June 19, 2020 Version 3

Safety Recall: 3.5L V6 Timing Belt

Supersedes 19-045, dated April 12, 2019, See REVISION SUMMARY.

AFFECTED VEHICLES

Year	Model	Trim	VIN Range
2019	Odyssey	ALL	Check the iN VIN status for eligibility.
2018-19	Pilot	ALL	Check the iN VIN status for eligibility.
2019	Ridgeline	ALL	Check the iN VIN status for eligibility.

REVISION SUMMARY

This service bulletin has been extensively revised, American Honda recommends you read this bulletin in its entirety.

BACKGROUND

During production, a supplier produced some timing belts that do not meet specification. These timing belts may shred or slip, causing the cam shafts to fall out of timing. Camshafts that are out of timing will set *DTC P0341 (CMP sensor and CKP sensor liorrect phase detected)* and/or *DTC P0369 (CMP sensor circuit intermittent interruption)* and the engine will run rough. Additionally, shredded timing belts may cause the vehicle to stall and not be able to restart, which increases the risk of a crash.

CUSTOMER NOTIFICATION

Owners of affected vehicles will be sent a notification of this campaign.

Do an iN VIN status inquiry to make sure the vehicle is shown as eligible.

Some vehicles affected by this campaign may be in your new or used vehicle inventory.

Failure to repair a vehicle subject to a recall or campaign may subject your dealership to claims or lawsuits from the customer or anyone else harmed as a result of such failure. To see if a vehicle in inventory is affected by this safety recall, do a VIN status inquiry before selling it.

CORRECTIVE ACTION

Inspect the timing belt and, if necessary, replace it. If the lot codes are not visible or the timing belt is damaged, a cylinder leak down test may be required and, based on those results, further repairs may be required.

NOTE

Only a small percentage of vehicles are expected to have timing belts that are out of specification. Order replacement parts only after you have identified an out-of-spec timing belt.

CUSTOMER INFORMATION: The information in this bulletin is intended for use only by skilled technicians who have the proper tools, equipment, and training to correctly and safely maintain your vehicle. These procedures should not be attempted by “do-it-yourselfers,” and you should not assume this bulletin applies to your vehicle, or that your vehicle has the condition described. To determine whether this information applies, contact an authorized Honda automobile dealer.

PARTS INFORMATION

NOTES

- Parts are applicable to all models unless otherwise noted.
- Only a small percentage of vehicles are expected to have timing belts that are out of specification. Order replacement parts only after you have identified an out-of-spec timing belt.
- Order the engine block and the applicable cylinder head(s) after a damaged engine is identified by completing a cylinder leak-down test.

Timing Belt Replacement

Part Name	Part Number	Quantity
Timing Belt	14400-R9P-A01	1
Timing Belt Idler Bolt	14551-RCA-A01	1
Flange Bolt (10 x 85)	90002-R70-A00	1
Flange Bolt (10 x 60)	90168-TA1-A00	2
Flange Bolt (10 x 105)	95801-10105-08	2

Engine Block and Cylinder Head Replacement - Odyssey

Part Name	Part Number	Quantity
Cylinder Block Assembly	10002-5MR-A10	1
Front Cylinder Head Assembly	10004-5MR-A00	1
Rear Cylinder Head Assembly	10005-5MR-A00	1
Self-Locking Nut (10 mm)	90212-SA5-003	6
Exhaust Pipe Gasket	18212-SA7-003	2
Pre-Chamber Gasket	18393-SDB-A00	2
Flange Bolt (12 x 30)	90161-SHJ-A00	8
Flange Bolt (14 x 125)	90165-TK8-A00	2
Flange Bolt (10 x 25)	90167-SAA-010	4
Self-locking Nut (8 mm)	90212-RCA-A01	8
Front Cylinder Head Gasket Kit	06110-5MR-A01	1
Rear Cylinder Head Gasket Kit	06120-5MR-A01	1
Cylinder Block Gasket Kit	06111-5J6-000	1
Washer Bolt (12 x 163)	90005-PAA-A01	12
Washer Bolt (12 x 188)	90005-5G0-A01	4
EGR Gasket Pipe A	18716-R70-A01	1
EGR Gasket Pipe B	18719-R70-A01	1

Engine Block and Cylinder Head Replacement - Odyssey (cont.)

Part Name	Part Number	Quantity
Exhaust Chamber Gasket (NIPPON LEAKLESS)	18115-5G0-A01	1
O-Ring (5/8")	80871-SN7-003	1
O-Ring (8 mm)	80873-ST7-000	1
Castle Nut (14 mm)	90365-STX-A00	2
Split Pin (M14)	90701-S3V-A01	2
Flange Nut (12 mm)	90362-SZA-A00	2
Split Pin (3.0 x 22)	94201-30220	2
Flange Nut (12 mm)	90362-SZA-A00	2
Flange Bolt (10 x 35)	90163-SDA-A01	2
Flange Nut (12 mm)	90371-SAA-010	4
Flange Bolt (10 x 30)	90163-SDB-A00	3
Flange Bolt (12 x 75)	90163-TA0-A00	4
Fuel Joint Pipe Set	16012-R9P-315	1
O-Ring	91311-5A2-A01	1
Injector Clip	16451-5R1-J01	6
Injector Seal Set	16452-RLV-A00	2

Engine Block and Cylinder Head Replacement - Pilot

Part Name	Part Number	Quantity
Cylinder Block Assembly	10002-5J6-A02	1
Front Cylinder Head Assembly	10004-RLV-A00	1
Rear Cylinder Head Assembly	10005-RLV-X00	1
Self-Locking Nut (10 mm)	90212-SA5-003	6
Exhaust Pipe Gasket	18212-SA7-003	2
Pre-Chamber Gasket	18393-SDB-A00	2
Flange Bolt (12 x 30)	90161-SHJ-A00	8
Flange Bolt (14 x 125)	90165-TK8-A00	2
Flange Bolt (10 x 25)	90167-SAA-010	4
Self-locking Nut (8 mm)	90212-RCA-A01	8
Front Cylinder Head Gasket Kit	06110-RLV-000	1
Rear Cylinder Head Gasket Kit	06120-RLV-000	1
Cylinder Block Gasket Kit	06111-5J6-000	1
Washer Bolt (12 x 163)	90005-PAA-A01	12
Washer Bolt (12 x 188)	90005-5G0-A01	4
EGR Gasket Pipe A	18716-R70-A01	1
EGR Gasket Pipe B	18719-R70-A01	1
Exhaust Chamber Gasket (NIPPON LEAKLESS)	18115-5G0-A01	1
O-Ring (5/8")	80871-SN7-003	1
O-Ring (8 mm)	80873-ST7-000	1
Castle Nut (14 mm)	90365-STX-A00	2
Split Pin (M14)	90701-S3V-A01	2
Flange Nut (12 mm)	90362-SZA-A00	2
Split Pin (3.0 x 22)	94201-30220	2
Flange Nut (12 mm)	90362-SZA-A00	2
Flange Bolt (10 x 35)	90163-SDA-A01	2
Flange Nut (12 mm)	90371-SAA-010	4
Flange Bolt (10 x 30)	90163-SDB-A00	3
Flange Bolt (12 x 75)	90163-TA0-A00	4

Engine Block and Cylinder Head Replacement - Pilot (cont.)

Part Name	Part Number	Quantity
Fuel Joint Pipe Set	16012-R9P-315	1
O-Ring	91311-5A2-A01	1
Injector Clip	16451-5R1-J01	6
Injector Seal Set	16453-R9P-A00	2

Engine Block and Cylinder Head Replacement - Ridgeline

Part Name	Part Number	Quantity
Cylinder Block Assembly	10002-5MJ-A00	1
Front Cylinder Head Assembly	10004-5MJ-A00	1
Rear Cylinder Head Assembly	10005-5MJ-A00	1
Self-Locking Nut (10 mm)	90212-SA5-003	6
Exhaust Pipe Gasket	18212-SA7-003	2
Pre-Chamber Gasket	18393-SDB-A00	2
Flange Bolt (12 x 30)	90161-SHJ-A00	8
Flange Bolt (14 x 125)	90165-TK8-A00	2
Flange Bolt (10 x 25)	90167-SAA-010	4
Self-locking Nut (8 mm)	90212-RCA-A01	8
Front Cylinder Head Gasket Kit	06110-RLV-000	1
Rear Cylinder Head Gasket Kit	06120-RLV-000	1
Cylinder Block Gasket Kit	06111-5J6-000	1
Washer Bolt (12 x 163)	90005-PAA-A01	12
Washer Bolt (12 x 188)	90005-5G0-A01	4
EGR Gasket Pipe A	18716-R70-A01	1
EGR Gasket Pipe B	18719-R70-A01	1
Exhaust Chamber Gasket (NIPPON LEAKLESS)	18115-5G0-A01	1
O-Ring (5/8")	80871-SN7-003	1
O-Ring (8 mm)	80873-ST7-000	1
Castle Nut (14 mm)	90365-STX-A00	2
Split Pin (M14)	90701-S3V-A01	2
Flange Nut (12 mm)	90362-SZA-A00	2
Split Pin (3.0 x 22)	94201-30220	2
Flange Nut (12 mm)	90362-SZA-A00	2
Flange Bolt (10 x 35)	90163-SDA-A01	2
Flange Nut (12 mm)	90371-SAA-010	4
Flange Bolt (10 x 30)	90163-SDB-A00	3
Flange Bolt (12 x 75)	90163-TA0-A00	4
Fuel Joint Pipe Set	16012-R9P-315	1

Engine Block and Cylinder Head Replacement - Ridgeline (cont.)

Part Name	Part Number	Quantity
O-Ring	91311-5A2-A01	1
Injector Clip	16451-5R1-J01	6
Injector Seal Set	16452-RLV-A00	2

REQUIRED TOOLS

Tool Name	Part Number	Quantity
Holder Handle	07JAB-001020B	1
50 mm Offset Holder Attachment	07MAB-PY3010B	1
19 mm Socket	07JAA-001020A	1
Cylinder Leak Down Tester	Commercially Available	1
Torque Angle Gauge	Commercially Available	1
Injector Seal Tool Set	070AG-5A0A100	1

REQUIRED MATERIALS

Material Name	Part Number	Quantity
Honda Long-Life Antifreeze/Coolant Type 2	OL999-9011	3
Honda Genuine Motor Oil 0W-20	08798-9036	6
Hondabond HT (1 tube repairs 4 vehicles)	08718-0004	1

WARRANTY CLAIM INFORMATION

Timing Belt Inspection

Operation Number	Description	Flat Rate Time	Defect Code	Symptom Code	Template ID	Failed Part Number
1105C3	Odyssey	0.5 hr	6CX00	L4M00	A19045A	14400-R9P-A01
1105C3	Pilot	0.5 hr	6CX00	L4M00	A19045B	14400-R9P-A01
1105C3	Ridgeline	0.5 hr	6CX00	L4M00	A19045C	14400-R9P-A01

Timing Belt Inspection, Replacement, Diagnosis (Cylinder Leak Down and Valve Timing), and Verify Valve Timing

Operation Number	Description	Flat Rate Time	Defect Code	Symptom Code	Template ID	Failed Part Number
1105C5	Odyssey	3.1 hr	6CX00	L4M00	A19045D	14400-R9P-A01
1105C5	Pilot	3.2 hr	6CX00	L4M00	A19045E	14400-R9P-A01
1105C5	Ridgeline	3.4 hr	6CX00	L4M00	A19045F	14400-R9P-A01

Timing Belt Inspection, Diagnosis, and Replace the Engine Block and One Cylinder Head

Operation Number	Description	Flat Rate Time	Defect Code	Symptom Code	Template ID	Failed Part Number
1105C6	Odyssey	13.6 hr	6CX00	L4M00	A19045G	14400-R9P-A01
1105C6	Pilot 2WD	12.4 hr	6CX00	L4M00	A19045H	14400-R9P-A01
1105C6	Pilot AWD	12.4 hr	6CX00	L4M00	A19045I	14400-R9P-A01
A	Add for AWD	0.4 hr				
1105C6	Ridgeline 2WD	12.4 hr	6CX00	L4M00	A19045J	14400-R9P-A01
1105C6	Ridgeline AWD	12.4 hr	6CX00	L4M00	A19045K	14400-R9P-A01
A	Add for AWD	0.4 hr				

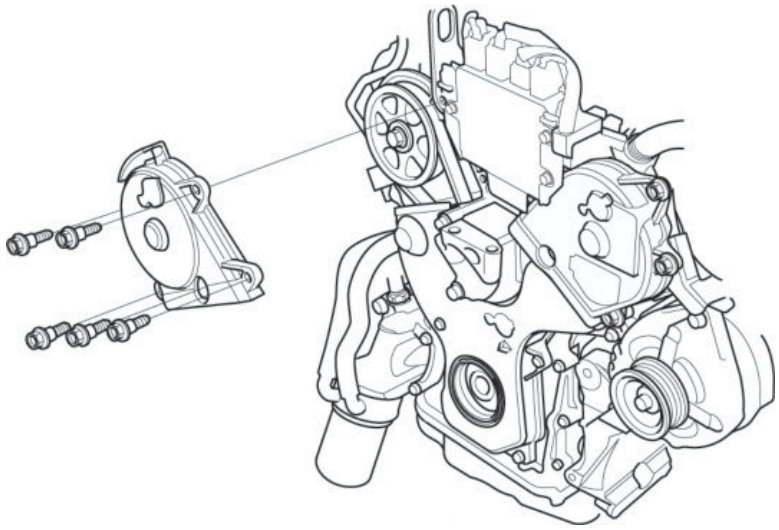
Timing Belt Inspection, Diagnosis, and Replace the Engine Block and Two Cylinder Heads

Operation Number	Description	Flat Rate Time	Defect Code	Symptom Code	Template ID	Failed Part Number
1105C7	Odyssey	13.9 hr	6CX00	L4M00	A19045L	14400-R9P-A01
1105C7	Pilot 2WD	12.7 hr	6CX00	L4M00	A19045M	14400-R9P-A01
1105C7	Pilot AWD	12.7 hr	6CX00	L4M00	A19045N	14400-R9P-A01
A	Add for AWD	0.4 hr				
1105C7	Ridgeline 2WD	12.7 hr	6CX00	L4M00	A19045O	14400-R9P-A01
1105C7	Ridgeline AWD	12.7 hr	6CX00	L4M00	A19045P	14400-R9P-A01
A	Add for AWD	0.4 hr				

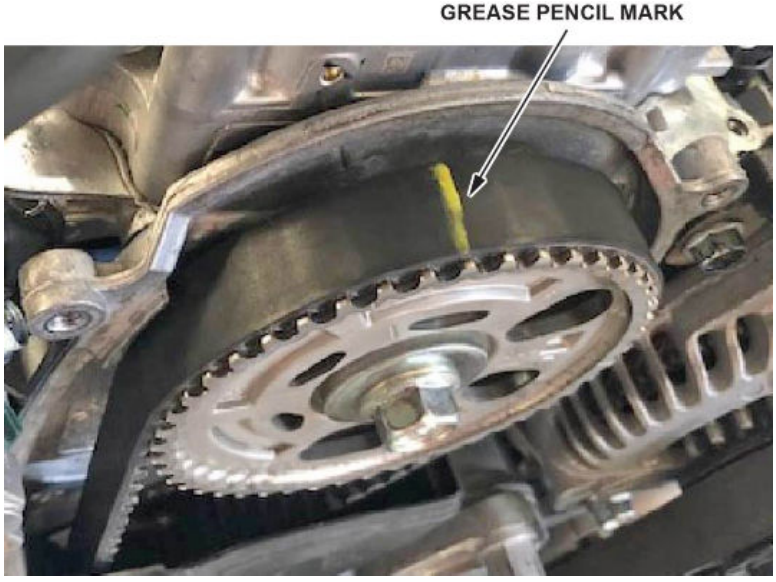
Skill Level: Repair Technician

INSPECTION

1. Place the vehicle on a lift, and remove the right front wheel.
2. Remove the top engine cover.
3. Remove the rear upper timing belt cover.
   3.1. Remove the five bolts.



