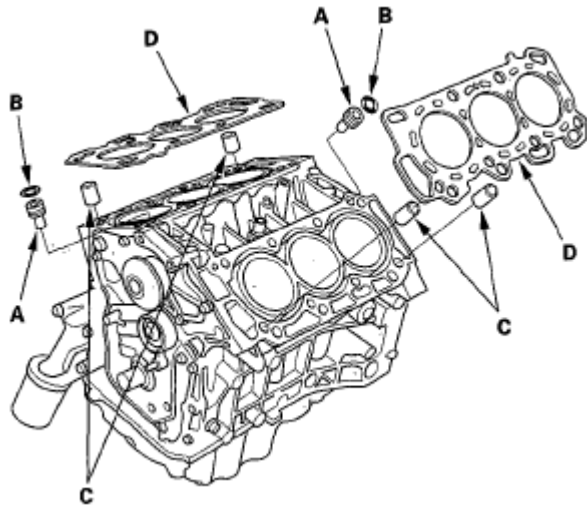


Fig. 484: Identifying Oil Control Orifices With O-Rings
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the dowel pins (C) and the new cylinder head gaskets (D).
4. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
5. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.

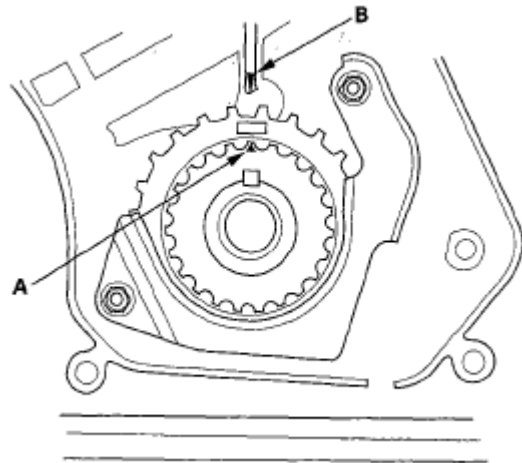


Fig. 485: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley With Pointer On Oil Pump
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

FRONT

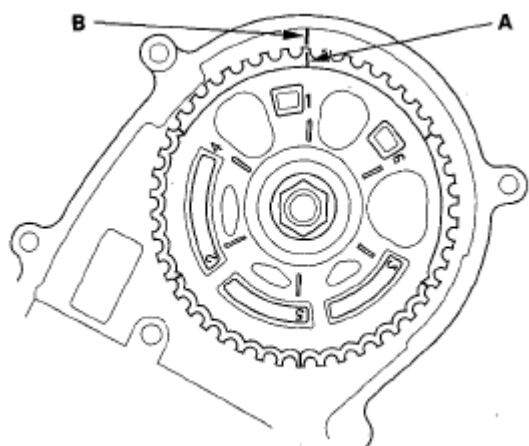


Fig. 486: Identifying TDC Marks On Camshaft Pulleys With Back Covers - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

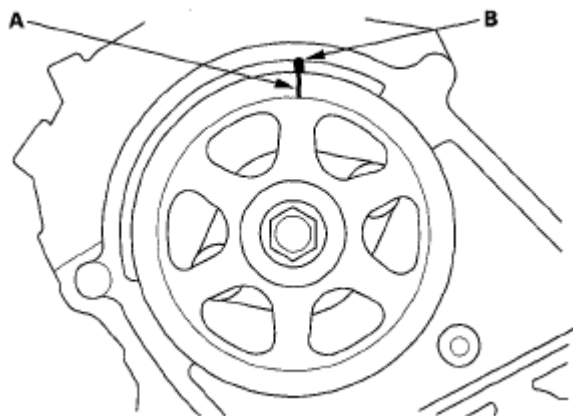


Fig. 487: Identifying TDC Marks On Camshaft Pulleys With Back Covers - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install the cylinder heads on the engine block.
8. Measure the diameter of each cylinder head bolt at point A and point B.

