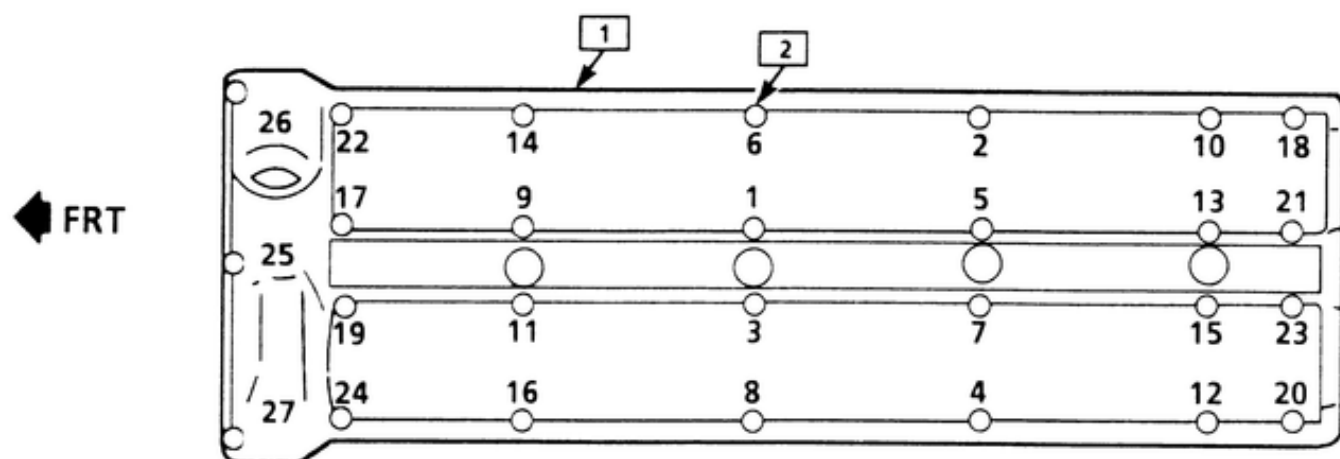
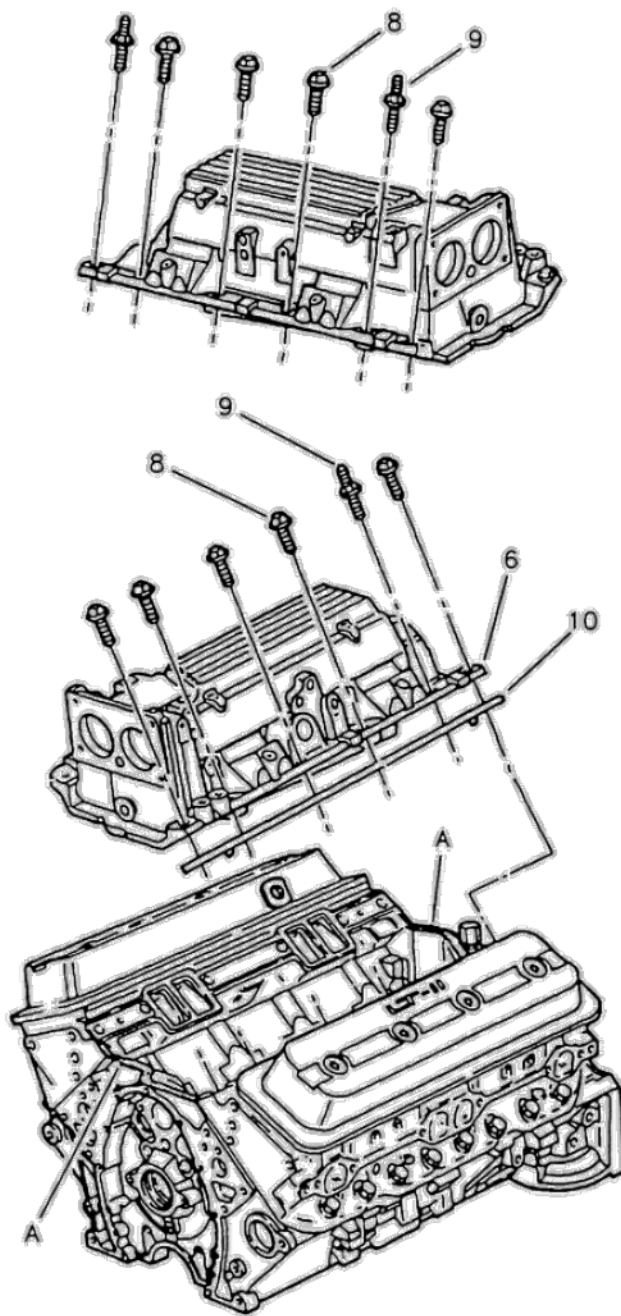
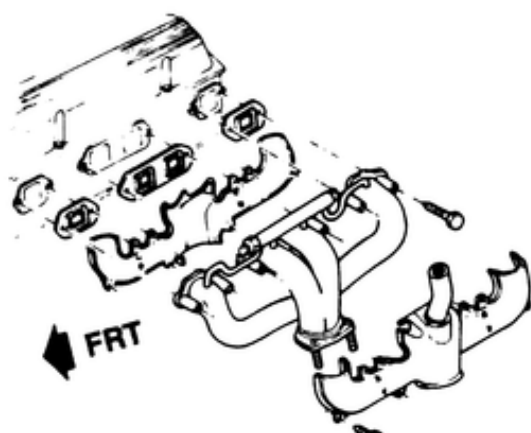




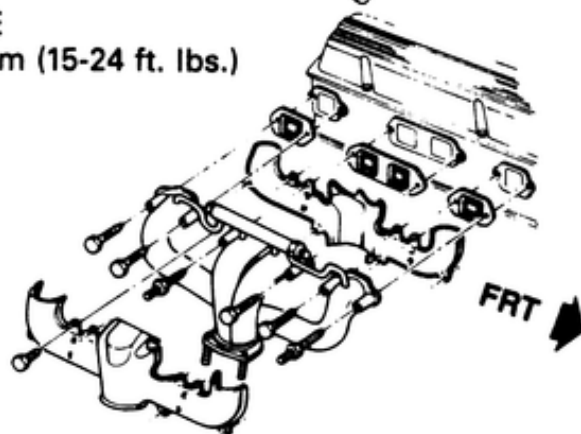
- 1 CAMSHAFT COVER
- 2 CAMSHAFT COVER BOLT

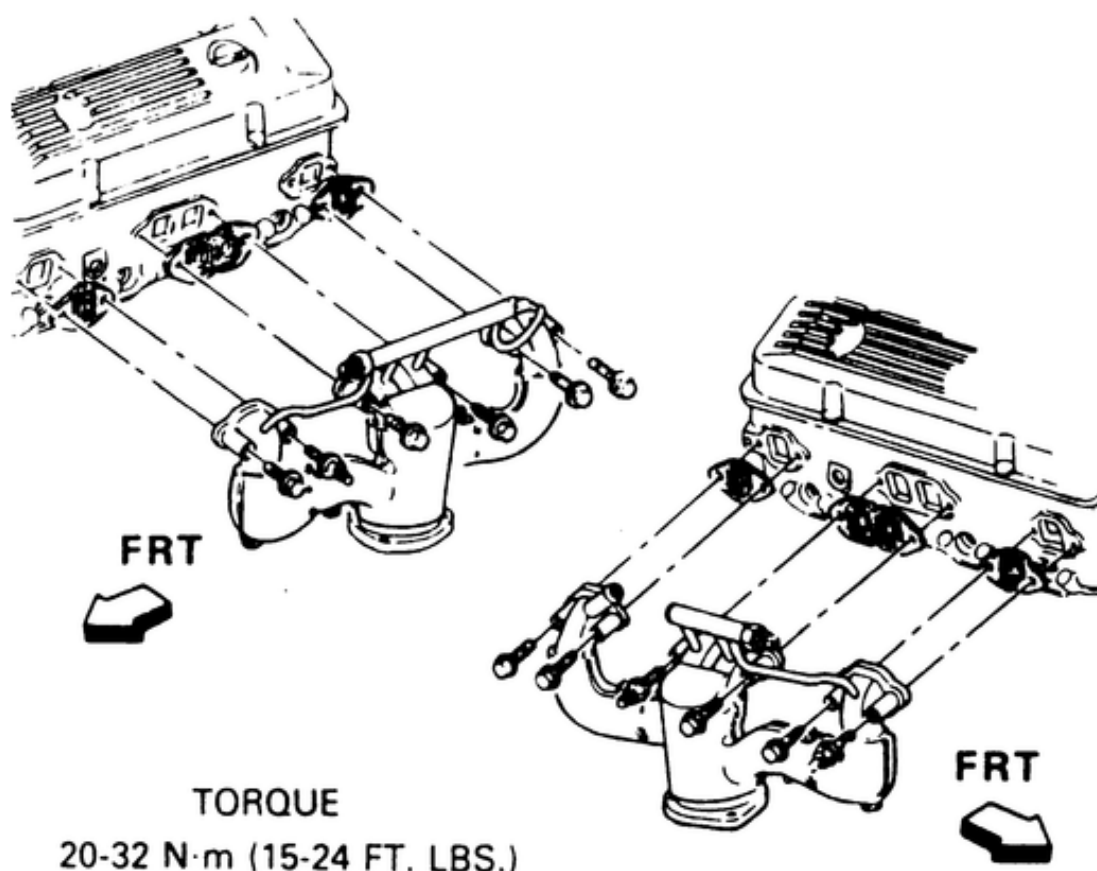


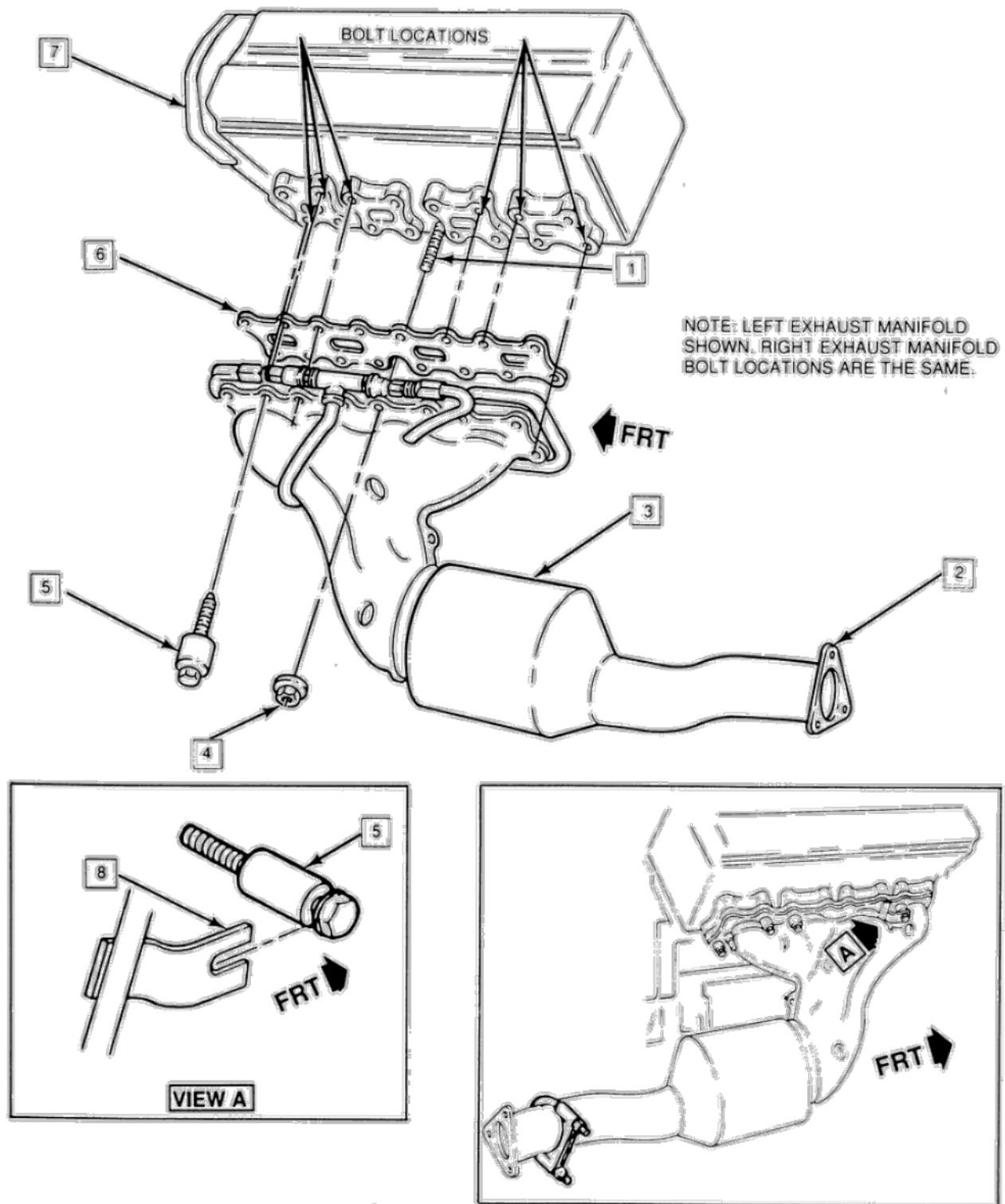
- A SEALER
- 6 MANIFOLD ASSEMBLY, INTAKE
- 8 BOLT/SCREW, INTAKE MANIFOLD
- 9 STUD, INTAKE MANIFOLD
- 10 GASKET, INTAKE MANIFOLD