   3.2. Remove the rear upper timing belt cover.
4. Mark the side of the timing belt as shown with a grease pen or marker.



5. Rotate the engine clockwise until you see the timing belt manufacturing information (lot code) or until the mark you made on the timing belt is visible again.

   NOTES

   You may need to rotate the engine several times before either the lot code or the mark you made is visible.

   - If the lot code is visible, go to step 6.
   - If the lot code is not visible, go to TIMING BELT REPLACEMENT.

6. Check the Lot Code.

- If the Lot Code is listed in the table, go to step 7.
- If the Lot Code is not listed in the table, the timing belt is okay and the inspection is complete. Assemble the vehicle in the reverse order of removal.

85B001	85B013	85E013	85E021	85E029	85E033	85E037	85E041	85F006	85F017
85F021	85F037	85F045	85F053	85G012	85G024	85G032	85G036	85G043	85G054
85H004	85H012	85H024	85H052	85I017	85I032	85I037	85I040	85I044	85L013
85L017	85L021	85L025	85L029	85L037	85L045	85M005	85M009	85M013	85M021
85N029	85N045	868039	868052	86B003	86B007	86B026	86B034	86C018	86C044
86C048	86I004	86I010	86I014	86J001	86J045	86J049	86J053	86K005	86K009
86K013	86K025	86K029	86K033	86K039	86L016	86L028	86L032	86L040	86L044
86L056	86M028	86M044	86M048	86M052	86M056	86P028	86P044	86R003	86R019
86R043	86R051	86S054	86T064	876006	876039	87A038	87B007	87B015	

7. Check the belt position code.

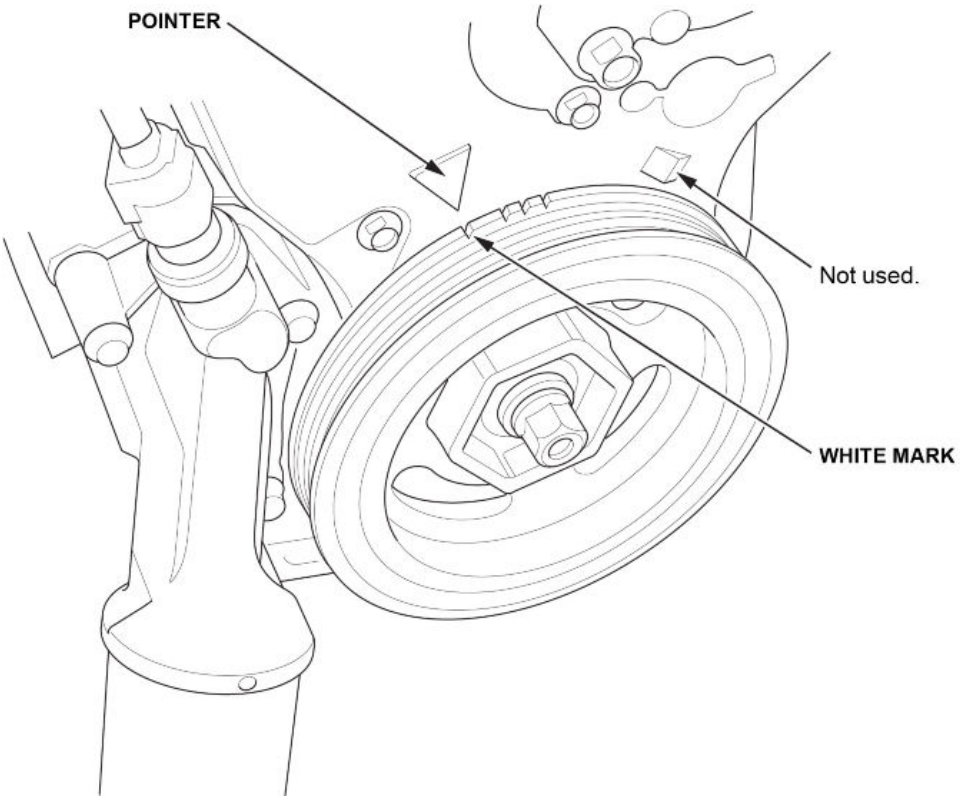
- If **all of the belt position values are less than** 170, the timing belt is OK. Assemble the vehicle in the reverse order of removal.
- If **any of the belt position values** are 170 or more, go to TIMING BELT REPLACEMENT.

TIMING BELT REPLACEMENT

1. Turn the crankshaft so its white mark on the crankshaft pulley lines up with the pointer.

   NOTE

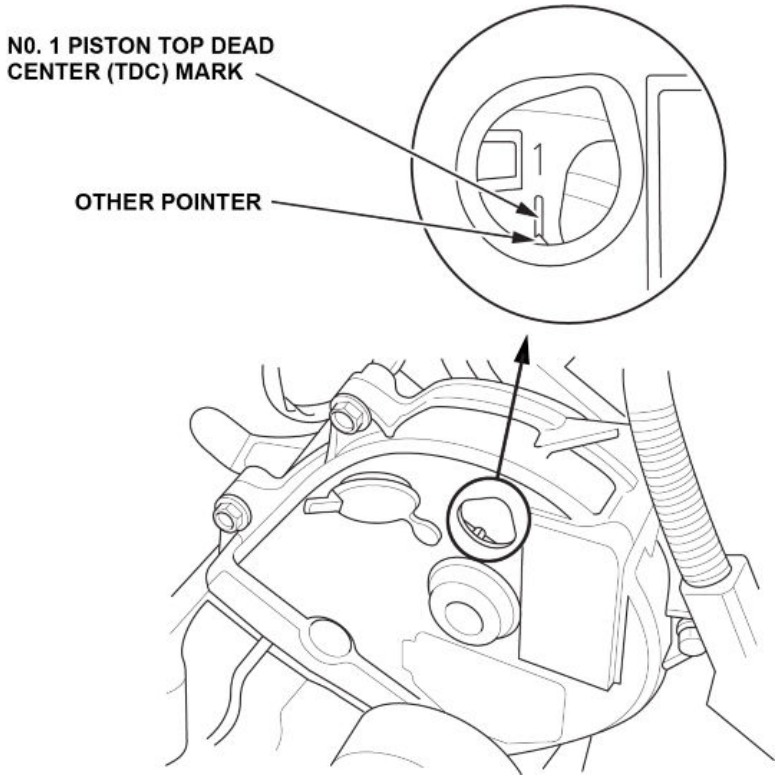
   The other pointer is not used.



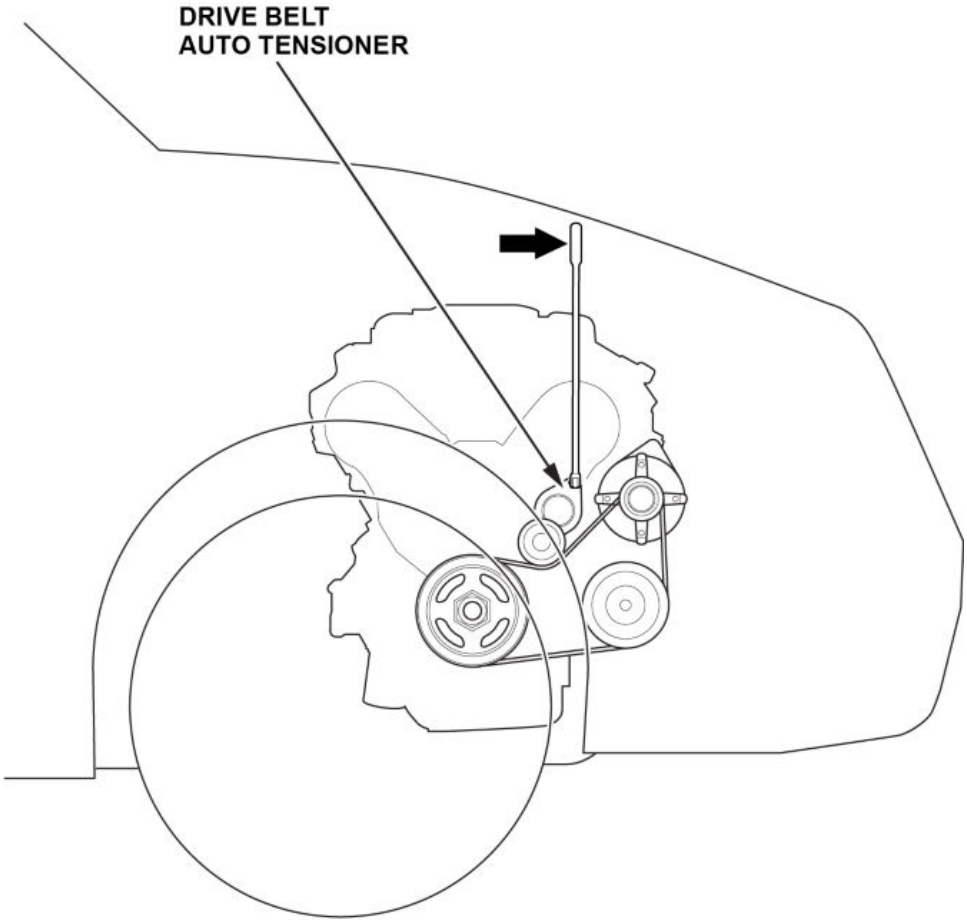
2. Check to make sure the No. 1 piston top dead center (TDC) mark on the front camshaft pulley is lined up with the pointer on the cover.

NOTES

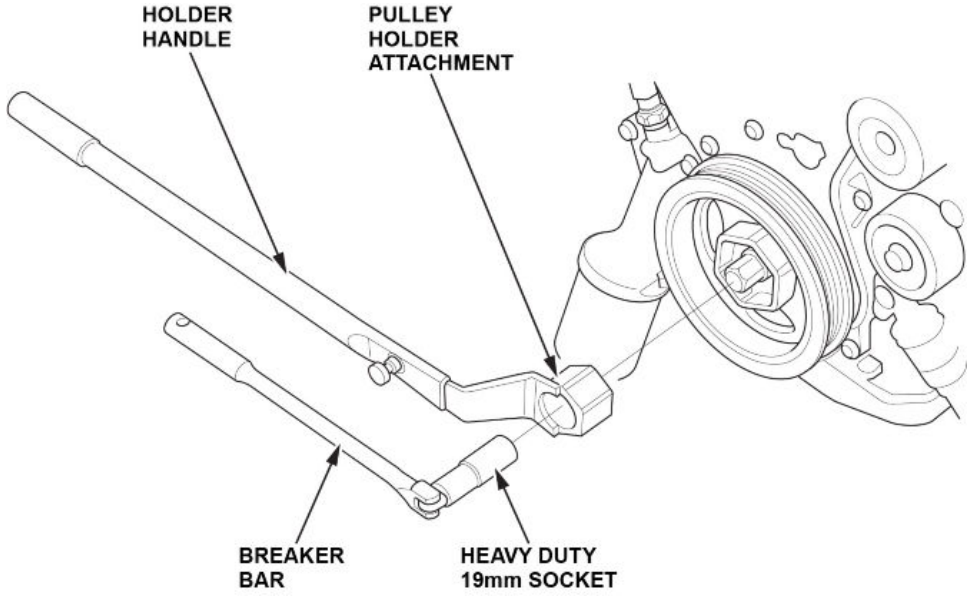
- If the marks do not line up, rotate the crankshaft 360 degrees, and check the camshaft pulley mark again.
- If the marks still do not line up, remove the original timing belt, install the new timing belt, then check the alignment again.



3. Remove the drive belt.



4. Partially remove the right side splash shield to gain access to the lower half of the engine.
5. Remove the crankshaft pulley.
   5.1. Hold the pulley with the holder handle and the crankshaft pulley holder attachment.

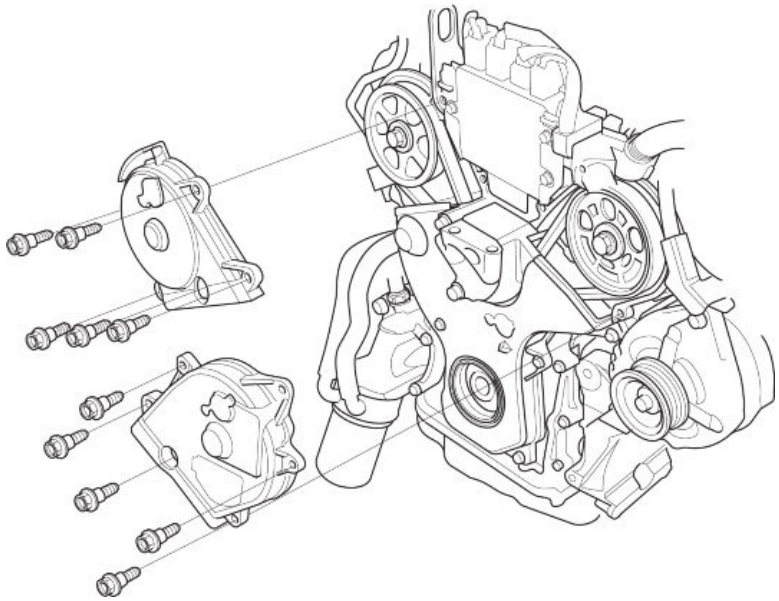


   5.2. Remove the bolt with a heavy duty 19 mm socket and a breaker bar, then remove the crankshaft pulley.
6. Lift and support the engine with a jack and a wood block under the oil pan.