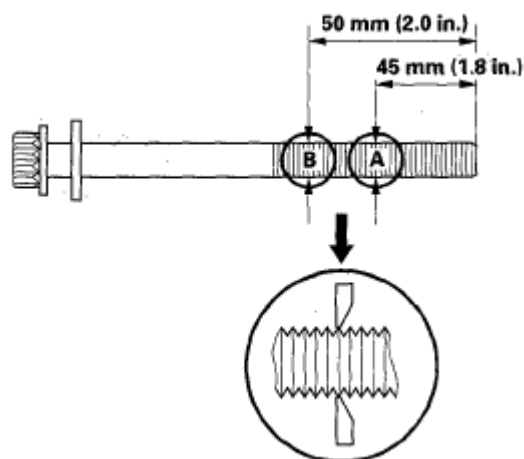


Fig. 488: Identifying Diameter Of Cylinder Head Bolt
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. If either diameter is less than 10.6 mm (0.42 in.), replace the cylinder head bolt.
10. Apply new engine oil to the threads and under the bolt heads of all cylinder head bolts.
11. Tighten the cylinder head bolts in sequence to 30 N.m (3.0 kgf.m, 22 lbf.ft), using a beam-type torque wrench. When using a preset-type torque wrench, be sure to torque slowly and do not overtighten. If a bolt makes any noise while you are torquing it, loosen the bolt and retighten it from the first step.

FRONT

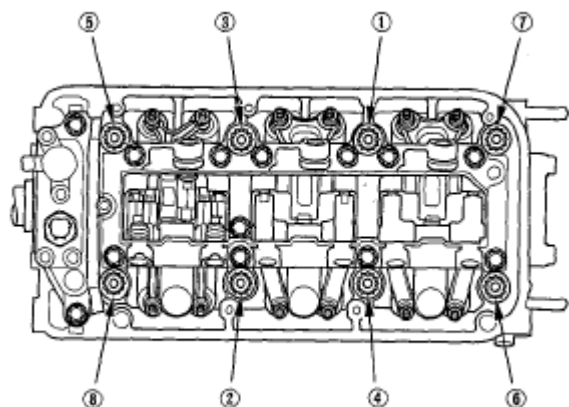


Fig. 489: Identifying Tightening Sequence Of Cylinder Head Bolts - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

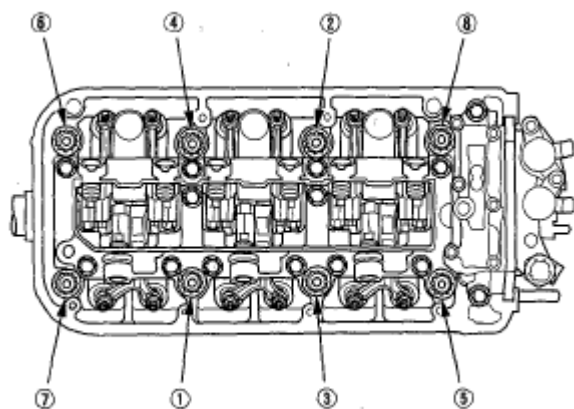


Fig. 490: Identifying Tightening Sequence Of Cylinder Head Bolts - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. After torquing, tighten all cylinder head bolts in two steps (90° per step). If you are using a new cylinder head bolt, tighten the bolt an extra 90°.

NOTE: Remove the cylinder head bolt if you tighten it beyond the specified angle, and go back to step 8 of the procedure. Do not loosen it back to the specified angle.

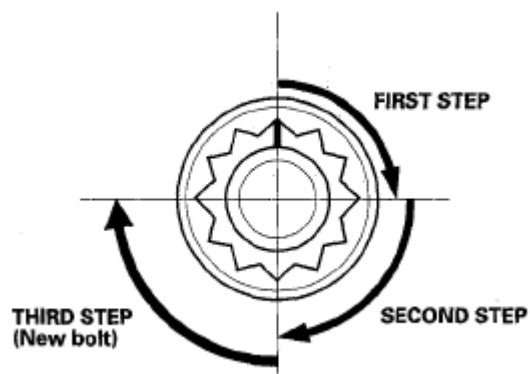


Fig. 491: Identifying Cylinder Head Bolts Tightening Steps
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the timing belt (see **TIMING BELT INSTALLATION**).
14. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
15. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**).
16. Install the water passage (see **WATER PASSAGE REPLACEMENT**).
17. Install the injector base **INJECTOR BASE REMOVAL AND INSTALLATION**).
18. Install the connector bracket to the front cylinder head.