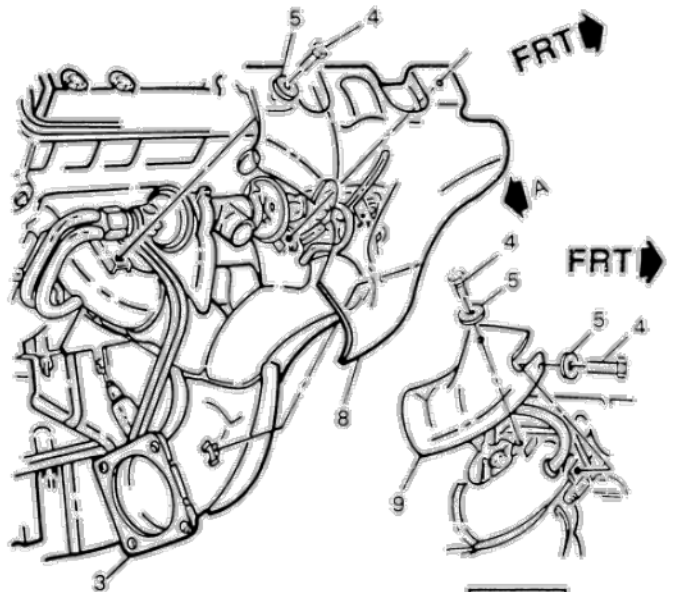
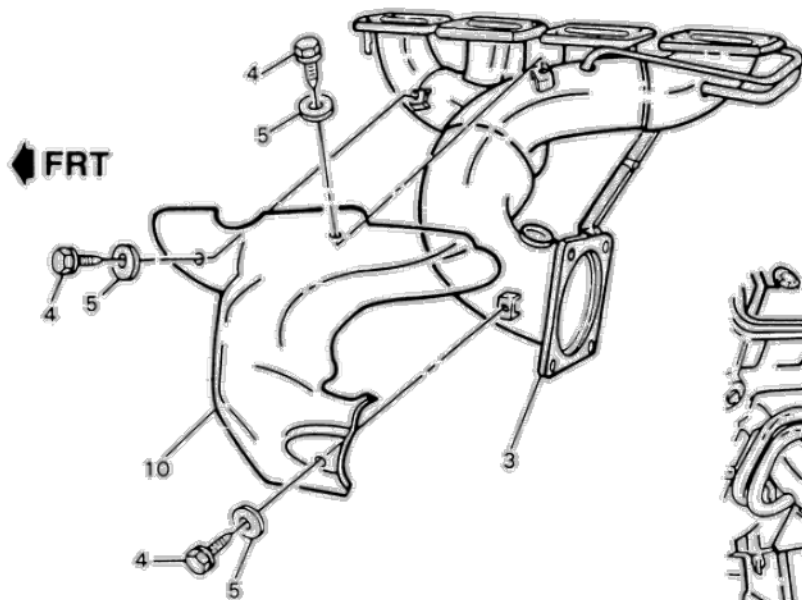
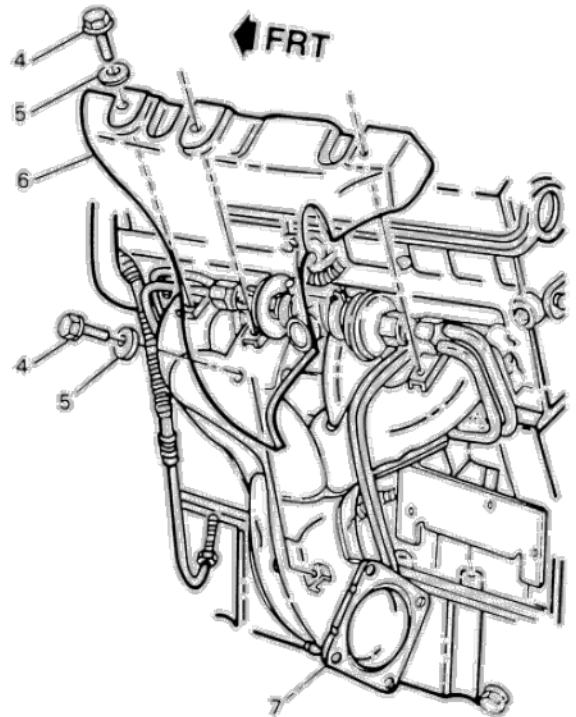
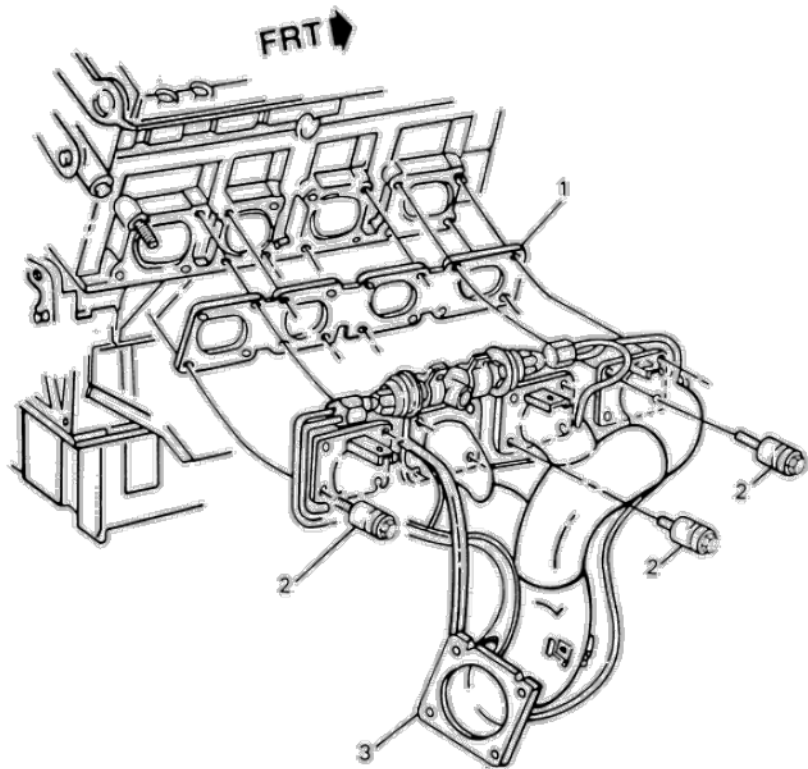
TORQUE
20-32 N•m (15-24 ft. lbs.)





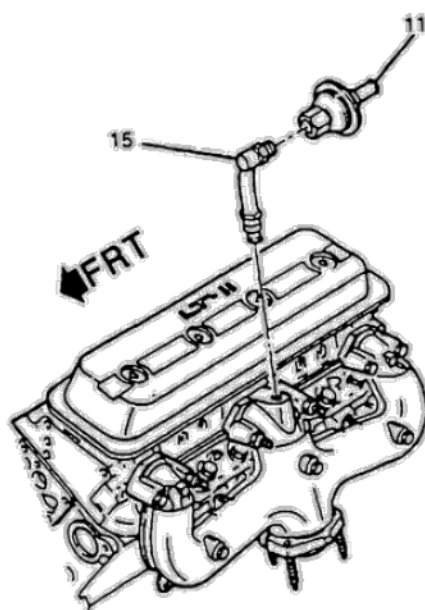
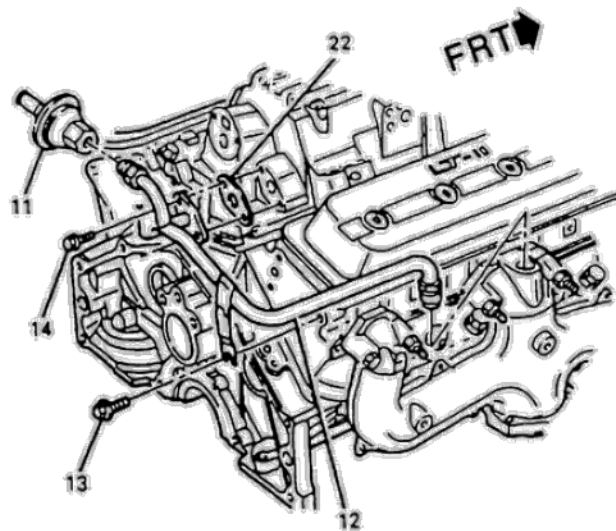


- | | |
|-------------------------------|---|
| 1 STUD, EXHAUST MANIFOLD | 5 BOLT W/SPACER, EXHAUST MANIFOLD/CONVERTER |
| 2 FLANGE, EXHAUST | 6 GASKET, EXHAUST MANIFOLD/CONVERTER |
| 3 MANIFOLD/CONVERTER, EXHAUST | 7 HEAD, CYLINDER |
| 4 NUT, EXHAUST MANIFOLD STUD | 8 BRACKET, BOLT |

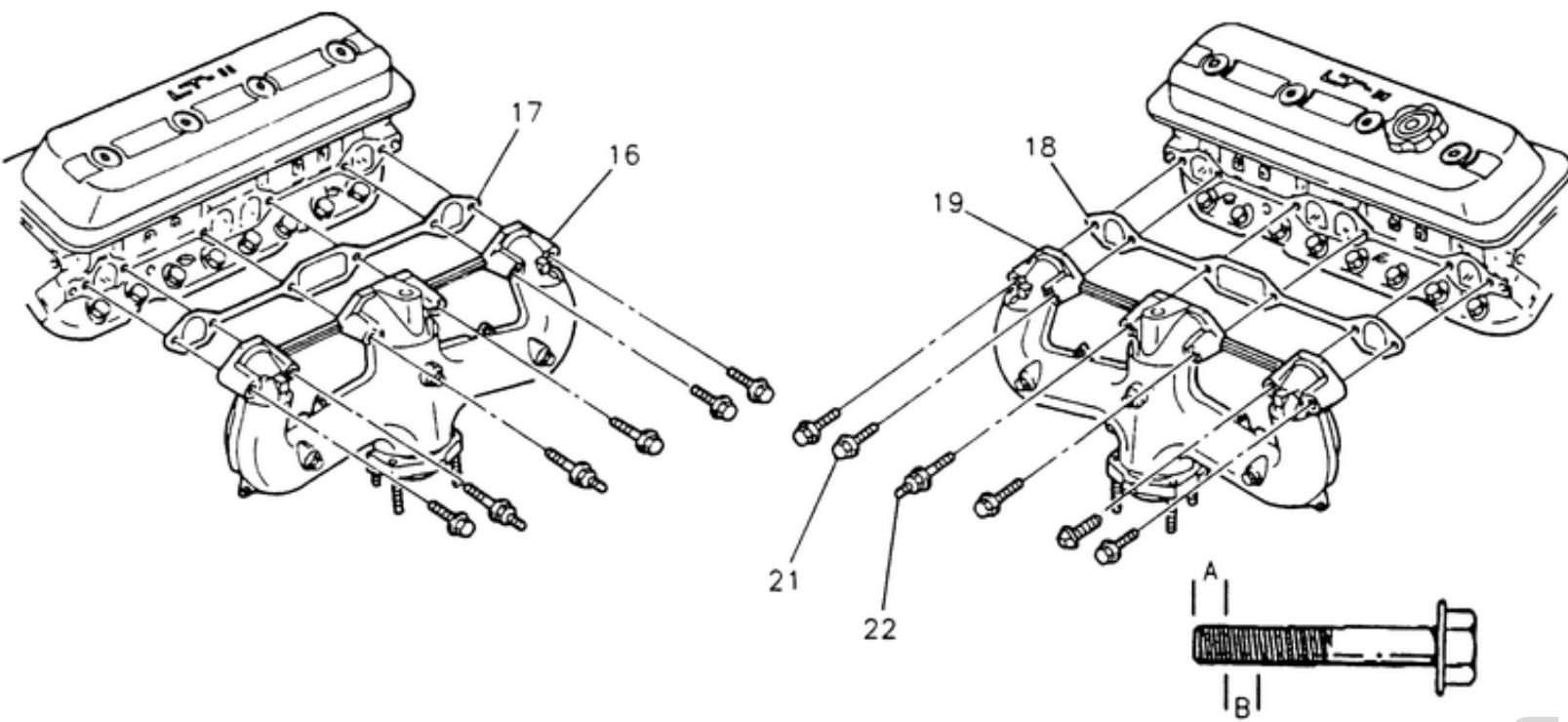


- 1 GASKET
- 2 BOLT W/SPACER
- 3 EXHAUST MANIFOLD, RIGHT
- 4 SCREW
- 5 WASHER

- 6 HEAT SHIELD, OUTER LEFT
- 7 EXHAUST MANIFOLD, LEFT
- 8 HEAT SHIELD, OUTER RIGHT
- 9 HEAT SHIELD, OUTER RIGHT FRONT
- 10 HEAT SHIELD, INNER