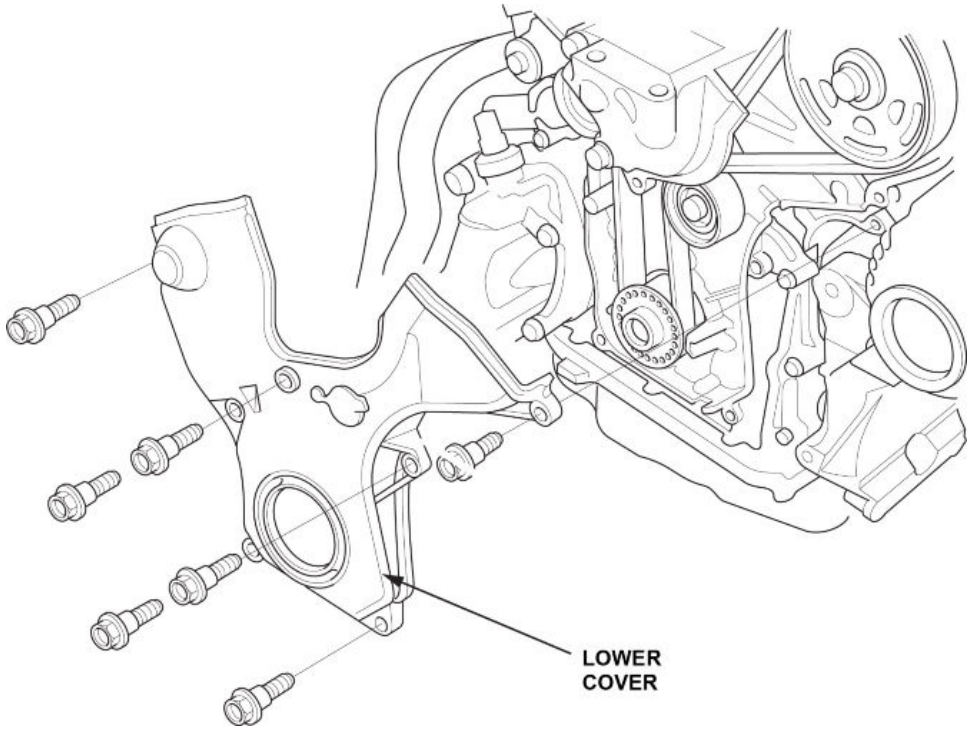
7. Remove the upper part of the side engine mount.
   7.1. Disconnect the ground cable.
   7.2. Remove the harness clamp bracket and the upper half of side engine mount bracket.

   NOTE

   You do not need to move the VSA modulator-control unit.
8. Remove the upper covers.

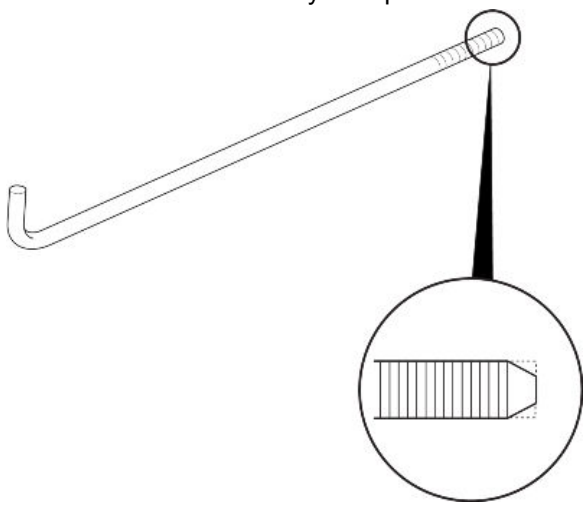


9. Remove the lower cover.



10. Hold the timing belt adjuster.

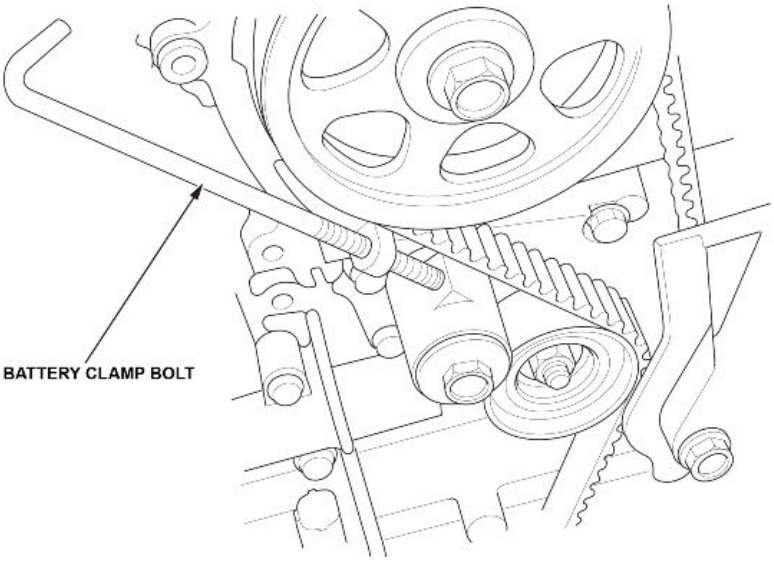
10.1. Remove one of the battery clamp bolts from the battery tray, and grind the end of it as shown.



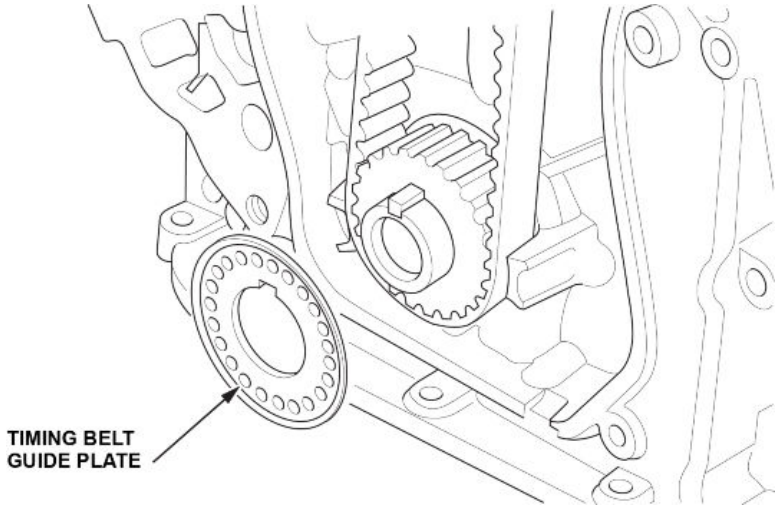
10.2. Thread the battery clamp bolt in as shown to hold the timing belt adjuster in its current position. Tighten it by hand.

NOTICE

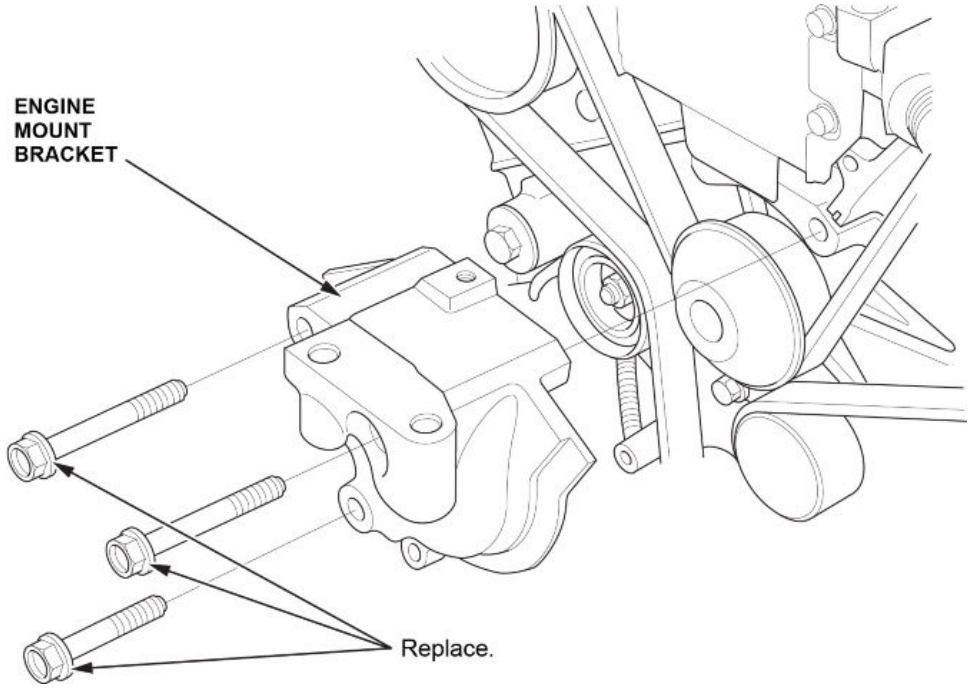
Do not tighten the bolt with a wrench.



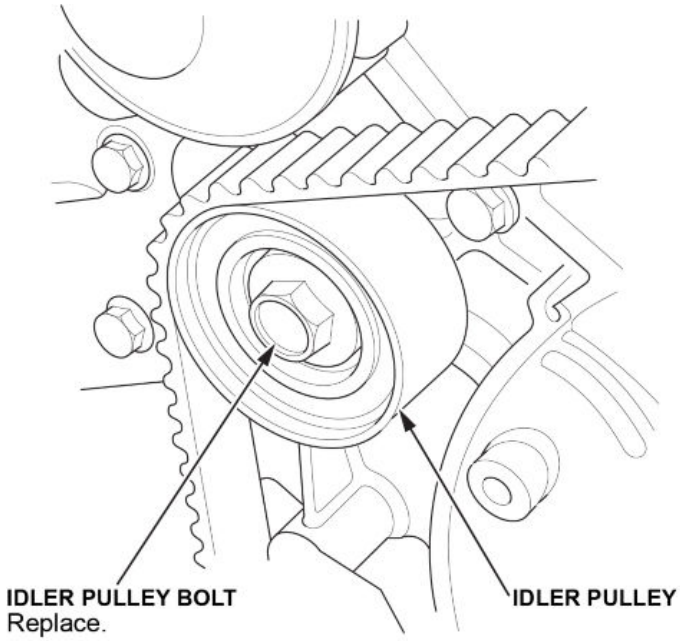
11. Remove the timing belt guide plate.



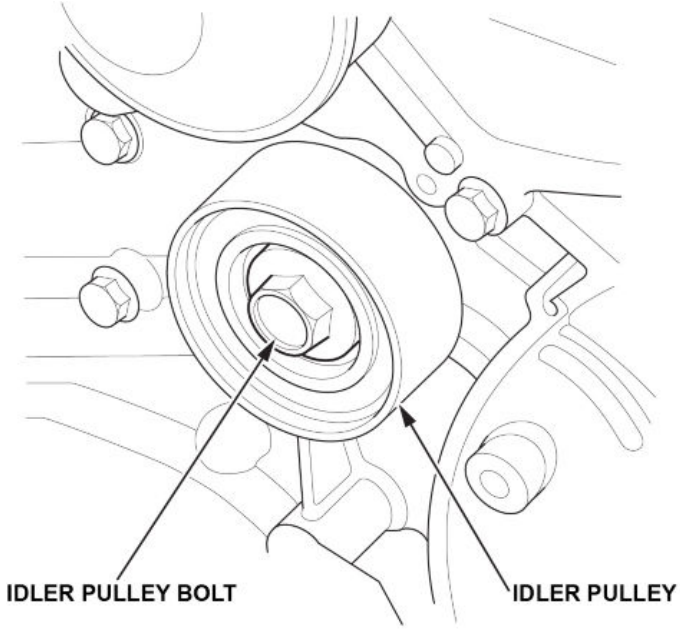
12. Remove the lower half of the engine mount bracket.



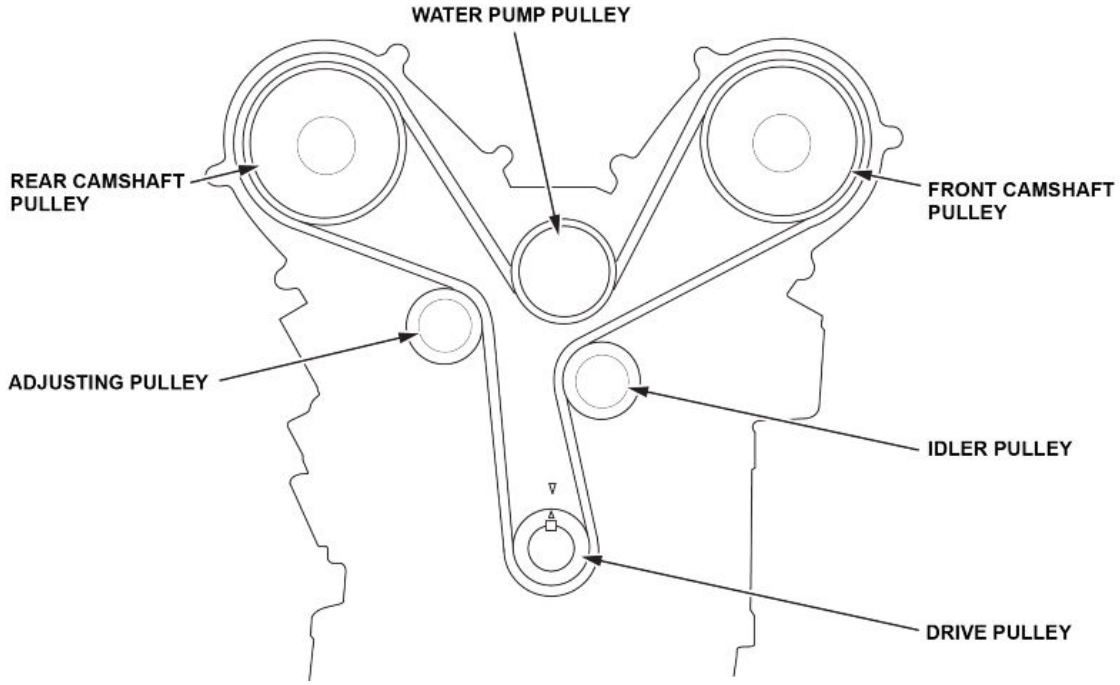
13. Remove the idler pulley bolt and the idler pulley, then remove the timing belt.



14. Check that the timing marks are still in the proper position as mentioned in steps 1 and 2.
15. Loosely install the idler pulley with a new idler pulley bolt so the pulley can move, but does not come off.



16. Install the timing belt in a counterclockwise sequence starting with the drive pulley:



16.1. Drive Pulley

16.2. Idler Pulley

16.3. Front Camshaft Pulley

16.4. Water Pump Pulley

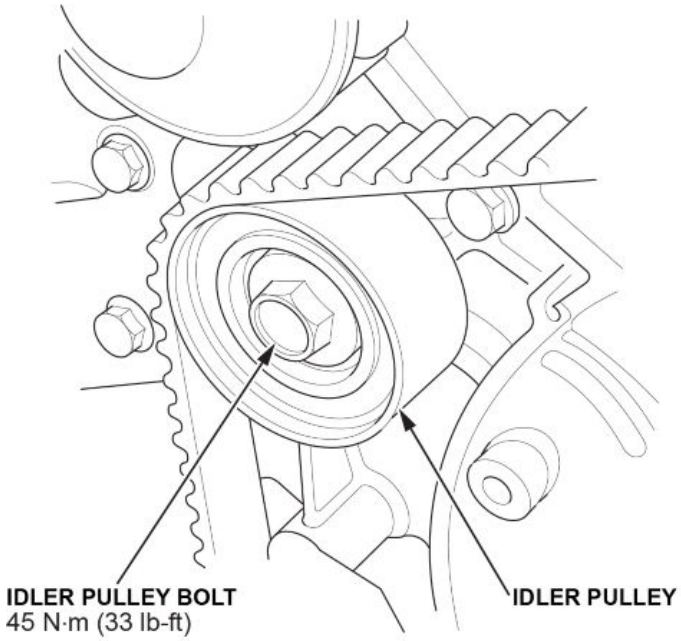
16.5. Rear Camshaft Pulley

16.6. Adjusting Pulley

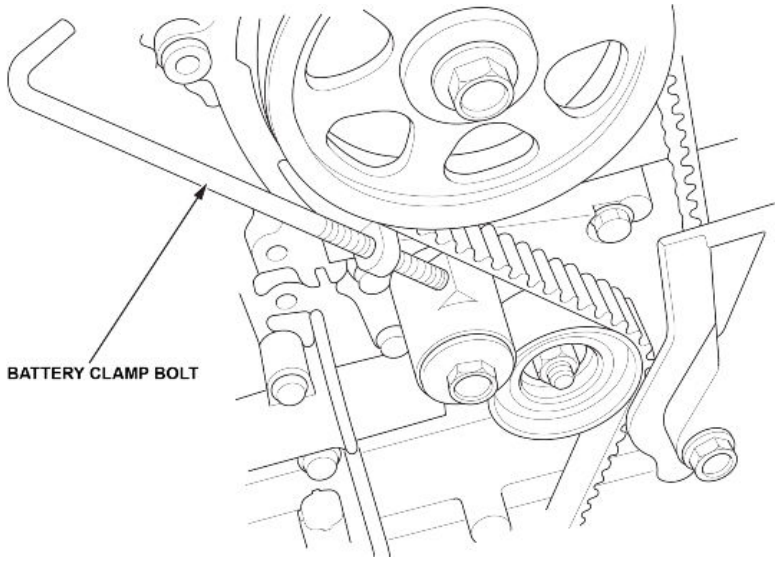
NOTE

If the timing belt auto-tensioner has extended and the timing belt cannot be installed, do the timing belt auto-tensioner installation procedure. Refer to the service information.