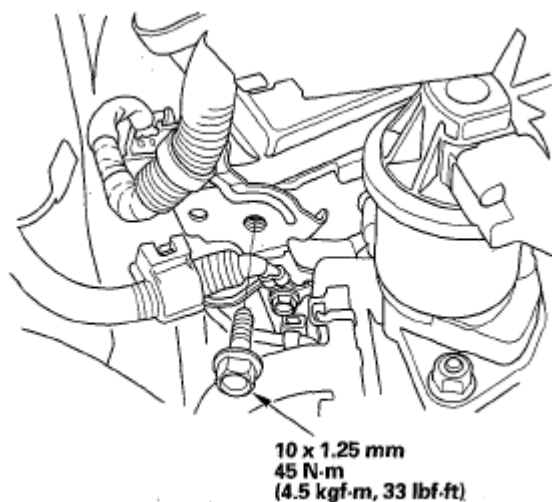


Fig. 492: Identifying Connector Bracket Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the harness clamp bracket to the rear cylinder head.

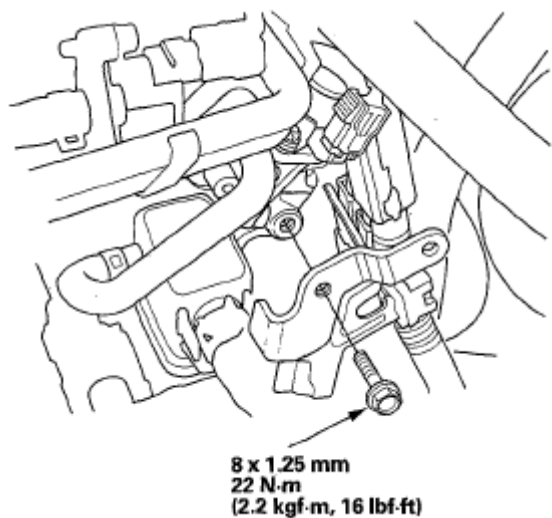


Fig. 493: Identifying Harness Clamp Bracket Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the heater hose (A).

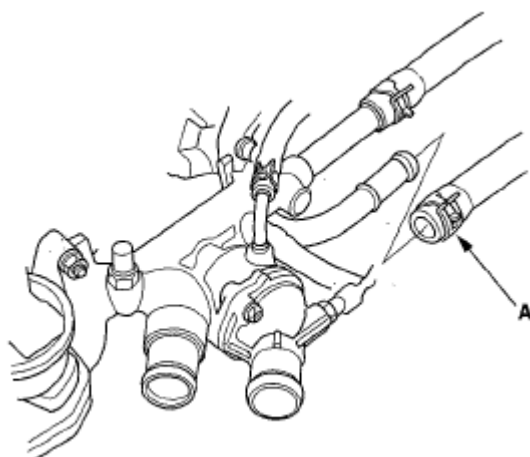


Fig. 494: Identifying Heater Hose

Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Connect the fuel feed hose (A) (see **FUEL LINE/QUICK-CONNECT FITTING INSTALLATION**), then install the quick-connect fitting cover (B).

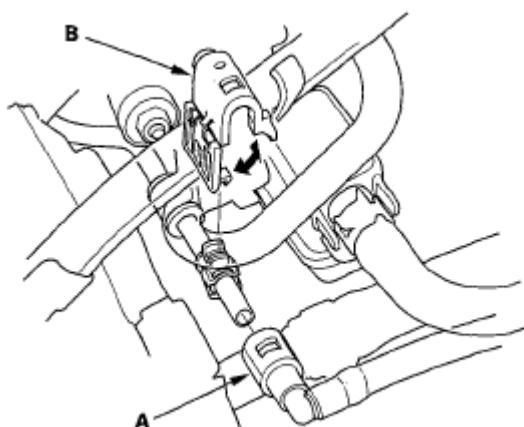


Fig. 495: Identifying Fuel Feed Hose And Quick-Connect Fitting Cover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Install the front warm up three way catalytic converter (front WU-TWC) (see **FRONT**) and the rear warm up three way catalytic converter (rear WU-TWC) (see **REAR**).
23. Connect the following engine wire harness connectors, and install the wire harness clamps to the cylinder head:
 - Six injector connectors
 - Knock sensor connector
 - Engine coolant temperature (ECT) sensor 1 connector
 - Engine coolant temperature (ECT) sensor 2 connector
 - Exhaust gas recirculation (EGR) valve connector
 - Rocker arm oil pressure sensor connector