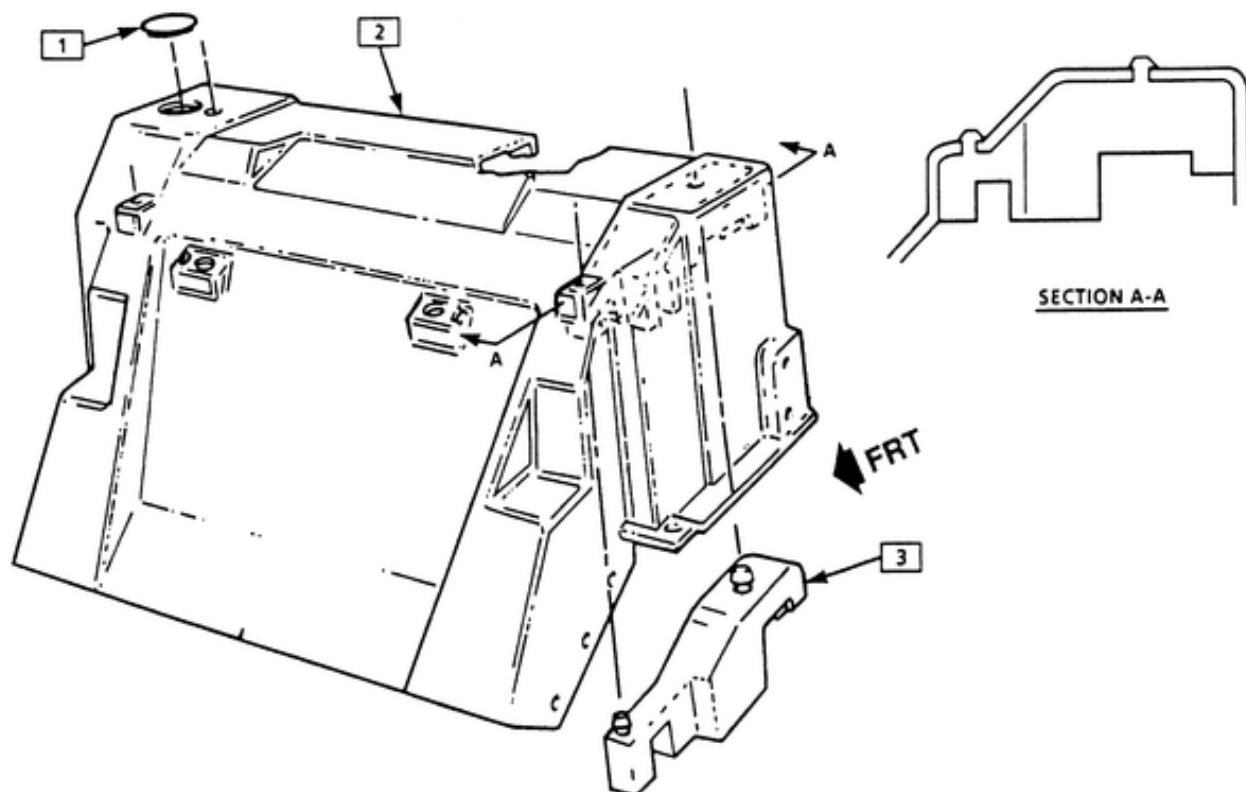


- 11 VALVE ASSEMBLY, SECONDARY AIR INJECTION CHECK
- 12 PIPE ASSEMBLY, SECONDARY AIR INJECTION
- 13 BOLT/SCREW, SECONDARY AIR INJECTION PIPE
- 14 BOLT/SCREW, SECONDARY AIR INJECTION PIPE
- 15 PIPE ASSEMBLY, SECONDARY AIR INJECTION
- 22 GASKET, SECONDARY AIR INJECTION PIPE

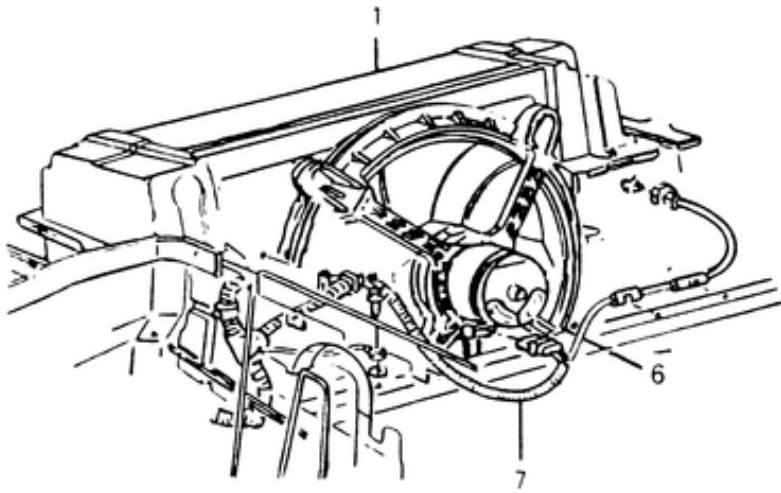


- A 1-3 THREADS FREE OF ADHESIVE
- B APPLY 8 mm (1/4 INCH) BAND OF ADHESIVE TO THE FULL CIRCUMFERENCE OF THREADS
- 16 MANIFOLD, EXHAUST
- 17 GASKET, EXHAUST MANIFOLD

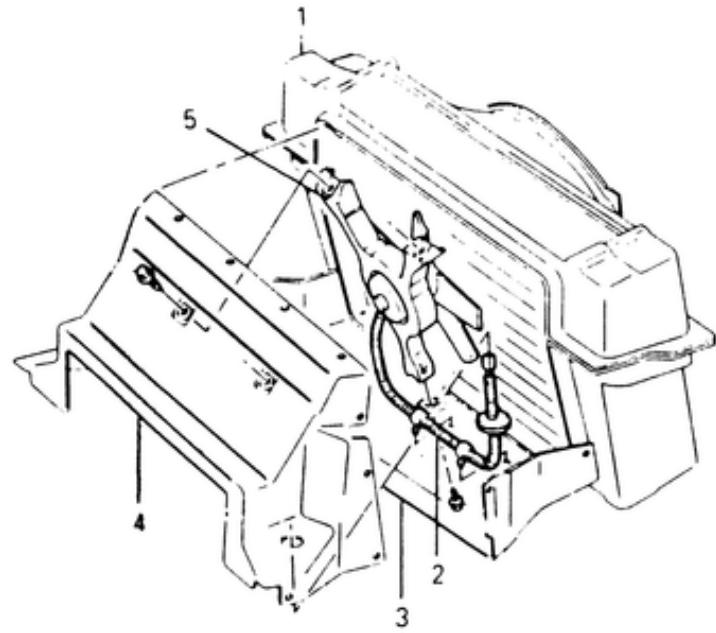
- 18 GASKET, EXHAUST MANIFOLD
- 19 MANIFOLD, EXHAUST
- 20 STUD, EXHAUST MANIFOLD
- 21 BOLT/SCREW, EXHAUST MANIFOLD



-
- 1** RADIATOR AIR BLEED ACCESS PLUG
 - 2** RADIATOR UPPER SUPPORT
 - 3** RADIATOR INSULATOR

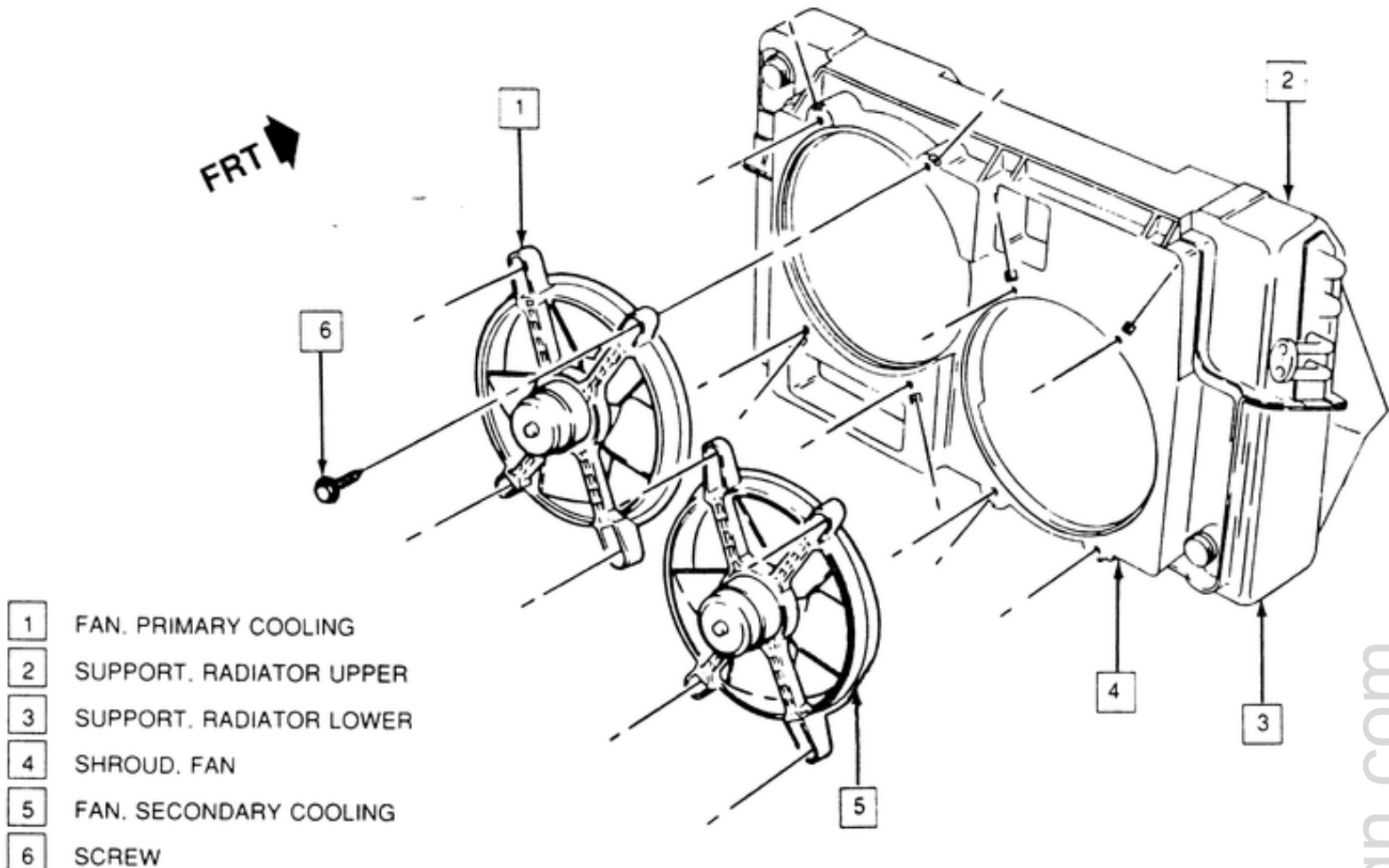


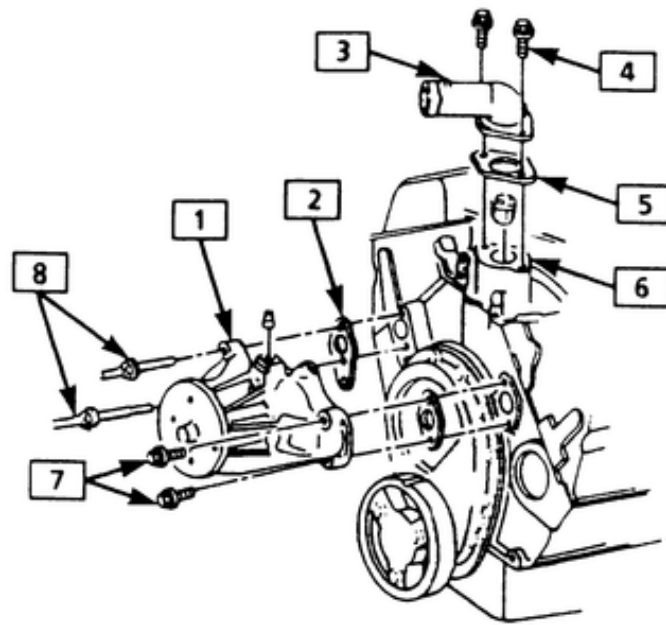
- 1 SUPPORT, RADIATOR UPPER
- 2 HARNESS, AUXILIARY COOLING FAN
- 3 BAFFLE, RADIATOR AIR LOWER
- 4 BAFFLE, RADIATOR AIR UPPER