17. Torque the idler pulley bolt to **45 N·m (33 lb-ft)**.



18. Remove the battery clamp bolt.



19. Check the cam timing and do a cylinder leak down test.

NOTE

The following steps will determine if there was any valve-to-piston contact requiring the replacement of the cylinder block and one or both cylinder heads.

19.1. Remove all of the spark plugs.

19.2. Do the cylinder leak down test. For information about the cylinder leak down test, refer to the following:

- See the *Tech2Tech®* video titled "Cylinder Leak Down Testing"
- See Online University self-study module WAENC10 *Pumping Theory and Cylinder Performance Testing*

NOTES

– Rotate the engine only in a clockwise direction.

– Confirm each cylinder is tested at TDC.

– A good cylinder should have less than **10%** cylinder leakage.

19.3. If the cylinder leak down test results show that all six cylinders have a **leak down rate of 10% or less**, go to step 20 and finish installing the timing belt.

19.4. If the cylinder leak down test results show that at least one cylinder has a **leak down rate that is more than 10%**, and the leak is from the intake or exhaust valves, replace the affected short block and the cylinder head(s) where the leak is coming from. Follow the procedures laid out in INTAKE MANIFOLD and CYLINDER HEAD REMOVAL, SHORT BLOCK REMOVAL and CYLINDER HEAD INSTALLATION.

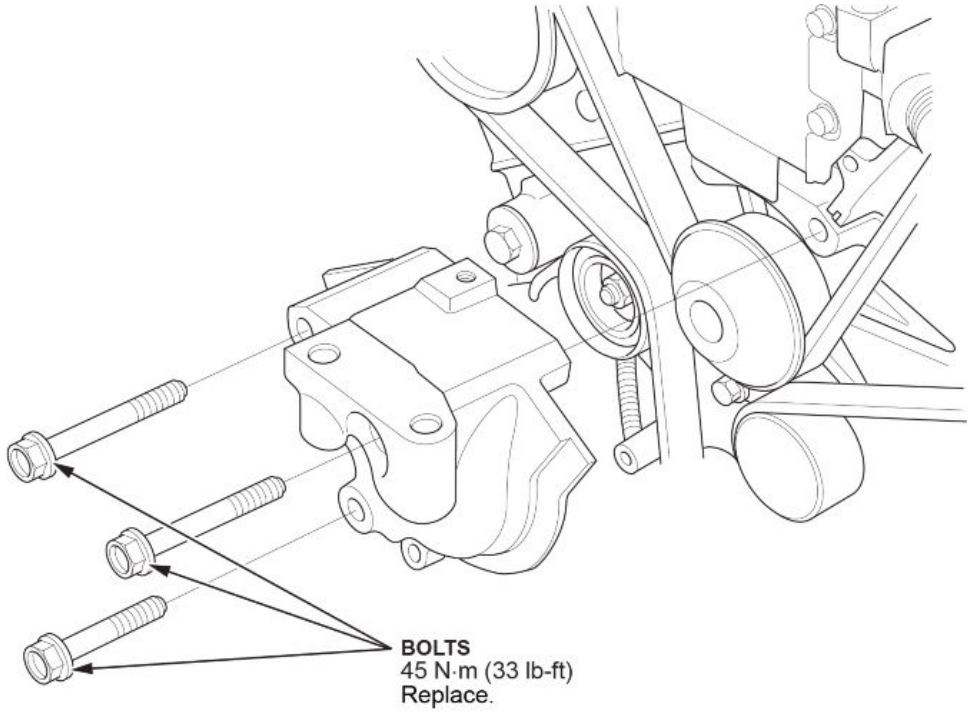
NOTE

If the leak is coming through the crankcase, this bulletin does not apply. Continue with normal system troubleshooting.

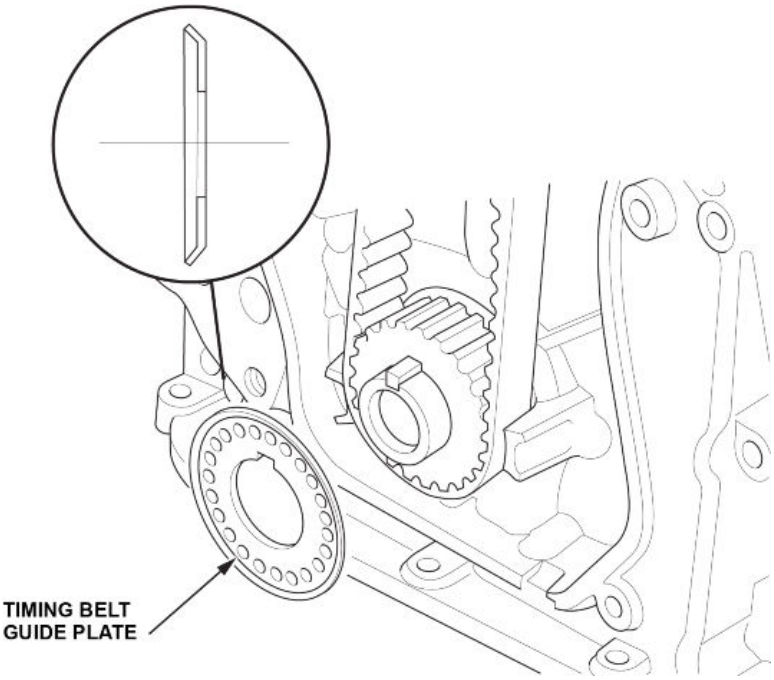
20. Install the lower half of the side engine mount bracket using new bolts. Torque the bolts to **45 N·m (33 lb-ft)**.

NOTE

Make sure the lower half of the side engine mount bracket is installed and the new bolts are torqued to specification before installing the upper half of the engine mount.

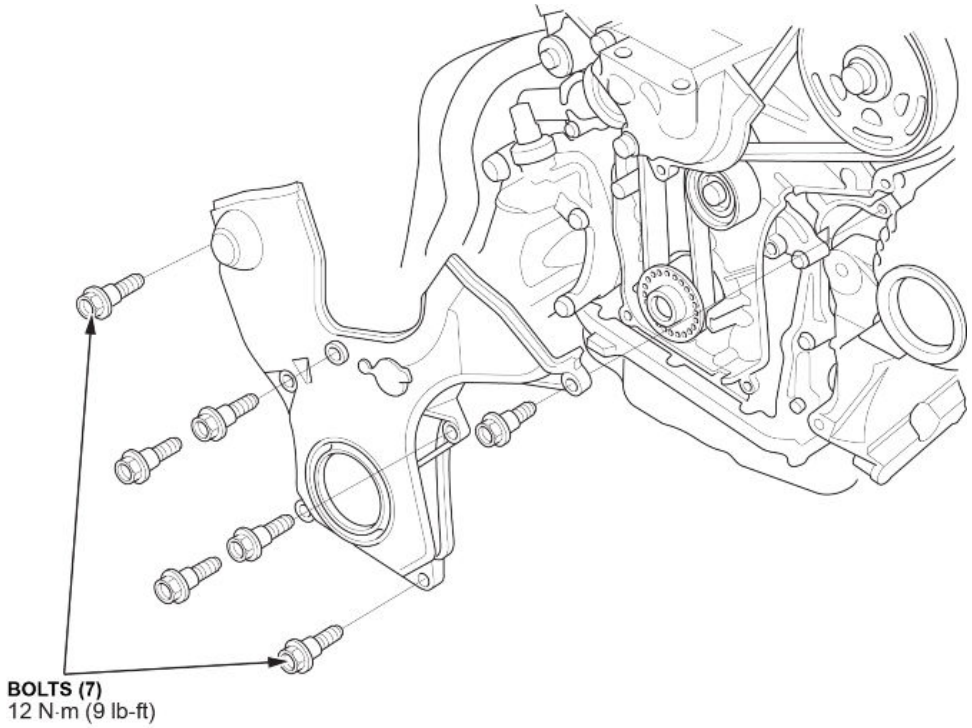


21. Install the timing belt guide plate as shown.

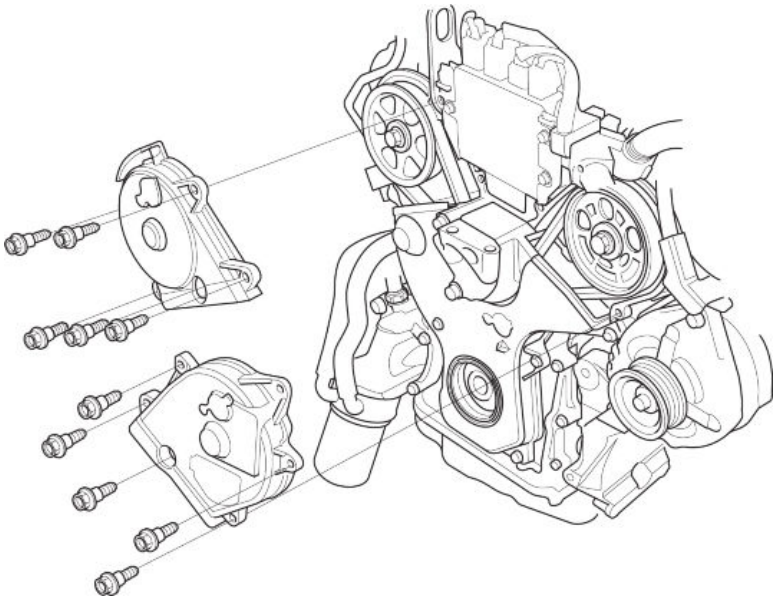


22. Install the timing belt covers:

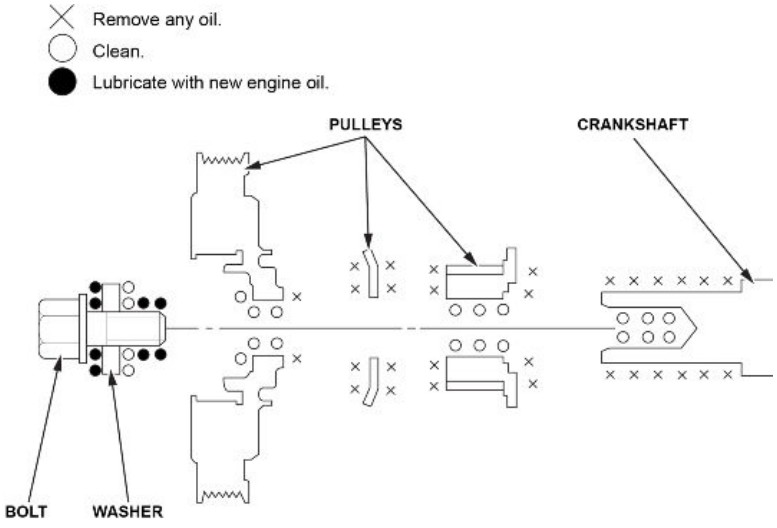
    22.1. Install the lower cover, and torque the bolts to **12 N·m (9 lb-ft)**.



22.2. Install the upper covers, and torque the bolts to **12 N·m (9 lb-ft)**.



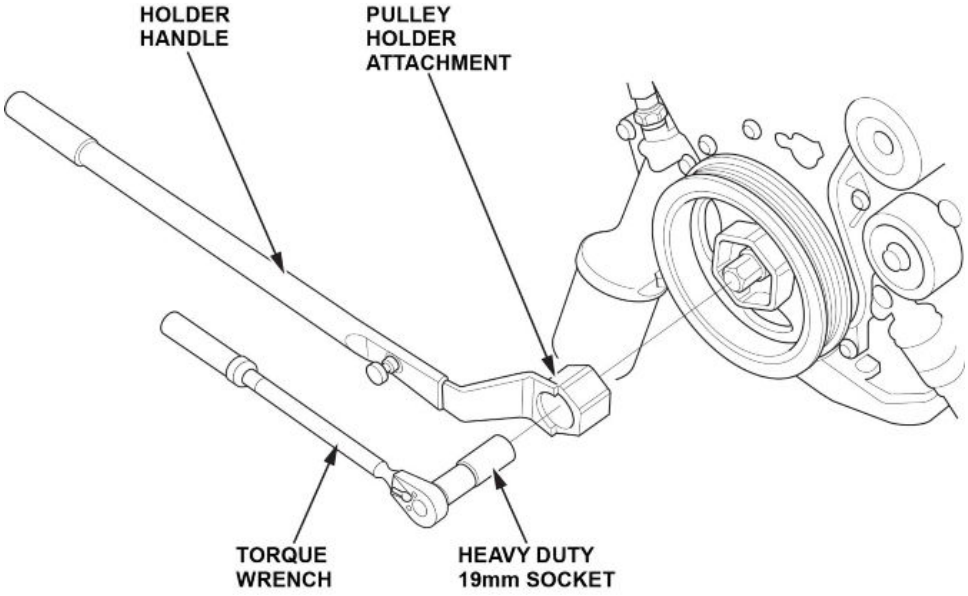
23. Loosely install the upper half of the side engine mount bracket using new bolts.
    23.1. Connect the ground cable.
    23.2. Remove the jack and wood block.
    23.3. Tighten the side engine mount bracket mounting bolts.
24. Install the crankshaft pulley.
    24.1. Remove any oil and clean the pulleys, the crankshaft, the bolt, and the washer. Lubricate with new engine oil as shown.