- Rocker arm oil control solenoid A (BANK 1) connector
 - Rocker arm oil control solenoid A (BANK 2) connector
 - Rocker arm oil control solenoid B (BANK 1) connector
 - Front rocker arm oil pressure switch connector
 - Rear rocker arm oil pressure switch connector
 - Camshaft position (CMP) sensor connector
 - Two air fuel ratio (A/F) sensor connectors
 - Two secondary heated oxygen sensor (secondary HO2S) connectors
24. Install the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
 25. Install the intake manifold (see **INSTALLATION**).
 26. Install the alternator (see **INSTALLATION ('08-09 MODEL)**).
 27. Install the power steering (P/S) pump (A) and tighten the bolt (B) securing the P/S hose bracket.

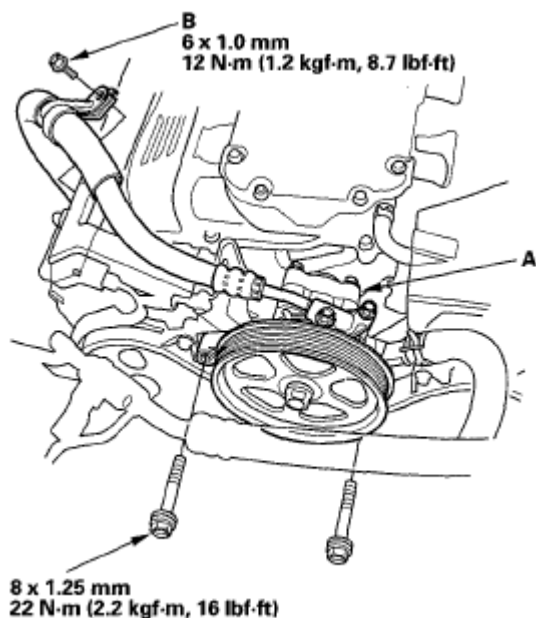


Fig. 496: Identifying Power Steering Pump And Bolt With torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

28. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
29. Do the battery terminal reconnection procedure (see (see **BATTERY TERMINAL DISCONNECTION AND RECONNECTION**).
30. After installation, check that all tubes, hoses and connectors are installed correctly.
31. Inspect for fuel leaks. Turn the ignition switch to ON (II) (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation three times, then check for fuel leakage at any point in the fuel line.
32. Refill the radiator with engine coolant, and bleed air from the cooling system with the heater valve open (see step 8 **THERMOSTAT REPLACEMENT**).

33. Do the powertrain control module (PCM) idle learn procedure (see **PCM IDLE LEARN PROCEDURE**).
34. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).
35. Inspect the idle speed (see **IDLE SPEED INSPECTION**).
36. Inspect the ignition timing (see **IGNITION TIMING INSPECTION**).

CAMSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

Ball Joint Remover/Installer 07GAF-SD40330

1. Remove the timing belt (see **Timing Belt Removal**).
2. Remove the camshaft pulley and the back cover.
3. Remove the camshaft oil seal.
4. Clean and dry the camshaft oil seal housing.
5. Apply a light coat of new engine oil to the lip of the camshaft oil seal.
6. Using the ball Joint remover/Installer (A), a washer (B), and a 12 x 75 x 1.25 mm bolt (C), press in the new camshaft oil seal (D) about 0.5-1.5 mm (0.02-0.06 in) below the surface of the cylinder head.

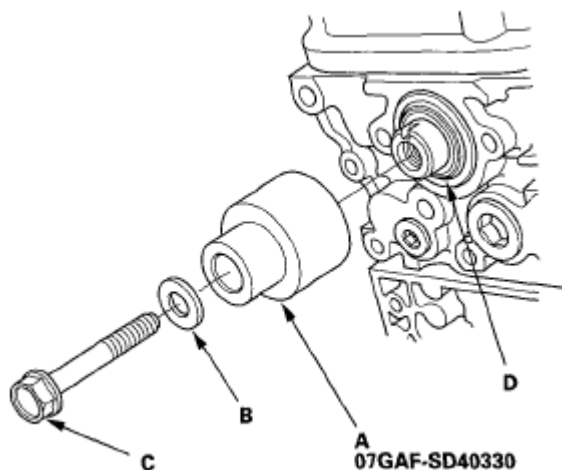


Fig. 497: Identifying Camshaft Oil Seal Driver And Camshaft Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Apply new engine oil to the threads of the camshaft pulley mounting bolt. Install the back cover, then install the camshaft pulley.
8. Install the timing belt (see **Timing Belt Installation**).