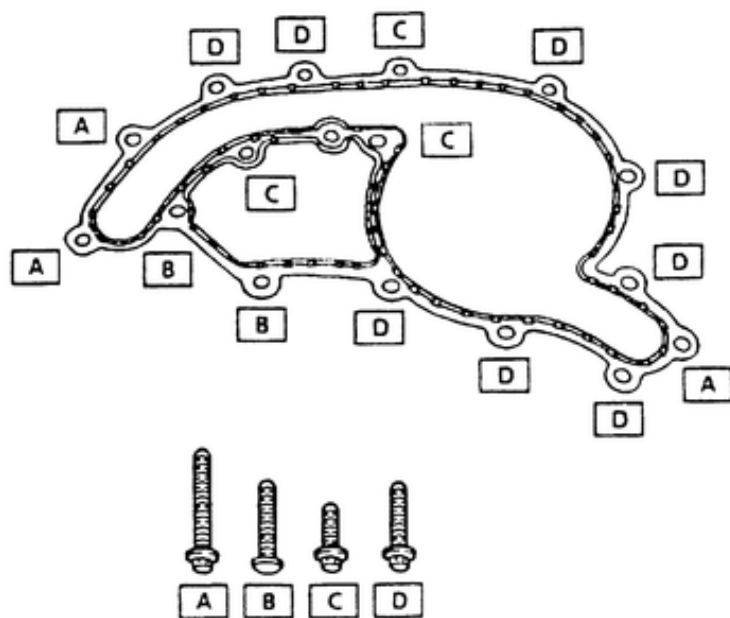
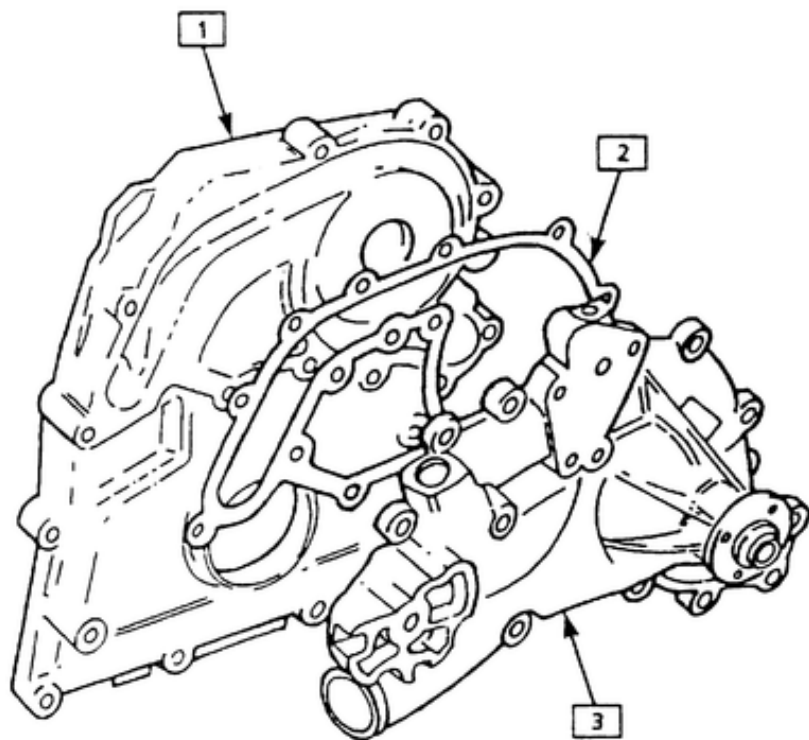
- 5 FAN, AUXILIARY COOLING
- 6 FAN, ENGINE COOLING
- 7 HARNESS, ENGINE COOLING FAN

FRT

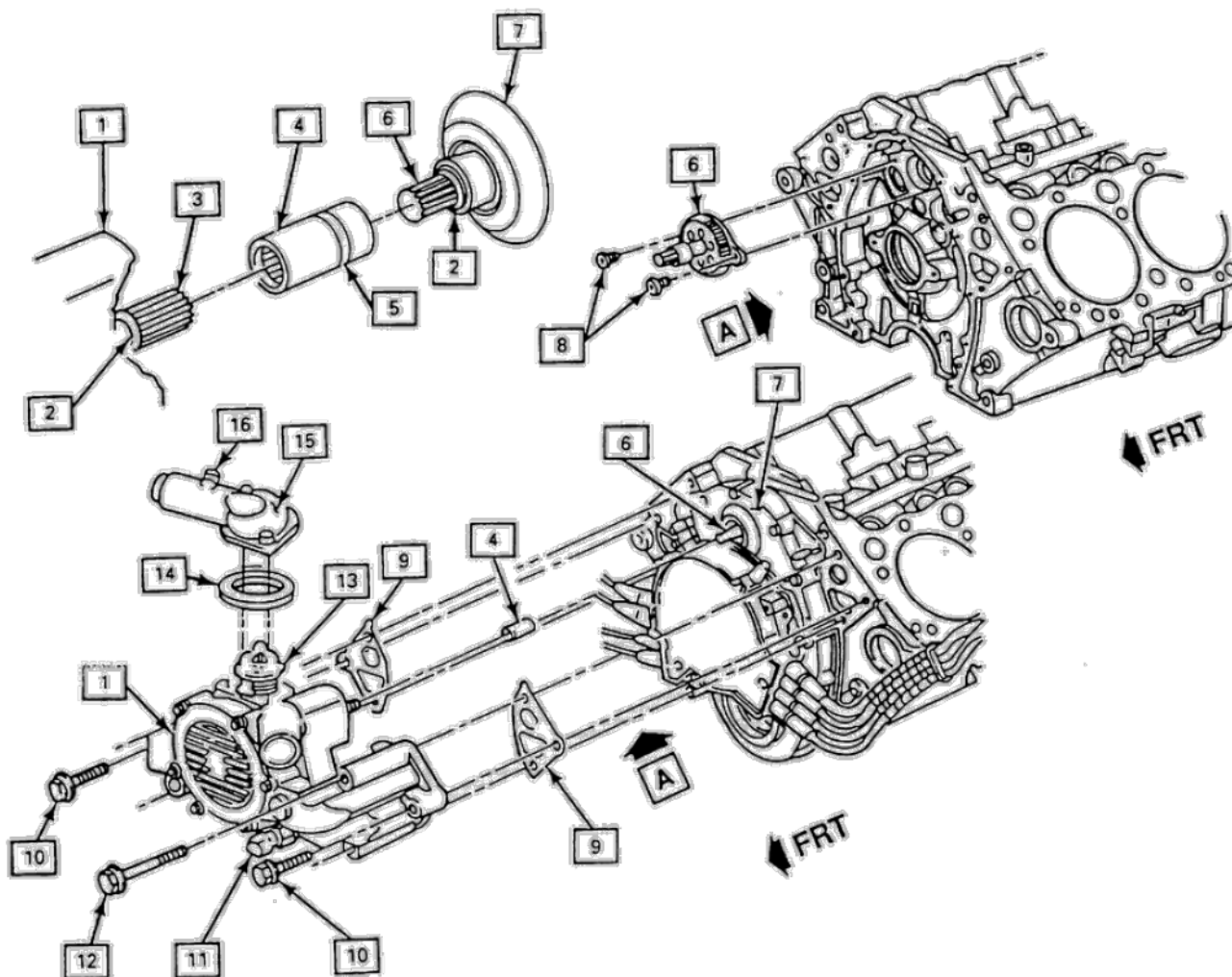




-
- 1** COOLANT PUMP
 - 2** COOLANT PUMP GASKET
 - 3** THERMOSTAT HOUSING
 - 4** THERMOSTAT HOUSING BOLT
 - 5** THERMOSTAT HOUSING GASKET
 - 6** THERMOSTAT
 - 7** COOLANT PUMP BOLT
 - 8** COOLANT PUMP STUD

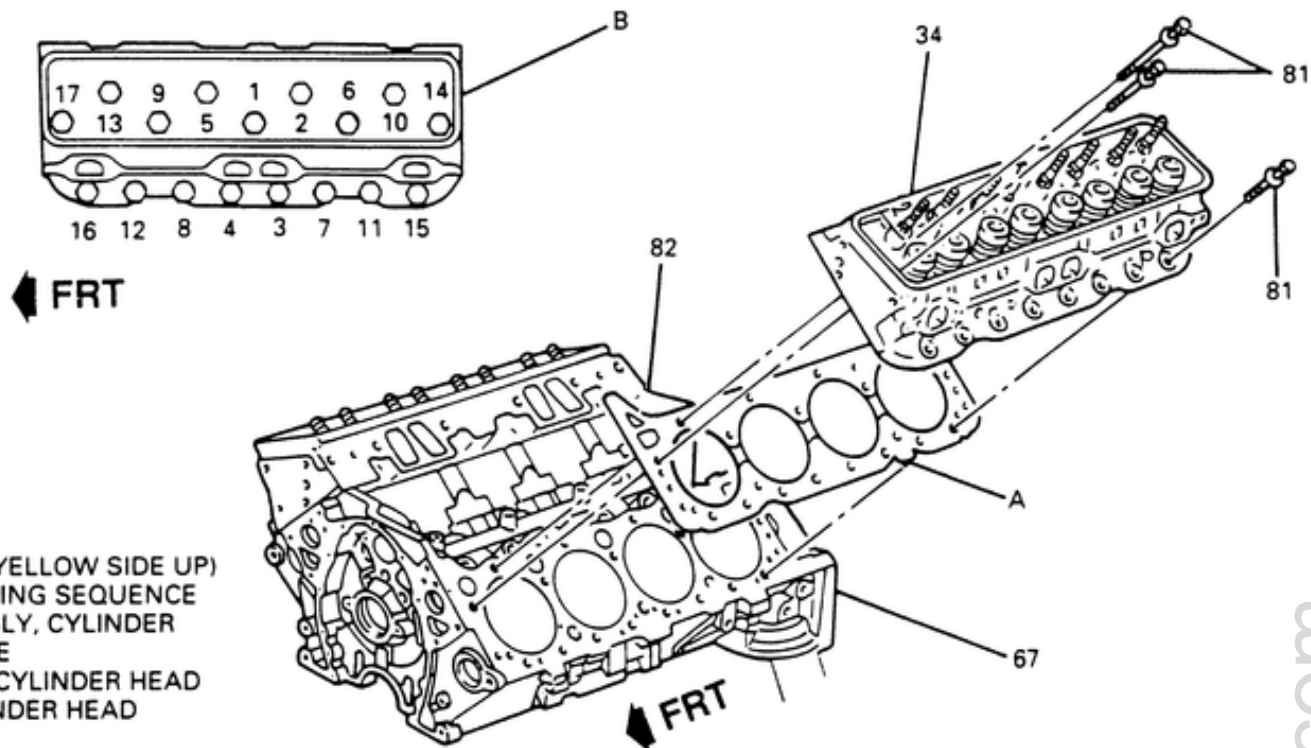


- 1 ENGINE FRONT COVER
- 2 COOLANT PUMP GASKET
- 3 COOLANT PUMP

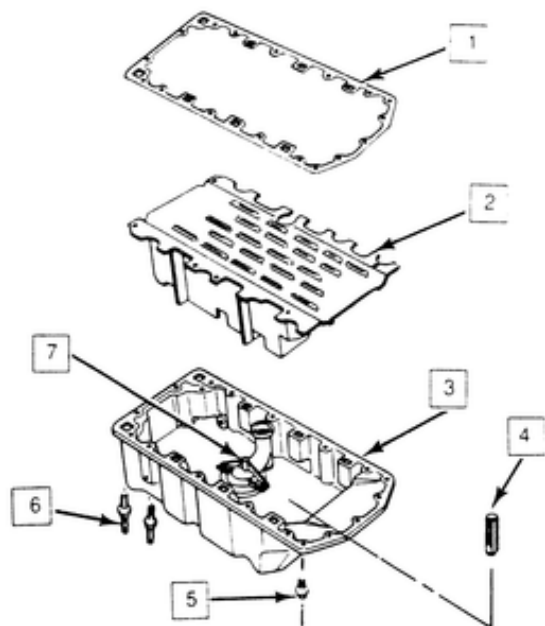


- 1 COOLANT PUMP
- 2 O-RING SEAL
- 3 COOLANT PUMP SHAFT
- 4 COUPLING
- 5 COUPLING GROOVE (TOWARD ENGINE)
- 6 DRIVE GEAR
- 7 TIMING CHAIN FRONT COVER
- 8 BOLTS-RETAINER PLATE