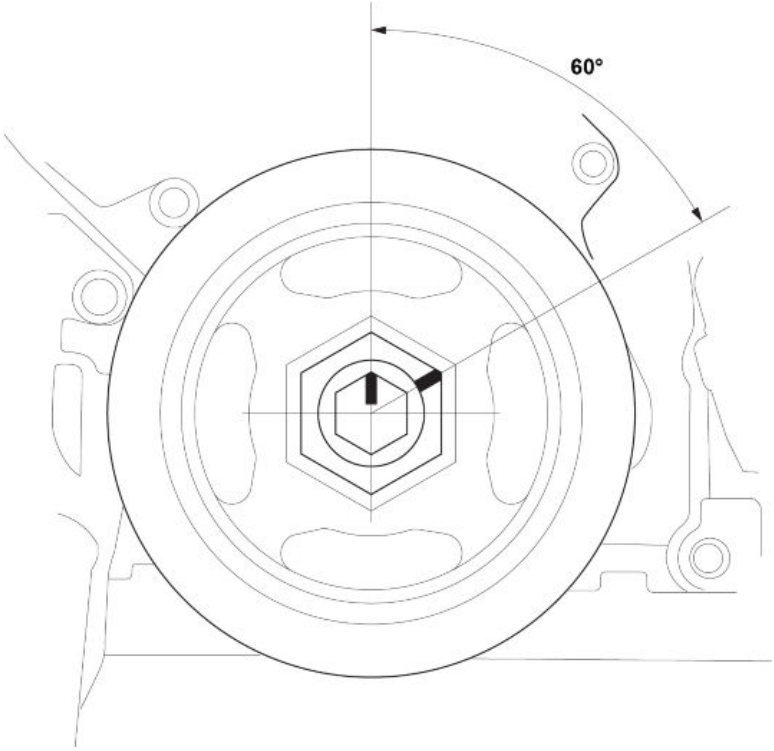
    24.2. Install the crankshaft pulley.
    24.3. Hold the pulley with the holder handle and the pulley holder attachment (50 mm offset). Torque the bolt to **65 N·m (48 lb-ft)**.

NOTE

Do not use an impact wrench.



24.4. Tighten the bolt an additional **60°**.



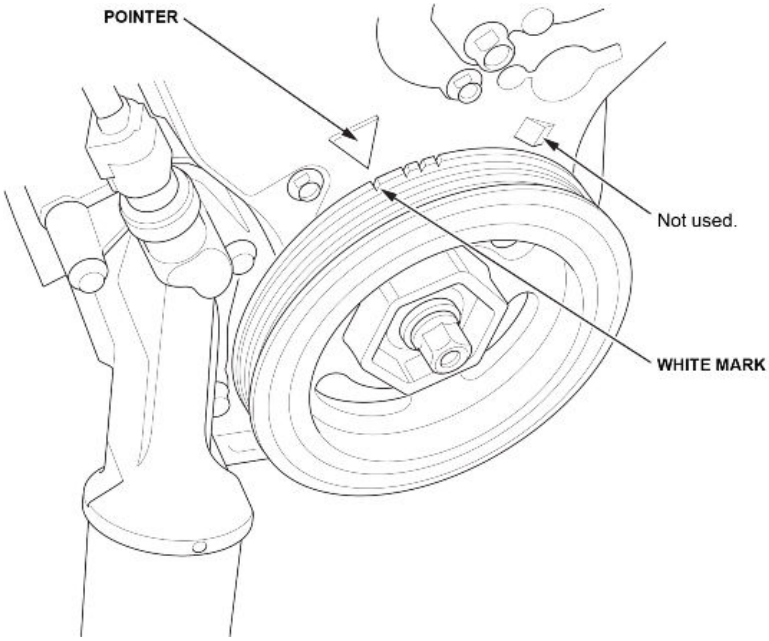
25. Check the camshaft timing.

25.1. Rotate the crankshaft pulley about six turns clockwise so the timing belt positions itself on the pulleys.

25.2. Turn the crankshaft pulley so the white mark lines up with the pointer.

NOTE

The other pointer is not used.



25.3. Check the camshaft pulley marks.

NOTES

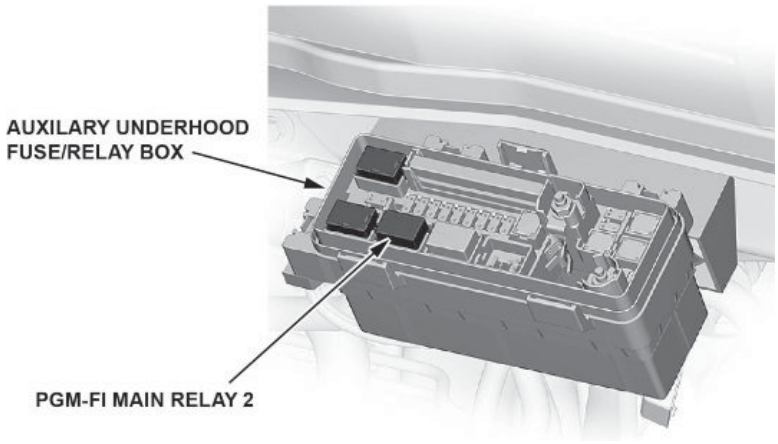
If the marks are not lined up, rotate the crankshaft one full turn and check the camshaft pulley mark again.

- If the camshaft pulley marks are at TDC, go to the next step.
- If the camshaft pulley marks are not at TDC, remove the timing belt and start the installation procedure again.

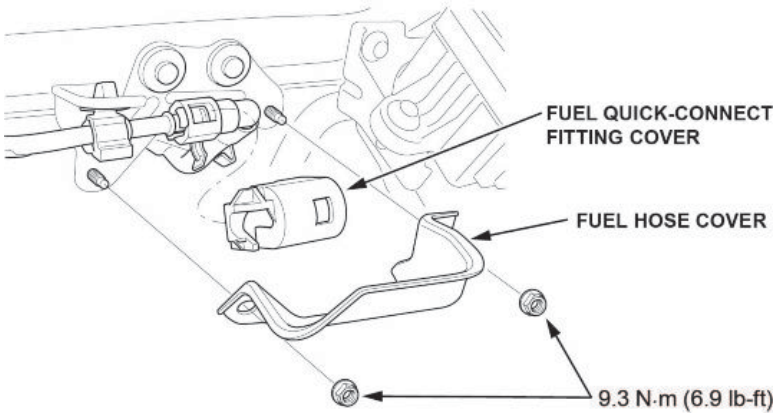
26. Install the drive belt tensioner.
27. Install the splash shield.
28. Install the passenger's side front wheel, and torque the nuts to **127 N·m (94 lb-ft)** for 14 mm wheel bolts, or **108 N·m (80 lb-ft)** for 12 mm wheel bolts.
29. Do the CKP learn procedure.
    29.1. Connect the HDS/i-HDS.
    29.2. Select CRANK PATTERN in the ADJUSTMENT MENU with the HDS.
    29.3. Select CRANK PATTERN CLEAR with the HDS, and clear the CKP pattern.
    29.4. Select CRANK PATTERN LEARNING with the HDS, and follow the screen prompts.

ENGINE REMOVAL

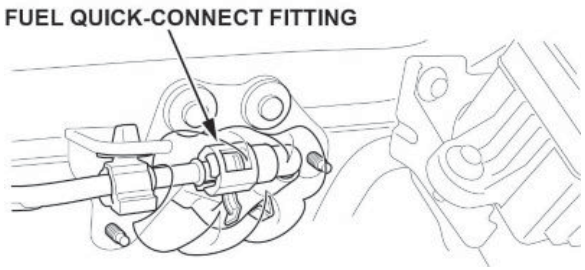
1. Evacuate the A/C.
2. Unbolt the A/C compressor, and move it to the side.
3. Relieve the fuel pressure.
4. Remove PGM-FI relay 2 from the auxiliary under-hood fuse/relay box.



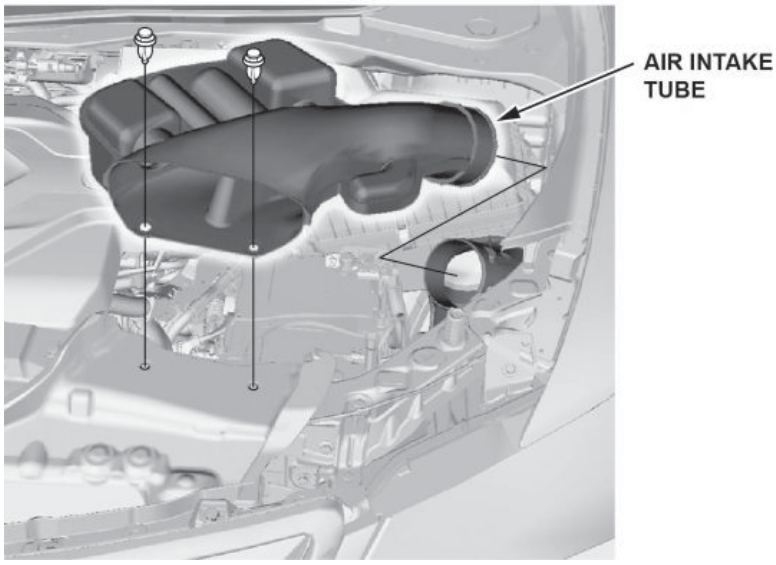
5. Start the engine, and let it idle until it stalls.
6. Turn the ignition to OFF.
7. Install the PGM-FI main relay.
8. Remove the fuel hose cover.



9. Remove the quick-connect cover.
10. Check the fuel quick-connect fitting for dirt, and clean it if needed.
11. Place a shop towel over the quick-connect fitting, then disconnect it.

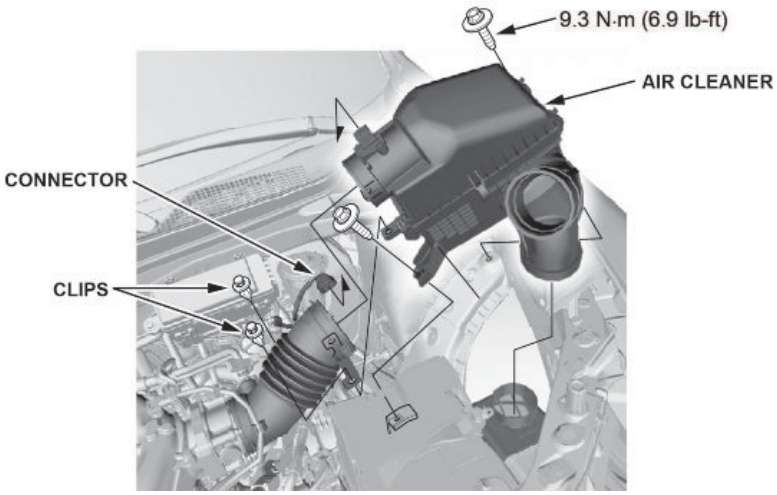


12. Remove the air intake tube.

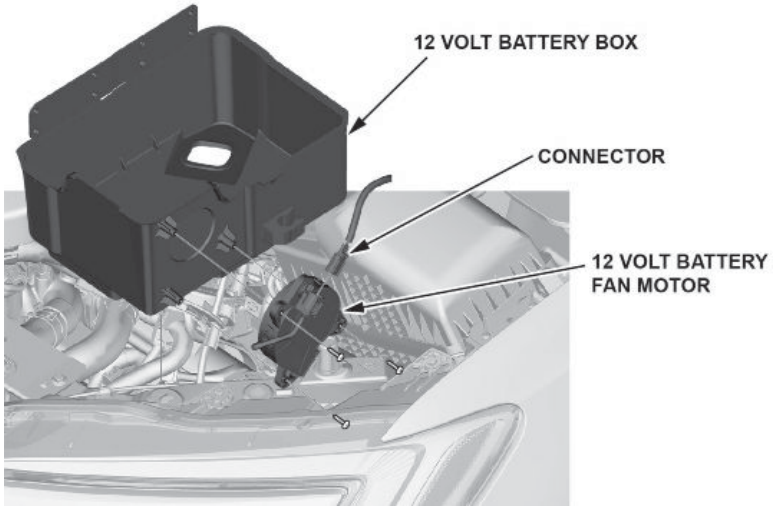


13. Disconnect the air intake tube.

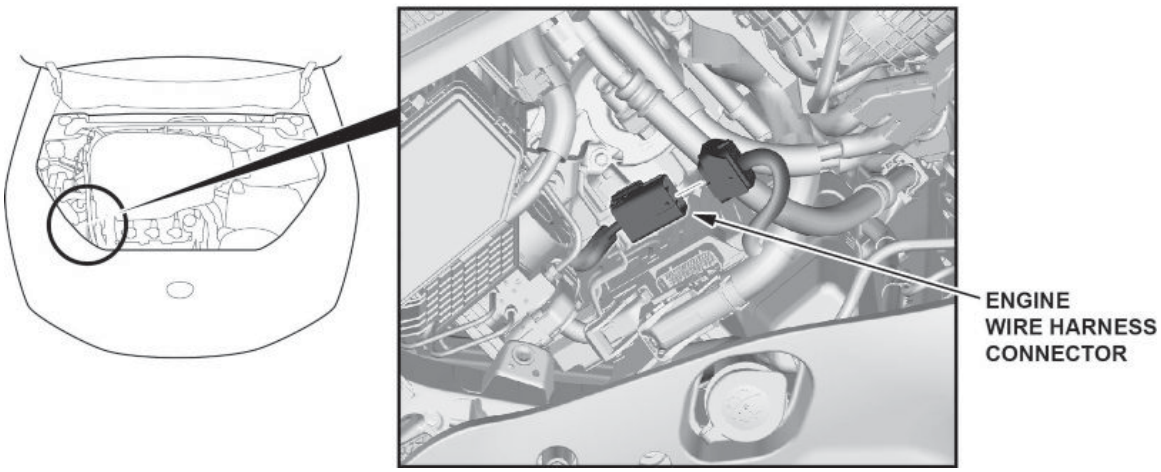
14. Remove the air cleaner.