SEALING BOLT INSTALLATION

NOTE: When installing the sealing bolt (A), always use a new washer (B).

FRONT

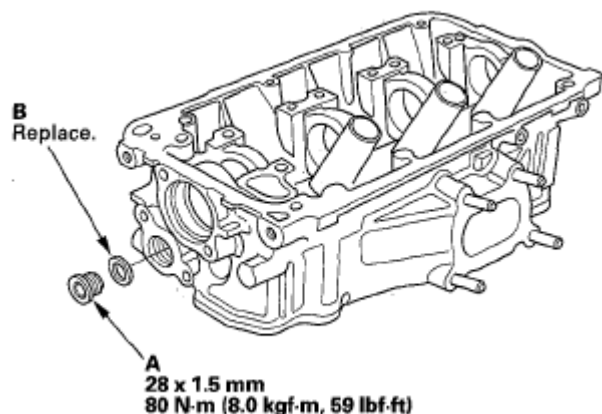


Fig. 498: Identifying Sealing Bolt - Front With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

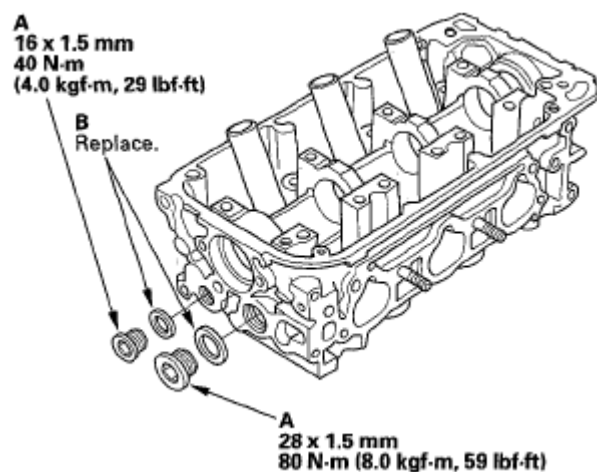


Fig. 499: Identifying Sealing Bolt - Rear With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT ROCKER ARM OIL CONTROL VALVE REPLACEMENT

1. Remove the front rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
2. Remove the rocker arm oil control valve (A).

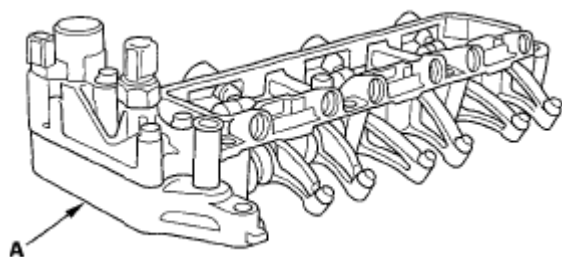


Fig. 500: Identifying Front Rocker Arm Oil Control Valve
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the rocker arm oil control valve in the reverse order of removal.

REAR ROCKER ARM OIL CONTROL VALVE REPLACEMENT

1. Remove the rear rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
2. Remove the rocker arm oil control valve (A).

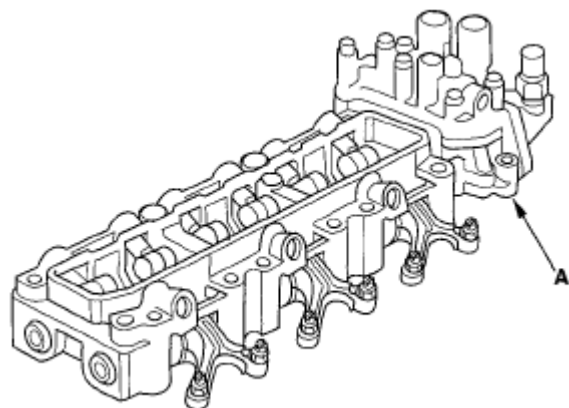


Fig. 501: Identifying Rear Rocker Arm Oil Control Valve
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the rocker arm oil control valve in the reverse order of removal.