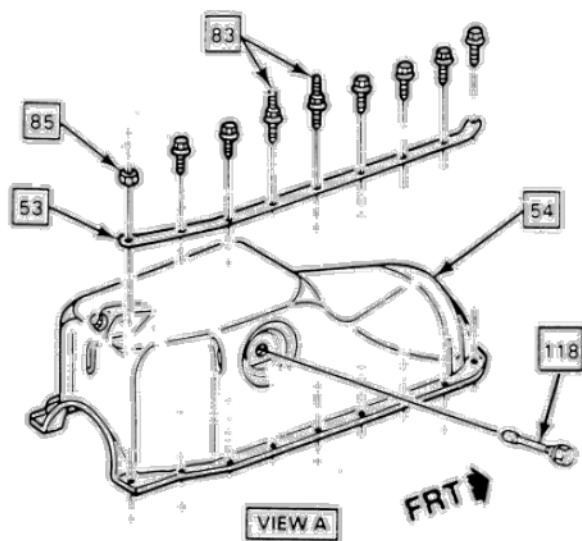
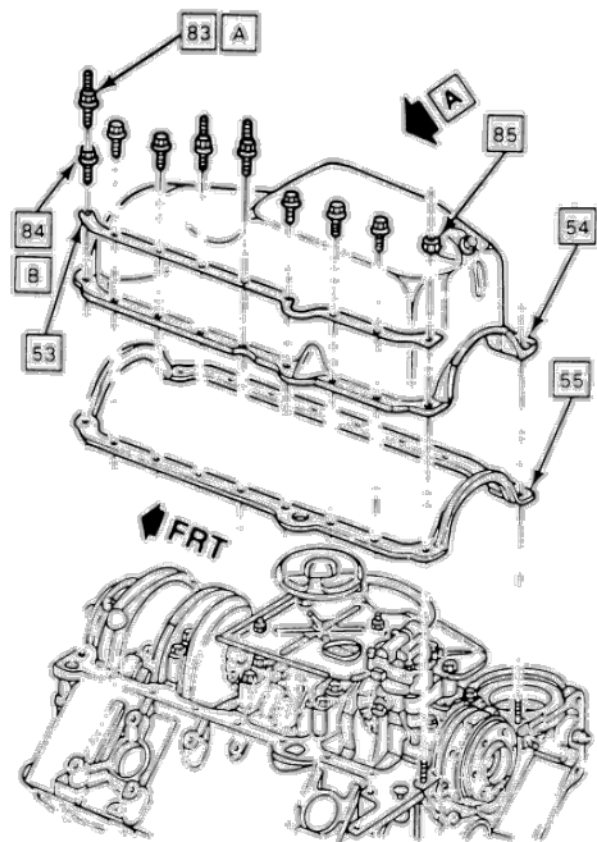
- 9 GASKET (INSTALL TAB UP)
- 10 BOLT (SHORT)
- 11 COOLANT SENSOR
- 12 BOLT (LONG)
- 13 THERMOSTAT
- 14 SEAL (INSTALL TAPER UP)
- 15 THERMOSTAT HOUSING
- 16 AIR BLEED VALVE



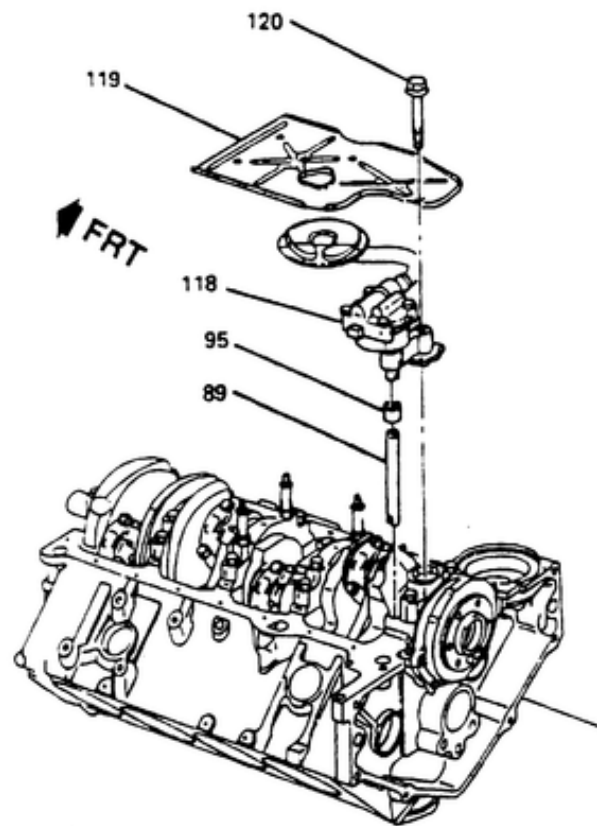
- A GASKET TAB (YELLOW SIDE UP)
- B BOLT TIGHTENING SEQUENCE
- 34 HEAD ASSEMBLY, CYLINDER
- 67 BLOCK, ENGINE
- 81 BOLT/SCREW, CYLINDER HEAD
- 82 GASKET, CYLINDER HEAD



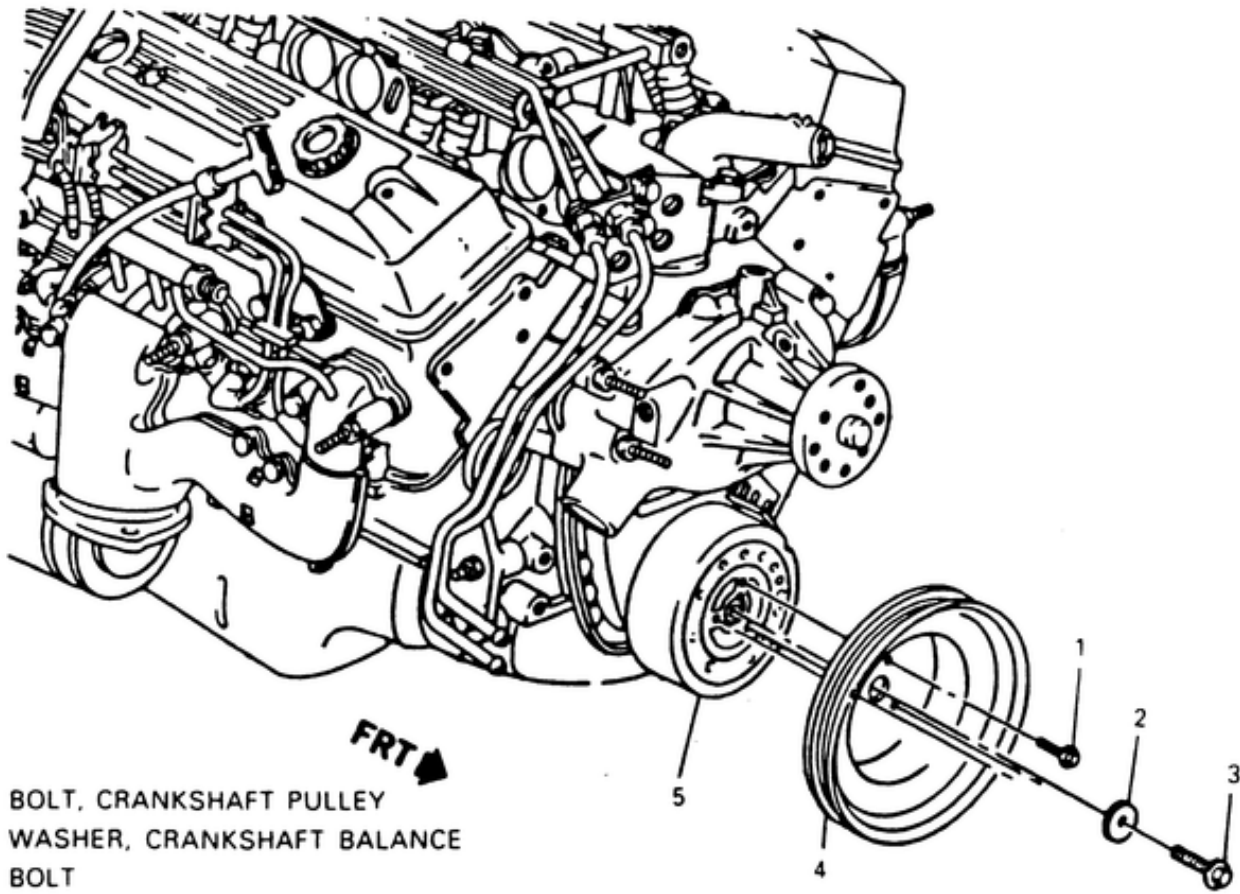
- 1 GASKET, OIL PAN
- 2 BAFFLE, OIL PAN
- 3 PAN, OIL
- 4 SPACER, OIL PAN PICKUP
- 5 BOLT, OIL PAN
- 6 BOLT, OIL PAN STUD
- 7 PIPE AND SCREEN ASSEMBLY, OIL PICKUP



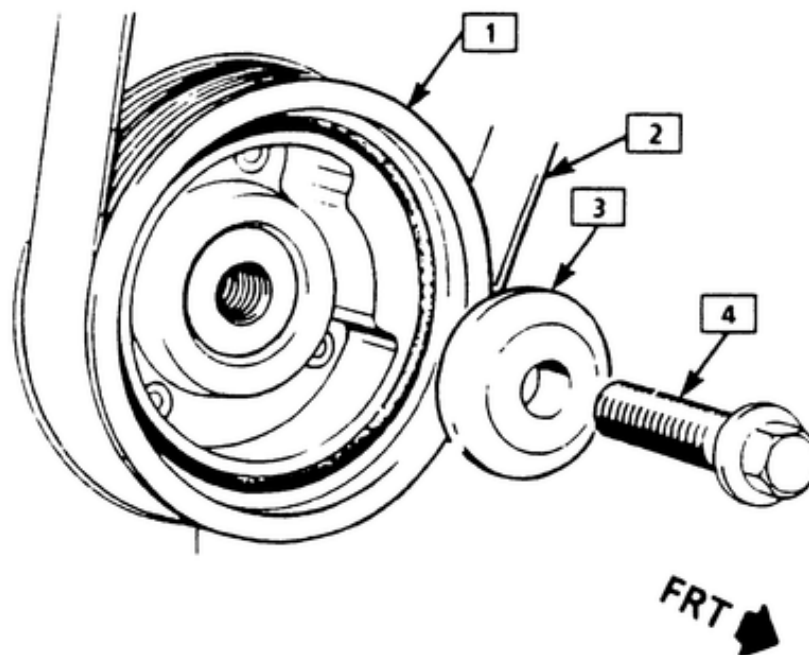
A	AUTO TRANSMISSION	83	STUD
B	MANUAL TRANSMISSION	84	BOLT
53	REINFORCEMENT	85	NUT
54	OIL PAN	118	OIL LEVEL SENSOR
55	GASKET		