15. Remove the 12-volt battery.
16. Remove the 12-volt battery fan motor from the 12-volt battery box.

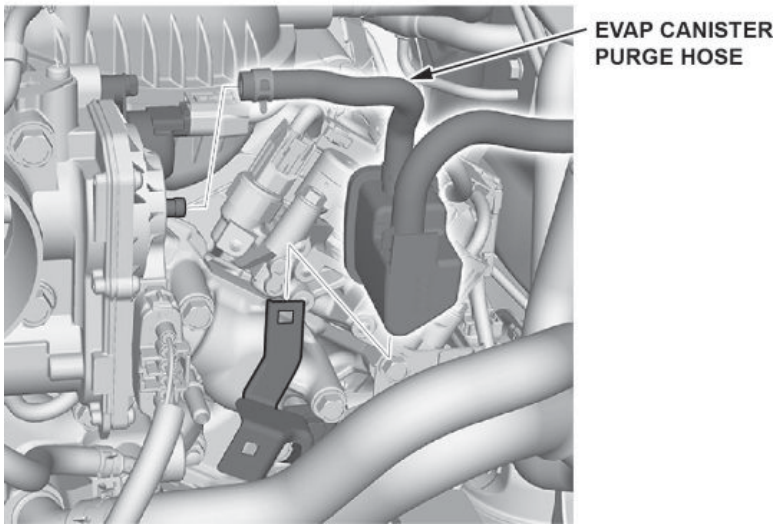


17. Disconnect the engine wire harness connector.

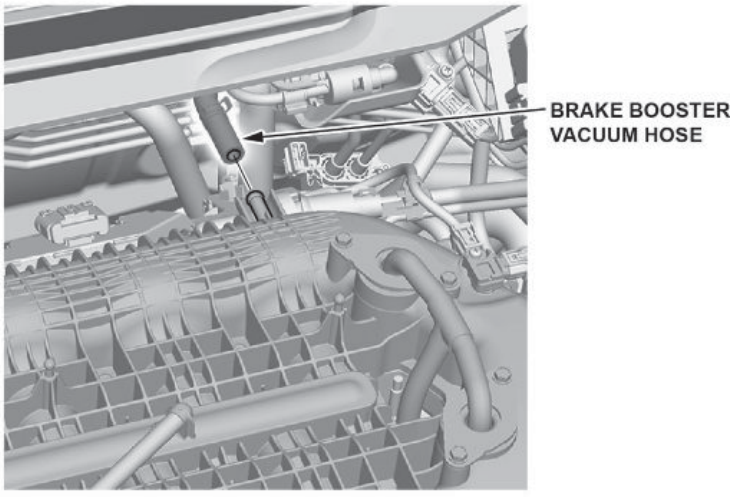


18. Disconnect the fuel feed hose (high pressure fuel pump side).

19. Disconnect the EVAP canister purge hose.

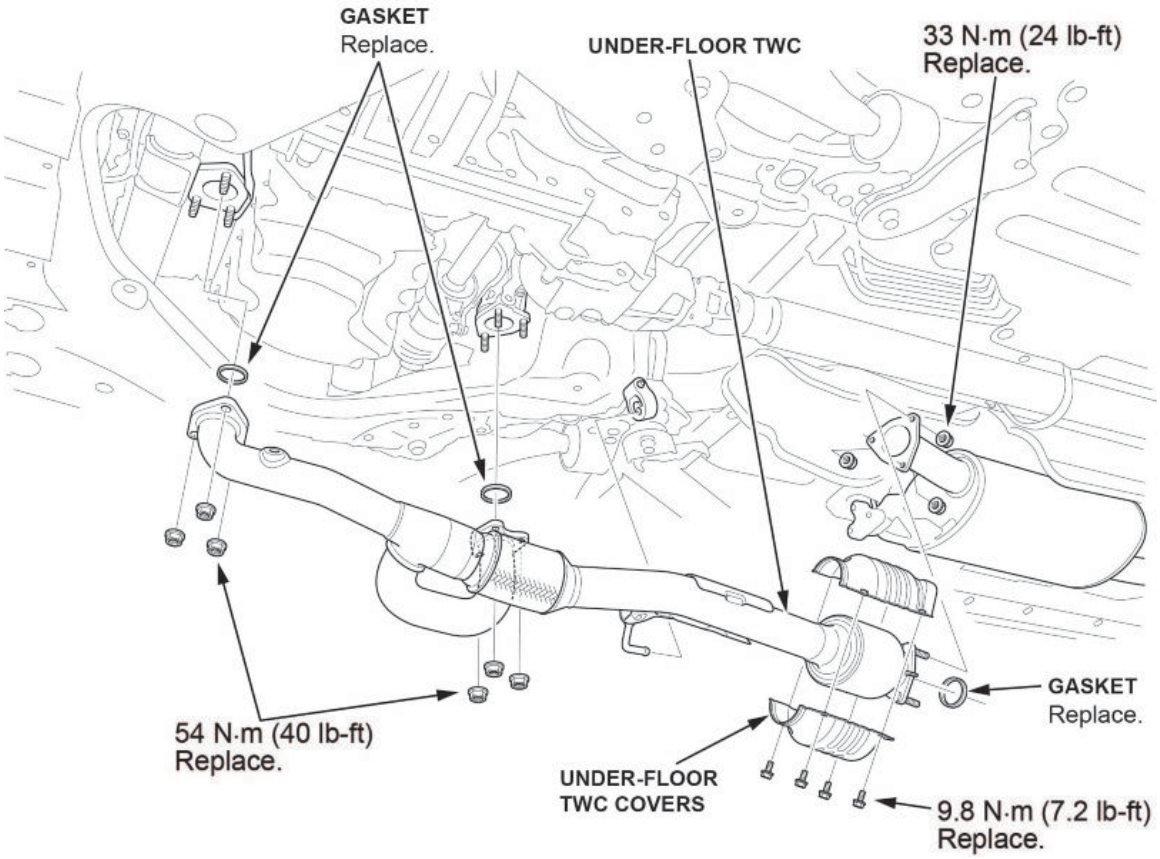


20. Move the EVAP canister purge joint.
21. Disconnect the brake booster vacuum hose.

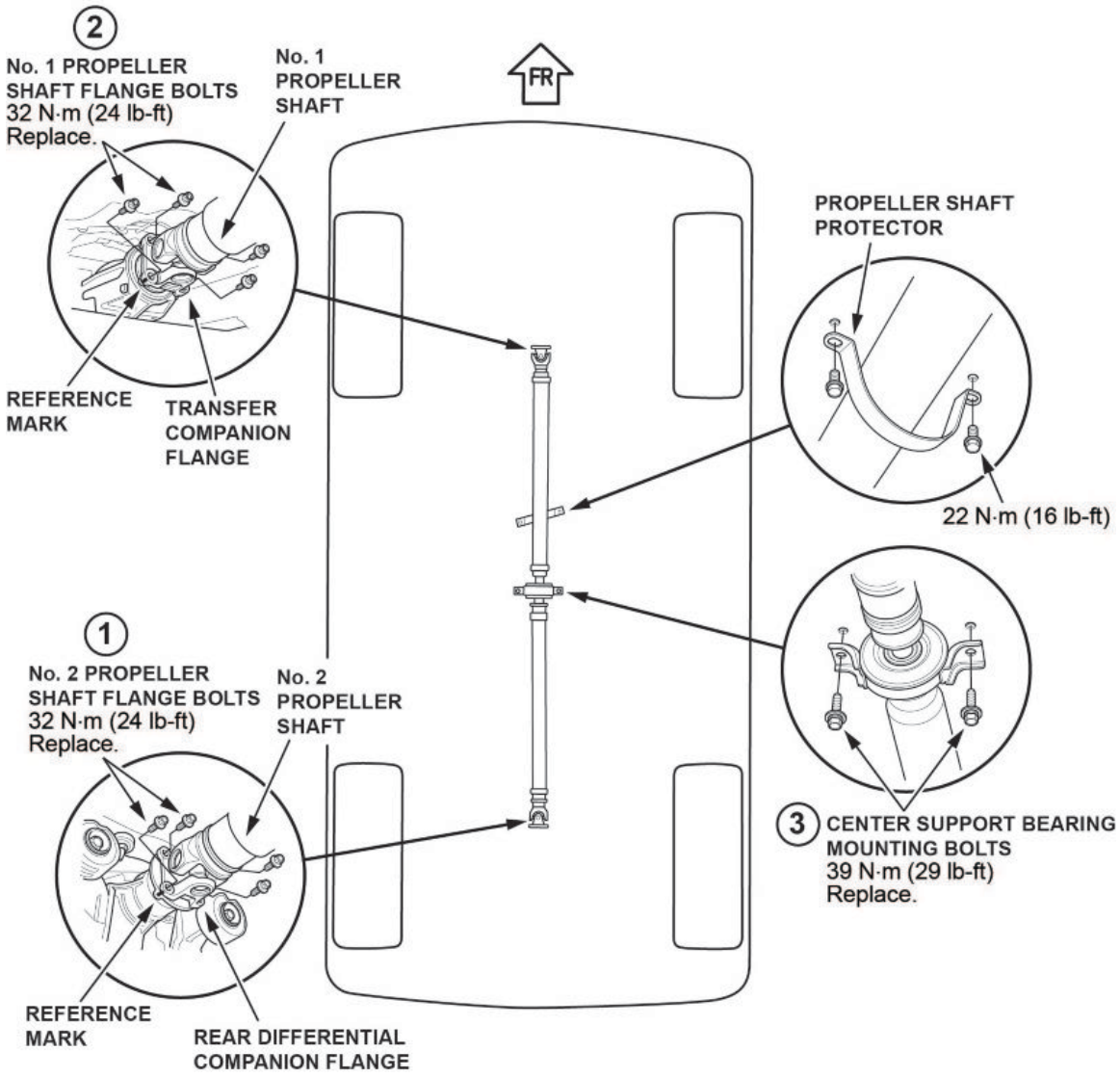


22. Disconnect the steering joint **(45 N.m (33 lb-ft)**.
23. Remove the radiator cap.
24. Raise and support the vehicle.
25. Remove the front wheels.
26. Drain the engine coolant.
27. Drain the engine oil.
28. Drain the ATF.
29. Remove the front inner fender.

30. Remove the under-floor TWC.

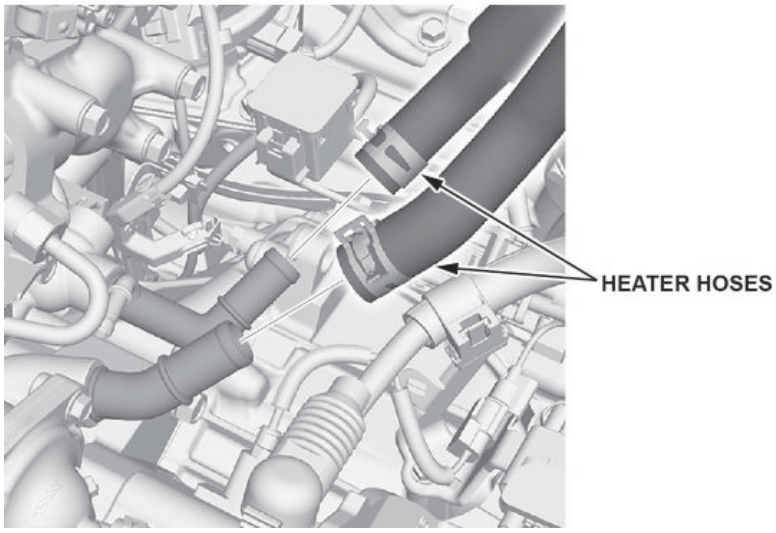


31. Remove the four bolts attaching the propeller shaft to the transfer assembly.

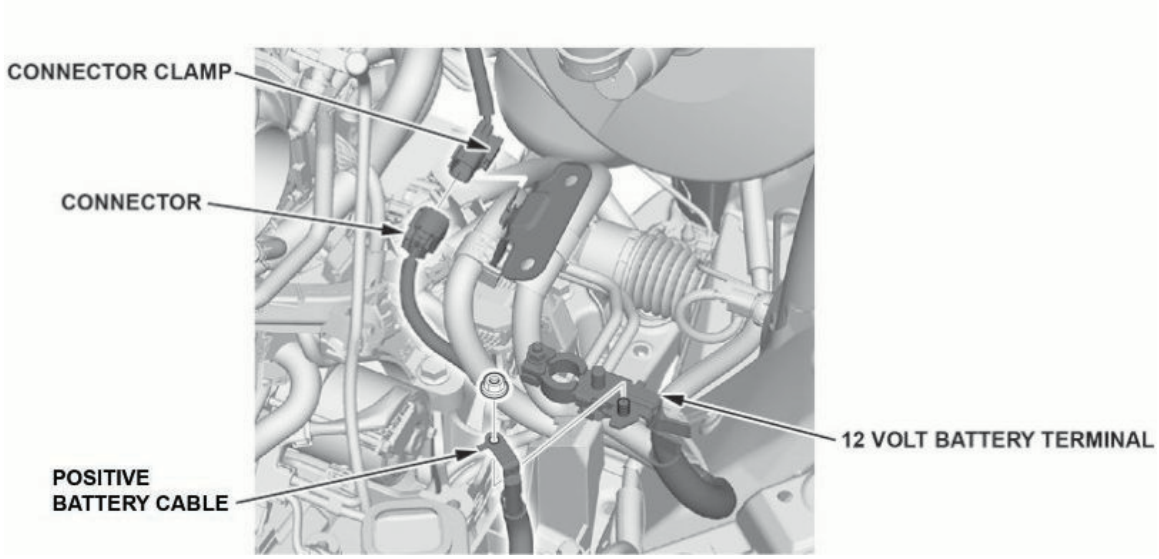


32. Disconnect the front stabilizer link ball joints.
33. Disconnect the tie-rod end ball joints.
34. Disconnect the front lower arm ball joints.
35. Remove the front driveshaft.

36. Disconnect the heater hoses.



37. Evacuate the A/C system, then remove the A/C hoses.
38. Disconnect the positive battery cable.

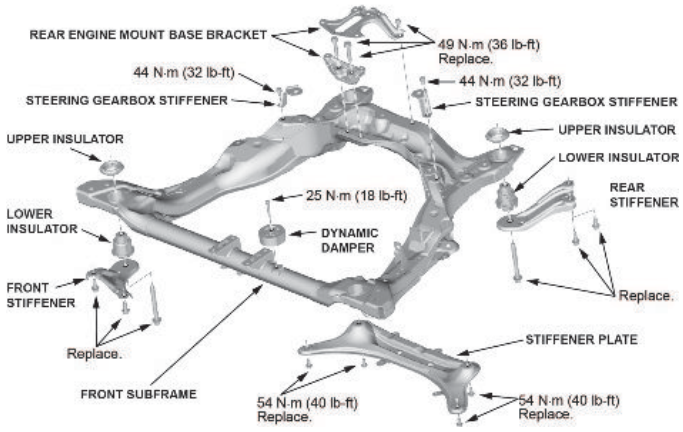


39. Remove the connector clamp.
40. Disconnect the connector.
41. Remove the front rear stiffener (small bolts).

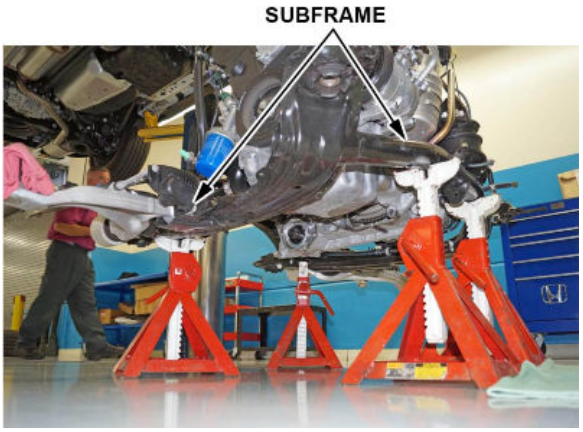
42. Remove the front subframe and engine.

NOTE

The engine and transmission will be removed on the subframe as one unit.



43. Lower the vehicle until the subframe is resting on four jack stands.



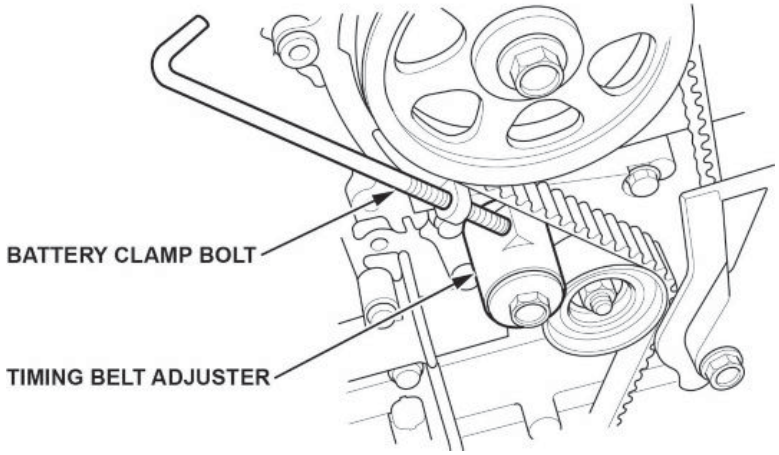
44. Remove all of the subframe bolts.
45. Carefully raise the vehicle while making sure the body clears and is not caught on the engine assembly.

INTAKE MANIFOLD AND CYLINDER HEAD REMOVAL

NOTE

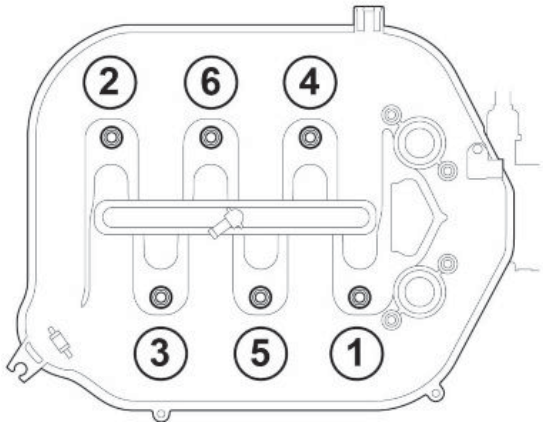
- Remove the cylinder head only if it is to be used again on the new short block.
- Transfer all components to the new short block, alternator, starter, etc.
- When using a new cylinder head, you will need to transfer the injectors, spark plugs, coils. etc. from the old cylinder head.

1. Remove the drive belt auto tensioner.
2. Remove the crankshaft pulley.
3. Lift and support the engine with a jack and wood block under the oil pan.
4. Remove the upper half of the side engine mount bracket.
5. Remove the timing belt. Refer to steps 10-13; page 17 for timing belt removal.

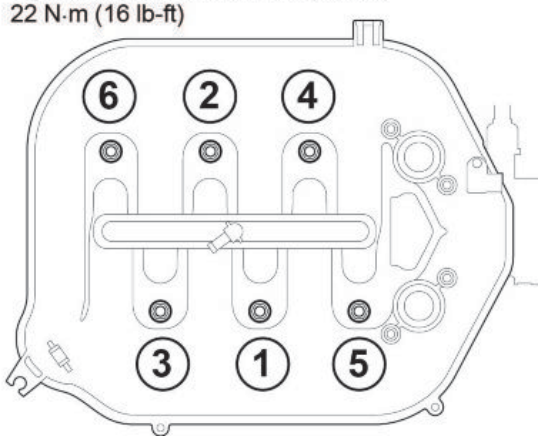


6. Remove the intake manifold mounting bolts and nuts as shown.

REMOVE:
Loosen bolts and nuts in sequence.

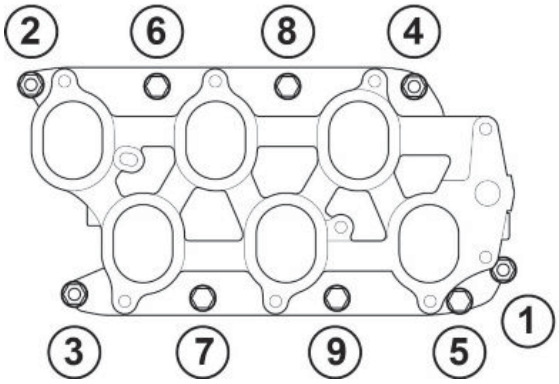


INSTALL:
Tighten bolts and nuts in sequence.
22 N·m (16 lb-ft)

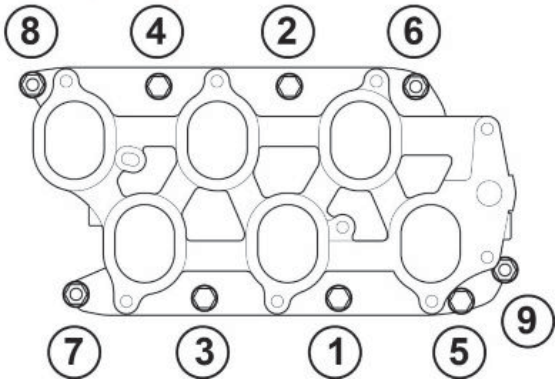


7. Remove the intake manifold base mounting bolts and nuts sequentially as shown, then remove the intake manifold base.

REMOVE:
Loosen bolts and nuts in sequence.

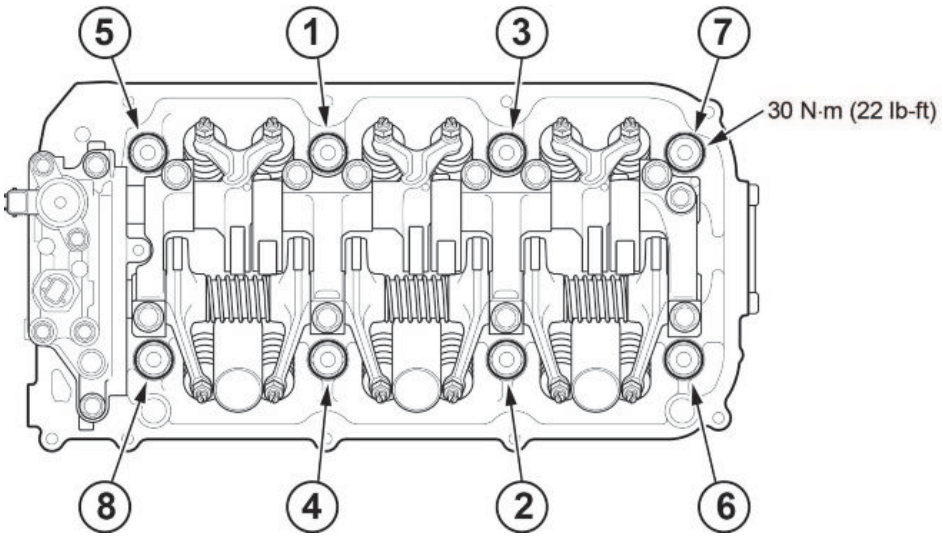


INSTALL:
Tighten bolts and nuts in sequence.
22 N·m (16 lb-ft)

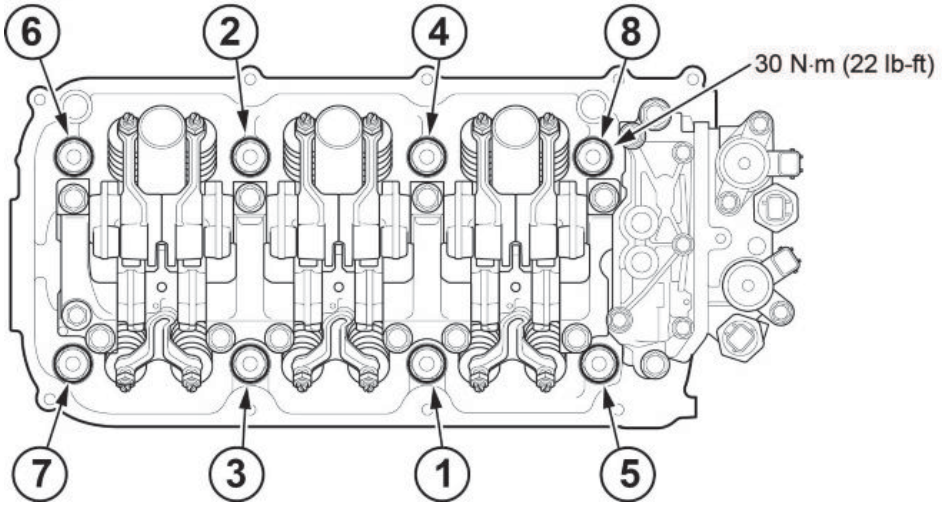


8. Remove the cylinder head bolts, then remove the cylinder heads.

FRONT

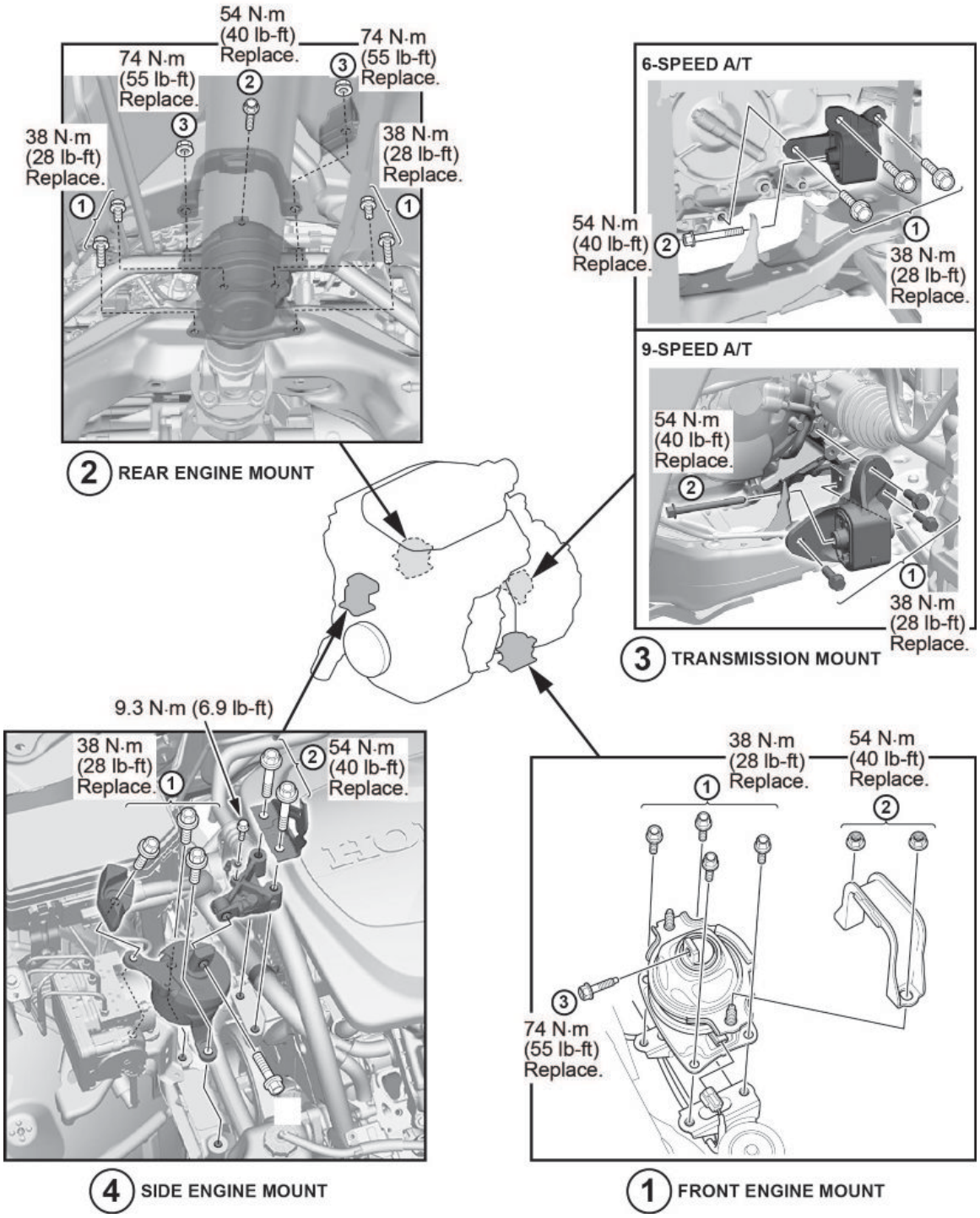


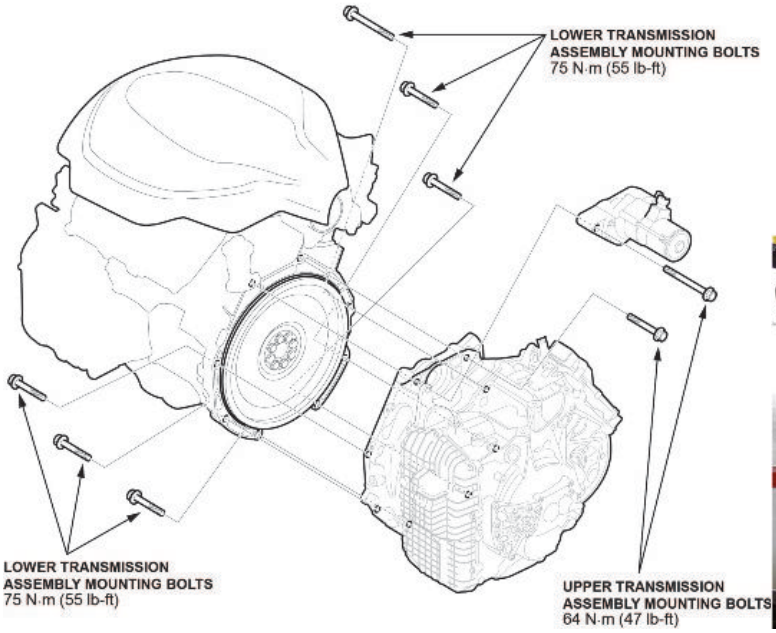
REAR

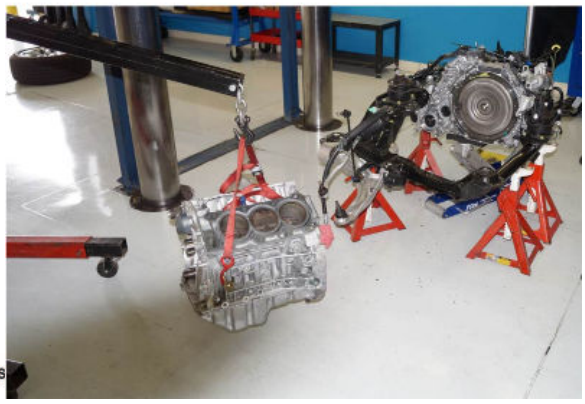


SHORT BLOCK REMOVAL

1. Install an engine hoist chain to the block, then, lift the short block until chain slack is gone.
2. Remove the torque converter bolts (9 A/T and 6 A/T).
3. Remove the engine and transmission assembly mounting bolts.