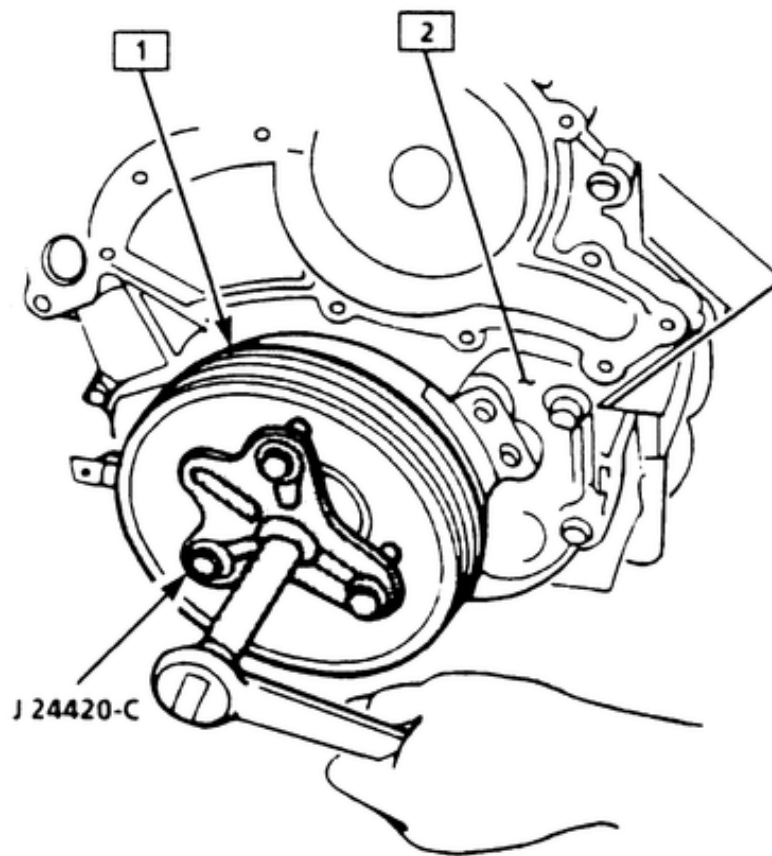
- 89 DRIVESHAFT, OIL PUMP
- 95 RETAINER, OIL PUMP DRIVESHAFT
- 118 PUMP ASSEMBLY, OIL
- 119 BAFFLE, OIL PAN
- 120 BOLT/SCREW, OIL PUMP



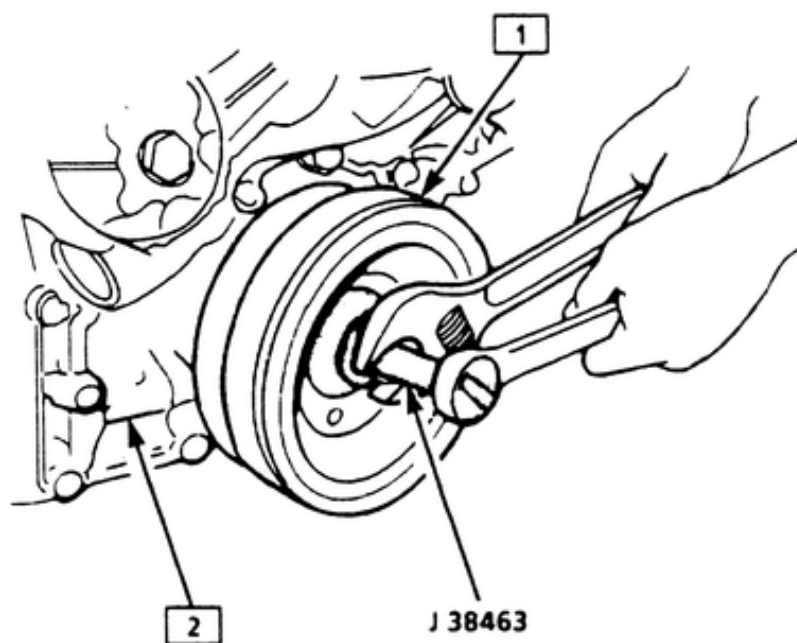
- 1 BOLT, CRANKSHAFT PULLEY
2 WASHER, CRANKSHAFT BALANCE
3 BOLT
4 PULLEY, CRANKSHAFT
5 DAMPER, TORSIONAL



-
- 1** TORSIONAL DAMPER
 - 2** SERPENTINE BELT
 - 3** CRANKSHAFT DAMPER WASHER
 - 4** CRANKSHAFT DAMPER BOLT

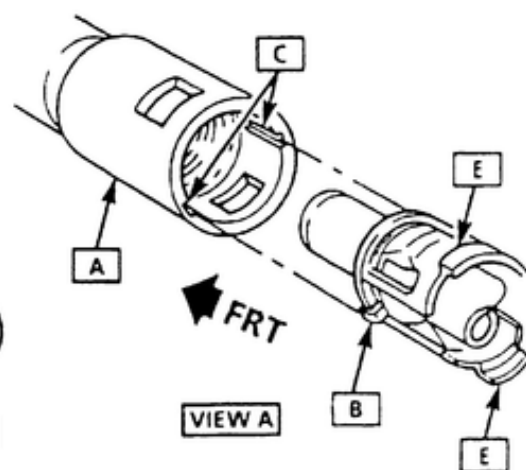
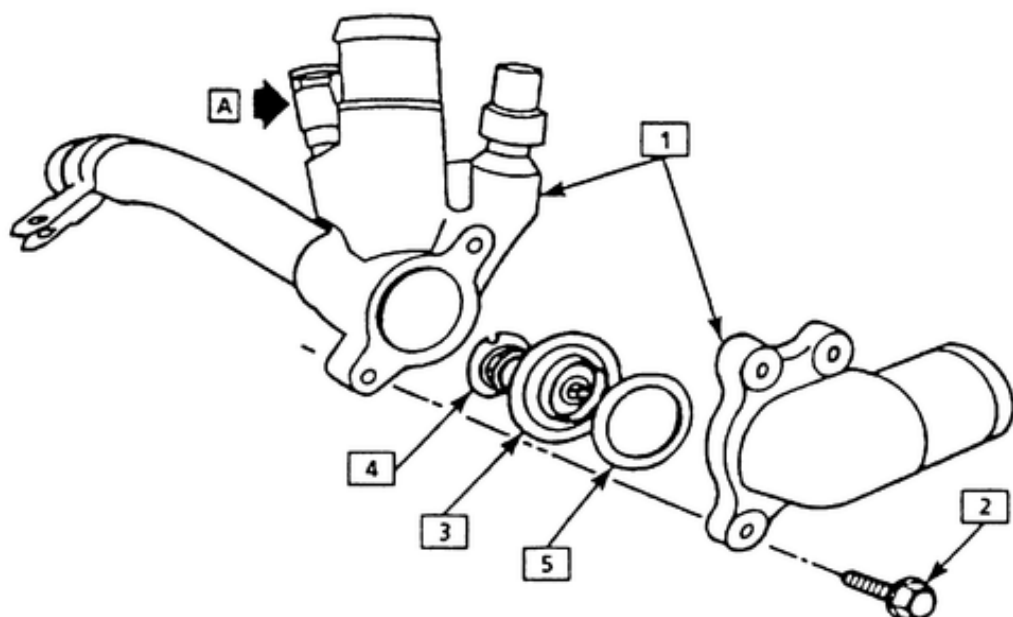


-
- 1** TORSIONAL DAMPER
 - 2** ENGINE FRONT COVER

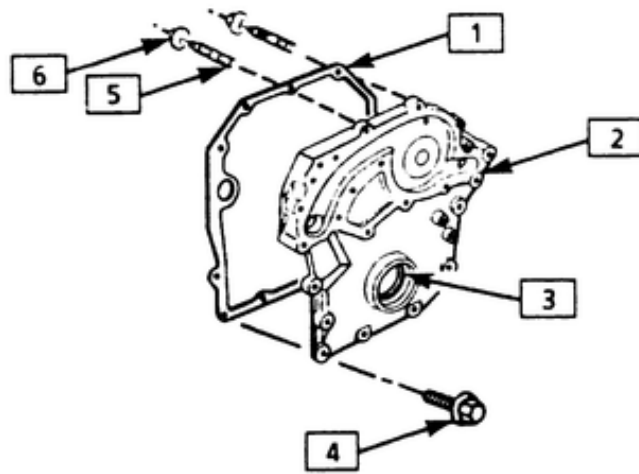


1 TORSIONAL DAMPER

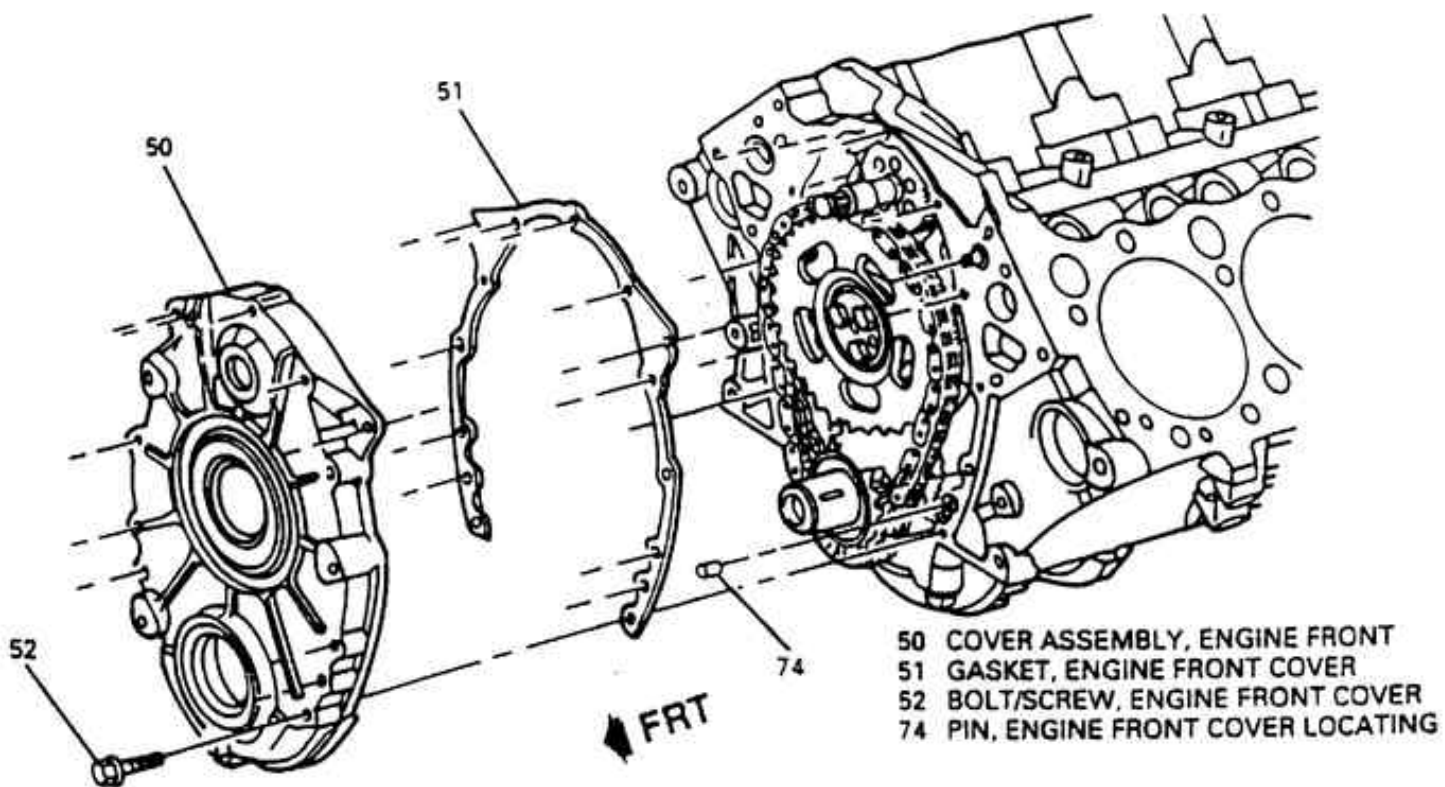
2 ENGINE FRONT COVER



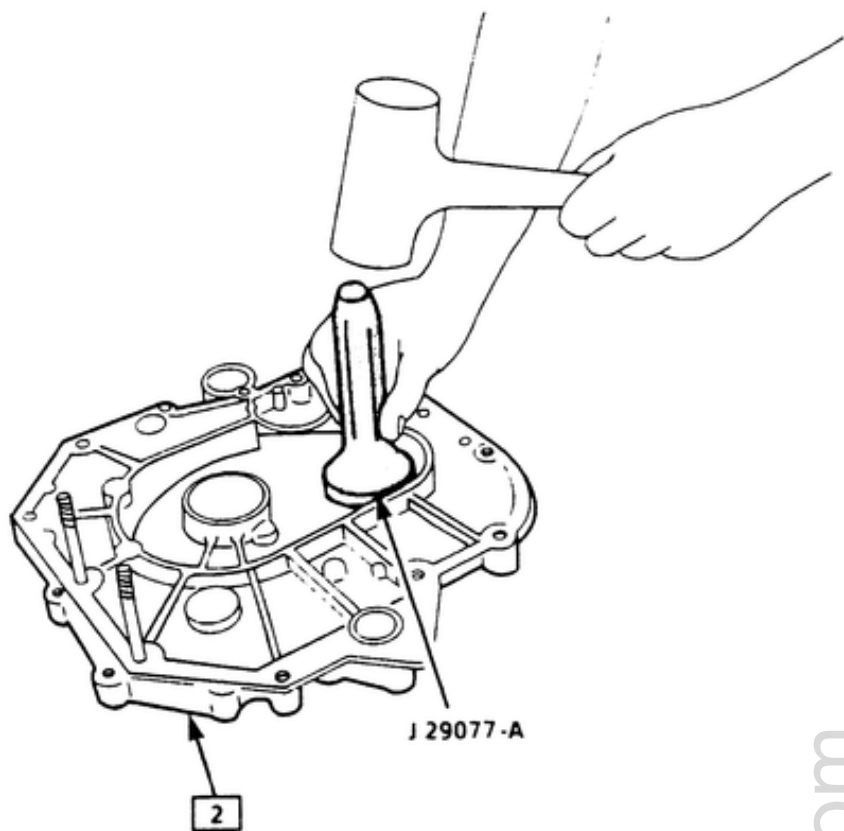
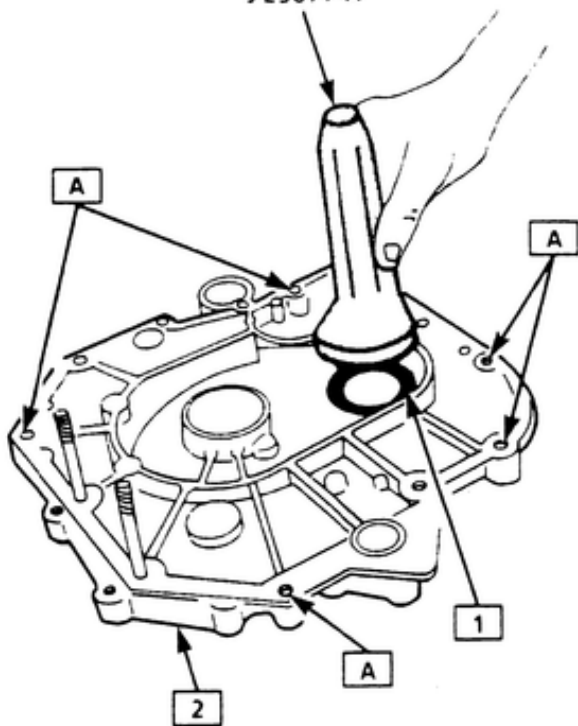
- | | |
|--------------------------------|--------------------------|
| A QUICK CONNECT FITTING | 2 BOLT |
| B ORIENTATION TAB | 3 THERMOSTAT SEAL |
| C GROOVE | 4 THERMOSTAT |
| E RELEASE TAB | 5 SEAL |
| 1 THERMOSTAT HOUSING | |



-
- 1** ENGINE FRONT COVER GASKET
 - 2** ENGINE FRONT COVER
 - 3** ENGINE FRONT COVER SEAL
 - 4** ENGINE FRONT COVER BOLT
 - 5** ENGINE FRONT COVER STUD
 - 6** ENGINE FRONT COVER STUD NUT



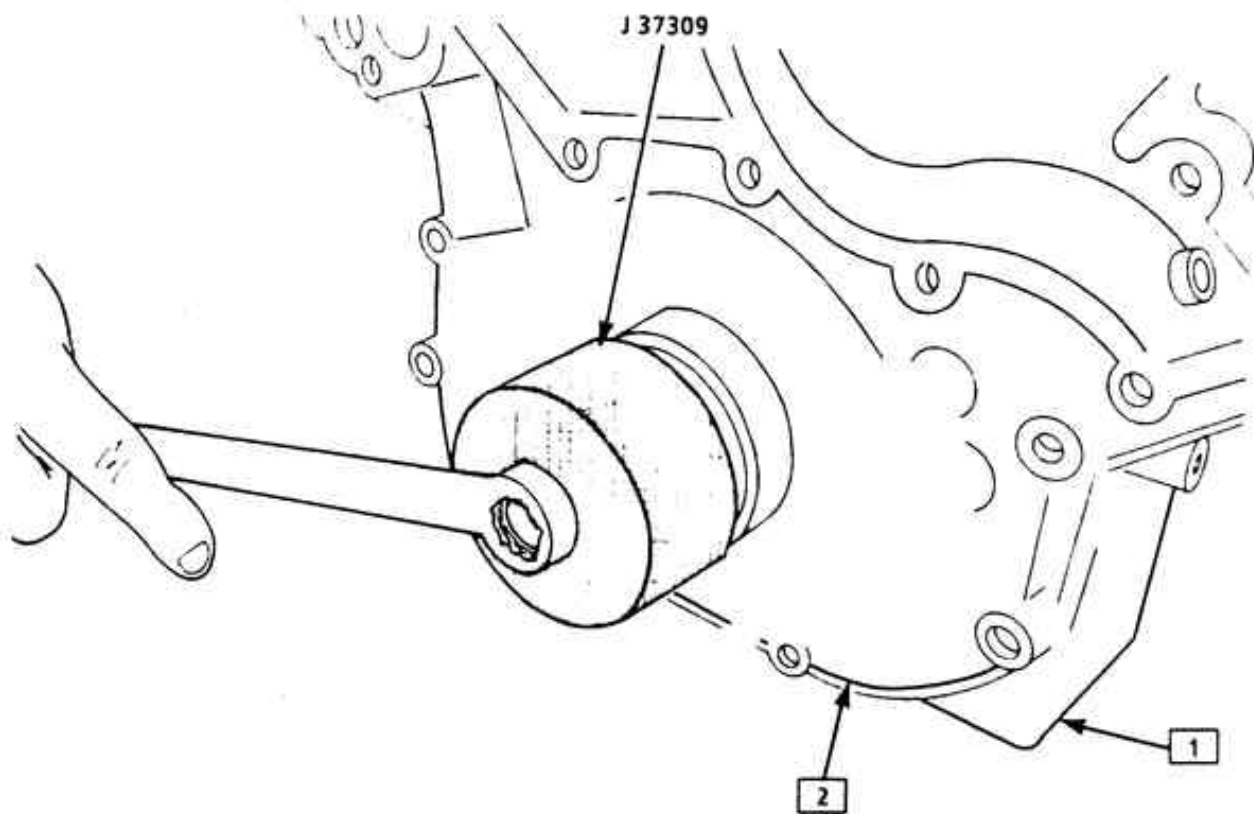
J 29077-A



A APPLY LOCTITE® 565 TO BOLTS
IN POSITION INDICATED

1 ENGINE FRONT COVER SEAL

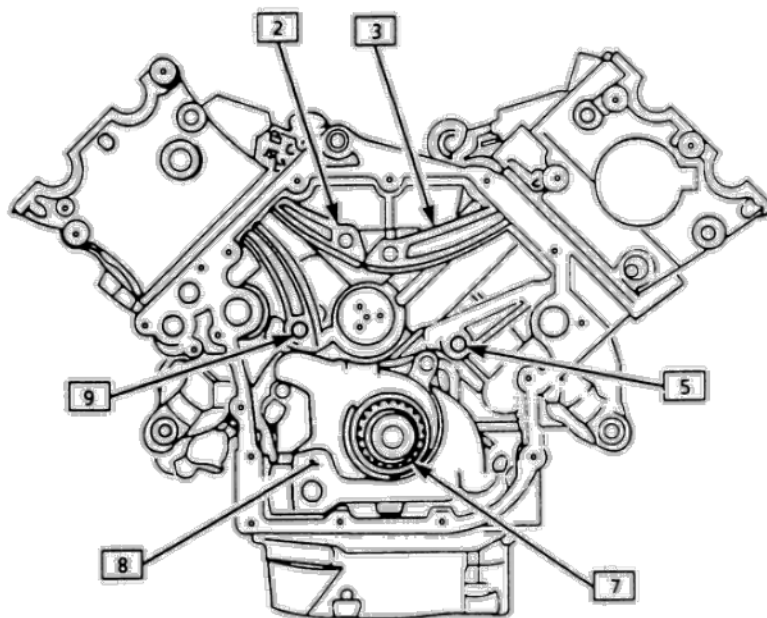
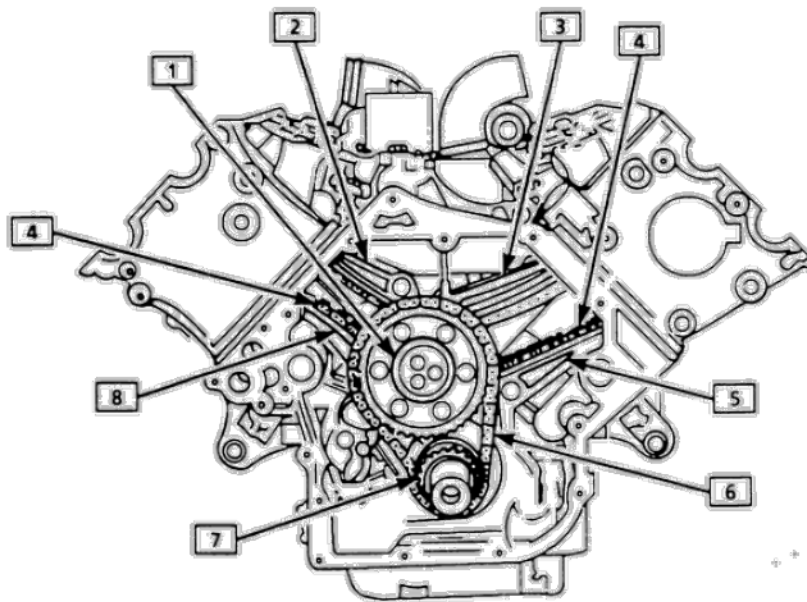
2 ENGINE FRONT COVER