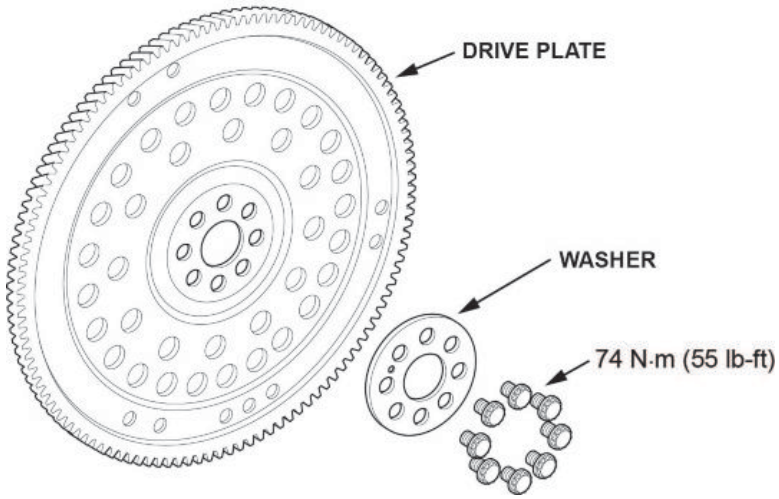



LOWER TRANSMISSION
ASSEMBLY MOUNTING BOLTS
75 N·m (55 lb-ft)
LOWER TRANSMISSION
ASSEMBLY MOUNTING BOLTS
75 N·m (55 lb-ft)
UPPER TRANSMISSION
ASSEMBLY MOUNTING BOLTS
64 N·m (47 lb-ft)



4. Remove the brackets from the old engine block, and install them on the new block.
5. Remove all of the engine mounts.
6. Remove the A/C compressor from the block, and install it to new short block.
7. Lift the short block out and off to the side.

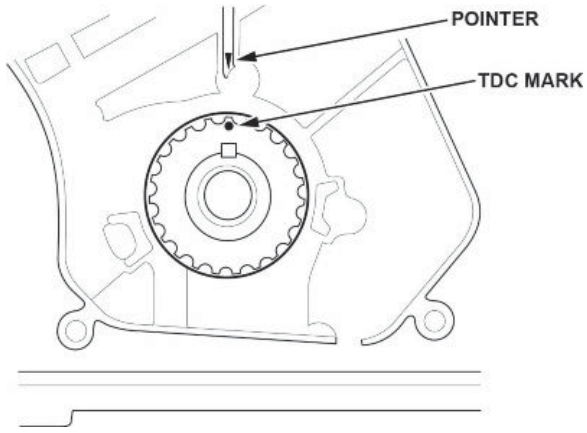
8. Remove the drive plate assembly, and install it to the new short block.



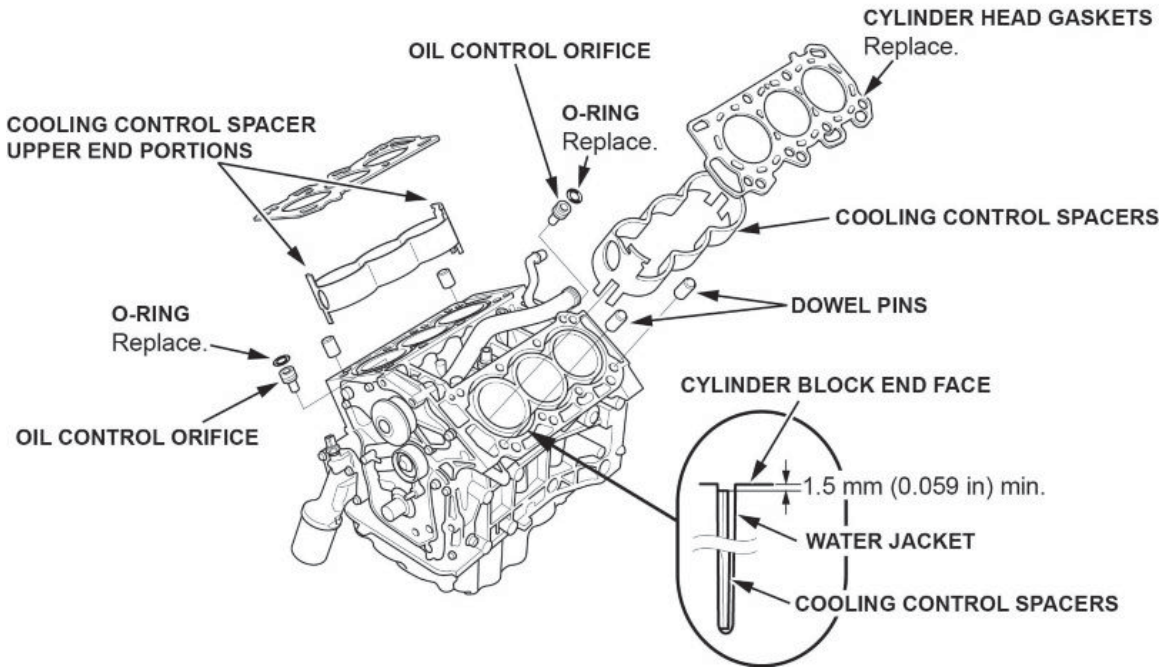
9. Lift the new short block into the subframe.
10. Torque the engine mounts and transmission converter bolts.

CYLINDER HEAD INSTALLATION

1. Set the timing belt drive pulley to top dead center (TDC) by lining up the TDC mark on the tooth of the timing belt drive pulley with the pointer on the oil pump.



2. Clean the cylinder head and the engine block surface.

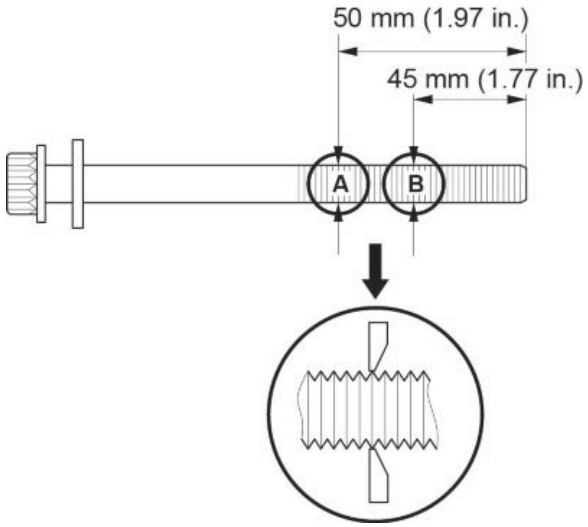


3. Clean and install the oil control orifices, the install the new O-rings.
4. Install the cooling control spacers in the engine block whenever the engine block is replaced, and check for free play between the cooling control spacer and the engine block. If there is any free play, install a new cooling control spacer.

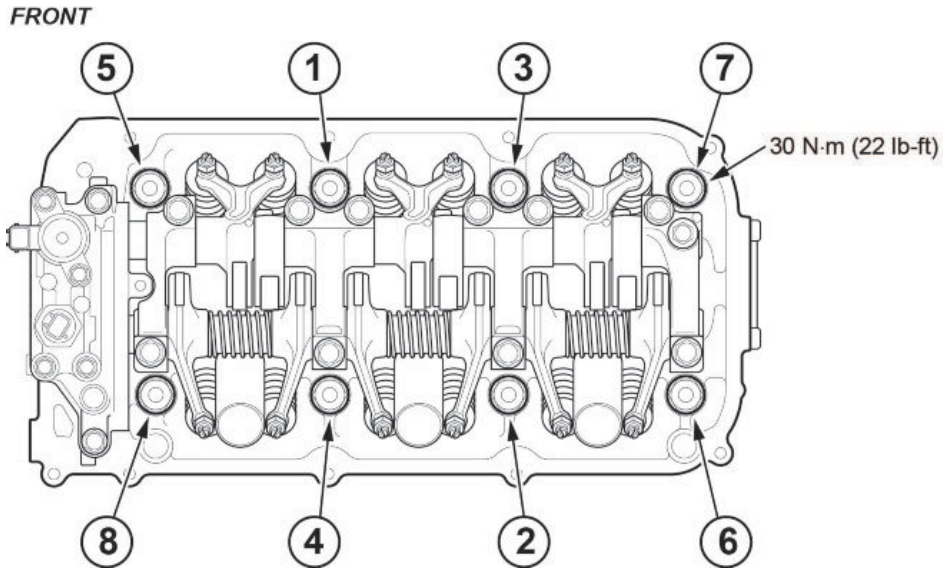
   NOTE

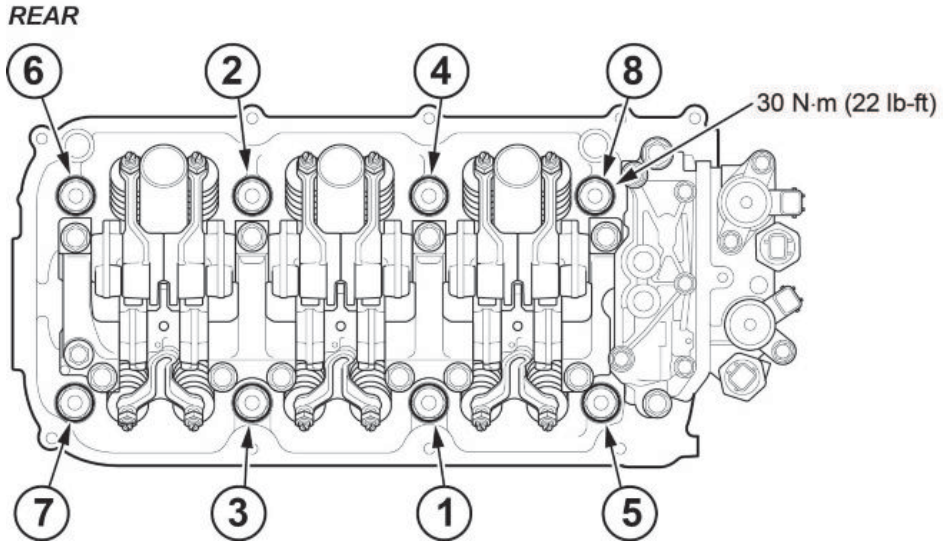
   - Make sure the cooling spacer contacts the bottom of the water jacket.
   - Make sure there is **1.5 mm (0.059 in)** clearance between the cooling control spacer upper end portions and the cylinder block end face.
5. Install the dowel pins and new cylinder head gasket.
6. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
7. Install the cylinder head to the engine block.

8. Measure the diameter of each cylinder head bolt at point A and point B.

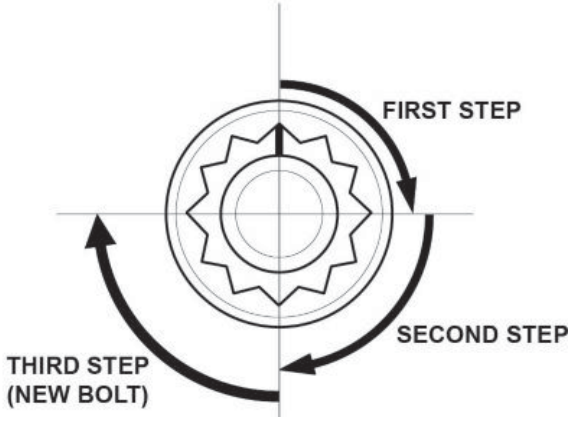


9. If either diameter is less than **11.3 mm (0.445 in)**, replace the cylinder head bolt.
10. Apply new engine oil to the threads and under the bolt heads of all cylinder head bolts.
11. Torque the cylinder head bolts as shown to **30 N.m (22 lb-ft)**, using a beam-type torque wrench. When using a preset click-type torque wrench, make sure to tighten slowly and do not overtighten. If a bolt makes any noise while you are torquing it, loosen the bolt and tighten it again from the first step.





12. After torquing, tighten all cylinder head bolts in two steps (90 degrees of rotation per step) as shown in step 11. If you are using a new cylinder head bolt, tighten the bolt an extra **90 degrees** of rotation.

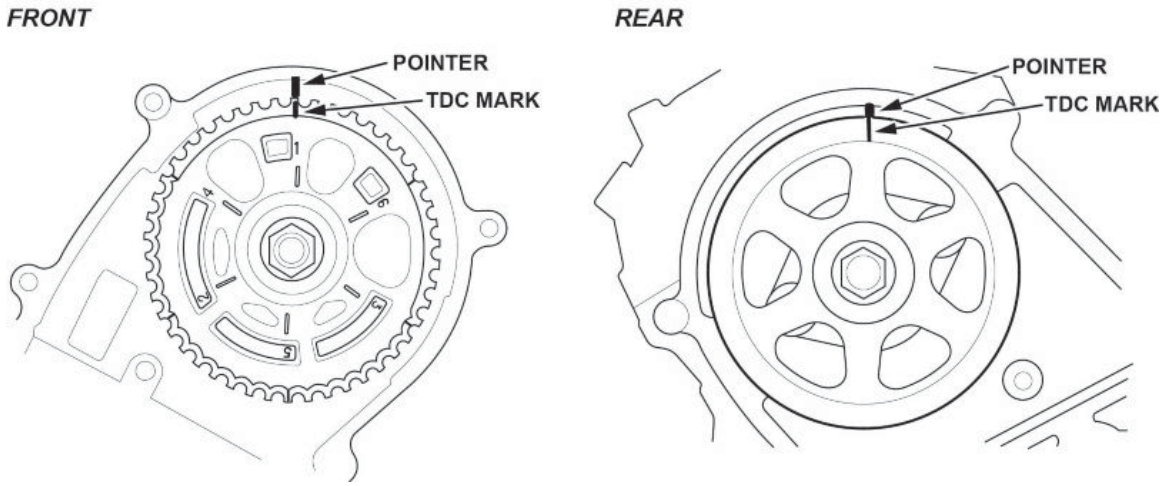


NOTE

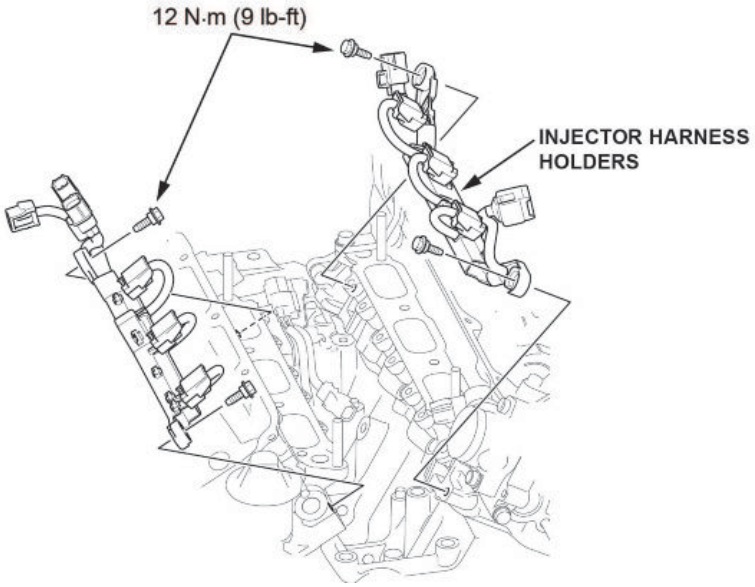
Remove the cylinder head bolt if you tightened it beyond the specified angle, and go back to step 8 of the procedure. Do not loosen the over-tightened bolt back to the specified angle.

13. Install the camshaft pulley and back cover.

14. Set the camshaft pulleys to TDC by lining up the TDC marks on the camshaft pulleys with the pointers on the back covers.



15. Install the timing belt.
16. Adjust the valve clearance.
17. Install the injector harness holder.



18. Install the cylinder head cover.
19. Finish assembling the engine by referencing the cylinder head removal and installation in the service information. Reinstall the subframe with the powertrain into the vehicle, following previous steps in reverse order.

END