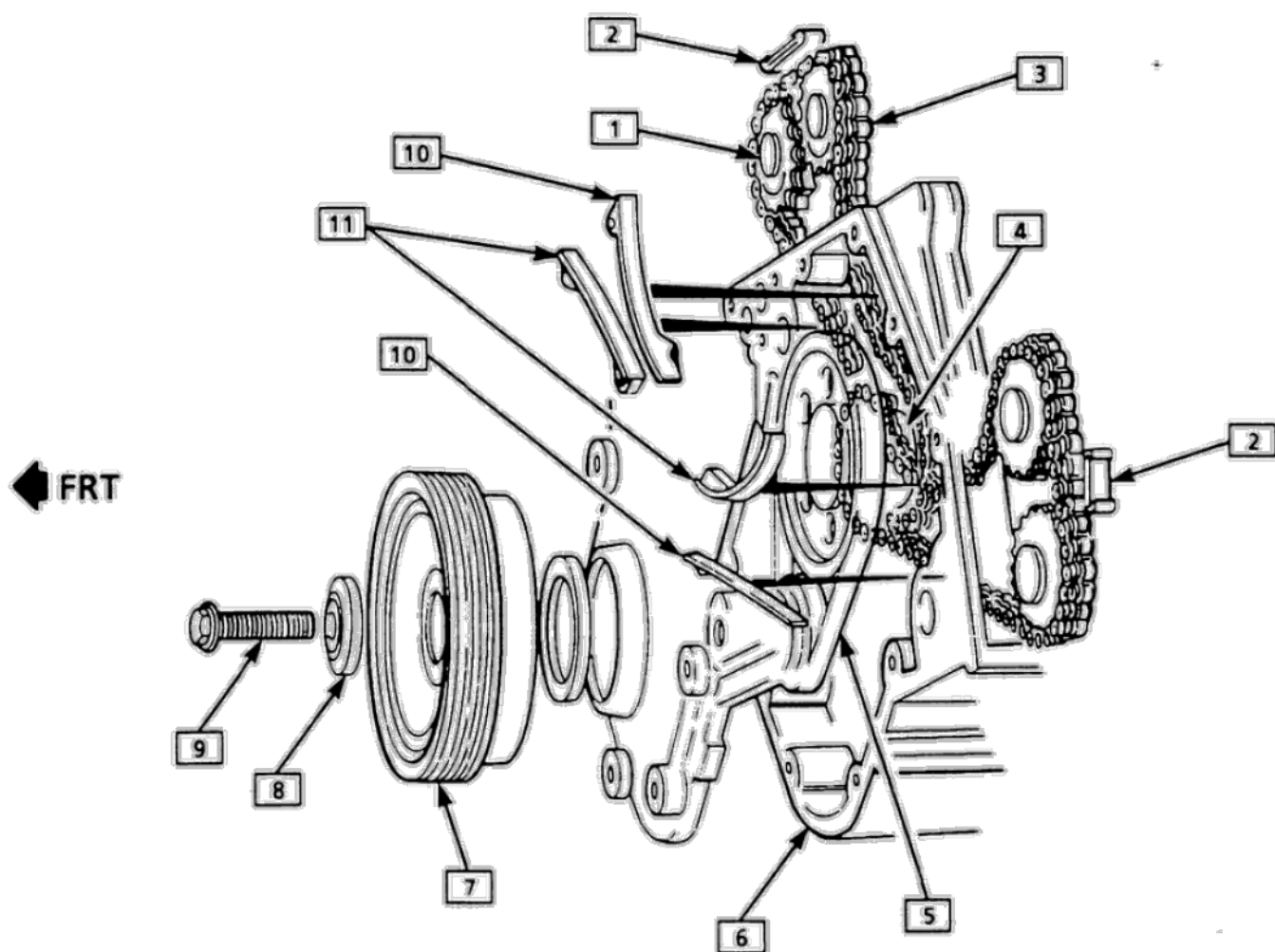
1 OIL PAN

2 ENGINE FRONT COVER

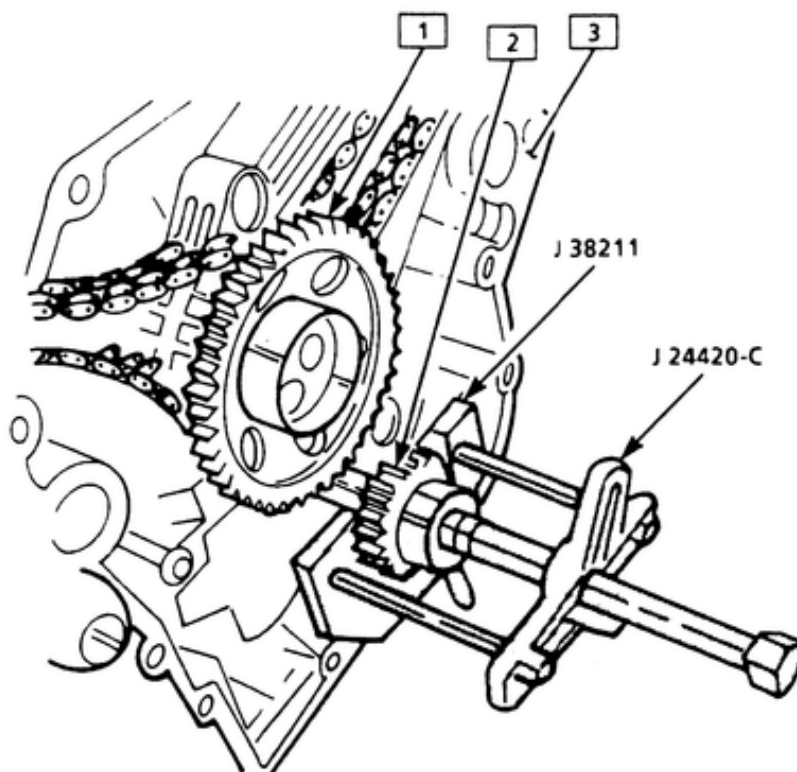
3 ENGINE TIMING INDICATOR PLATE



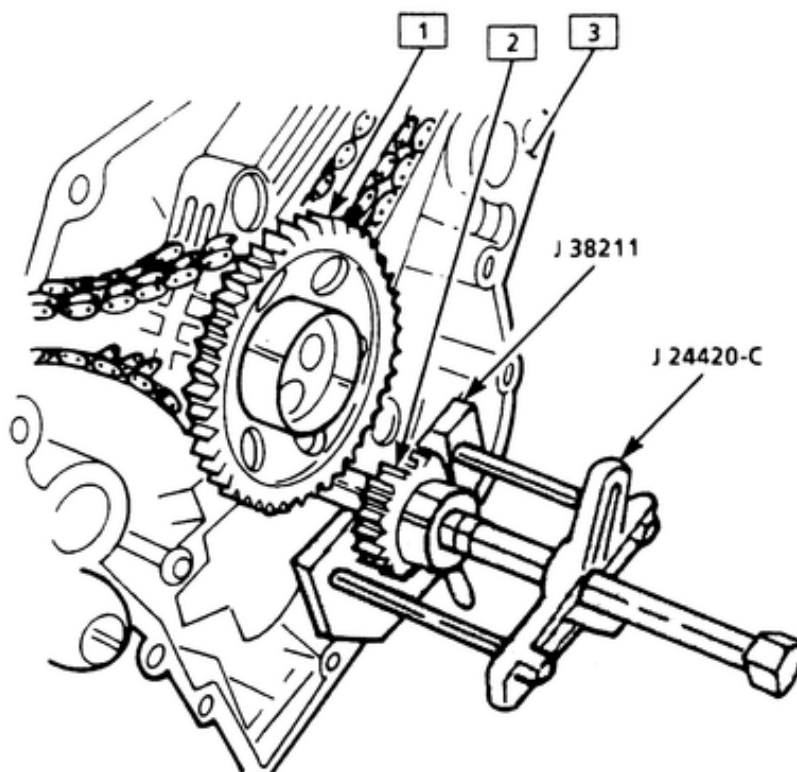
-
- 1** CAMSHAFT TIMING CHAIN IDLER SPROCKET ASSEMBLY
 - 2** CAMSHAFT SECONDARY TIMING CHAIN FIXED GUIDE - RH
 - 3** CAMSHAFT SECONDARY TIMING CHAIN PIVOT GUIDE - LH
 - 4** CAMSHAFT SECONDARY TIMING CHAIN
 - 5** CAMSHAFT SECONDARY TIMING CHAIN FIXED GUIDE - LH
 - 6** CAMSHAFT PRIMARY TIMING CHAIN
 - 7** CRANKSHAFT SPROCKET
 - 8** OIL PUMP
 - 9** CAMSHAFT TIMING CHAIN PIVOT GUIDE - RH



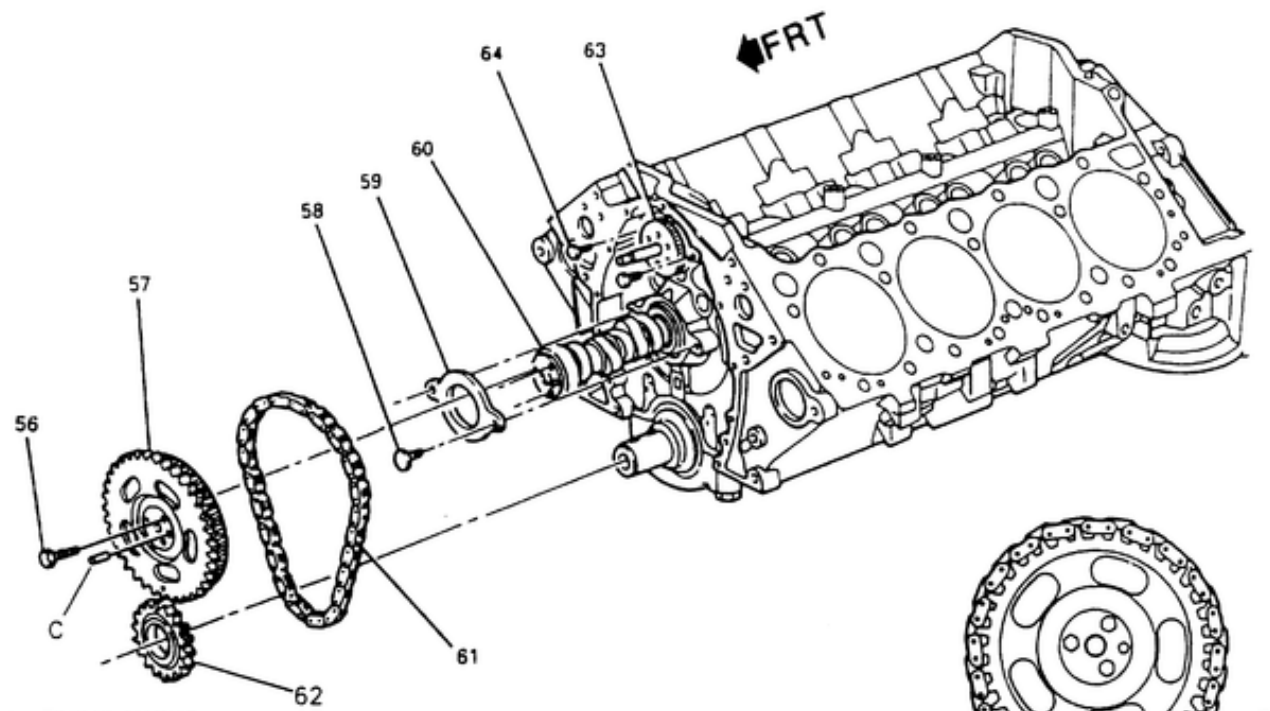
- | | |
|--|---|
| 1 CAMSHAFT SPROCKET | 7 TORSIONAL DAMPER |
| 2 CAMSHAFT SECONDARY TIMING CHAIN TOP GUIDE | 8 CRANKSHAFT DAMPER WASHER |
| 3 CAMSHAFT SECONDARY TIMING CHAIN | 9 CRANKSHAFT DAMPER BOLT |
| 4 CAMSHAFT TIMING CHAIN IDLER SPROCKET ASSEMBLY | 10 CAMSHAFT SECONDARY TIMING CHAIN FIXED GUIDE |
| 5 CAMSHAFT PRIMARY TIMING CHAIN | 11 CAMSHAFT SECONDARY TIMING CHAIN PIVOT GUIDE |
| 6 CYLINDER CASE | |



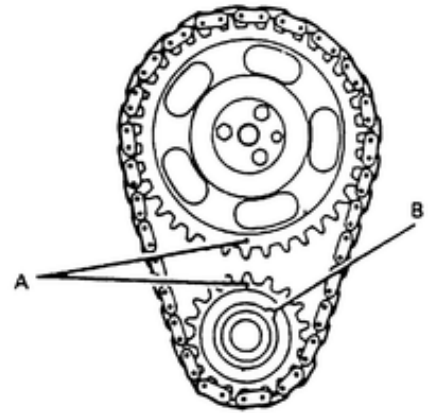
- 1** CAMSHAFT TIMING CHAIN IDLER SPROCKET
- 2** CRANKSHAFT SPROCKET
- 3** CYLINDER CASE

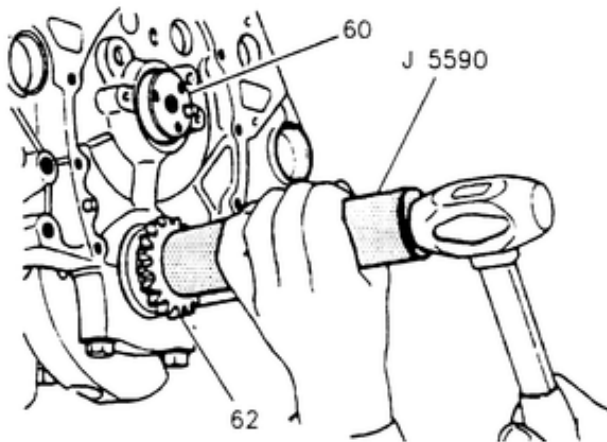
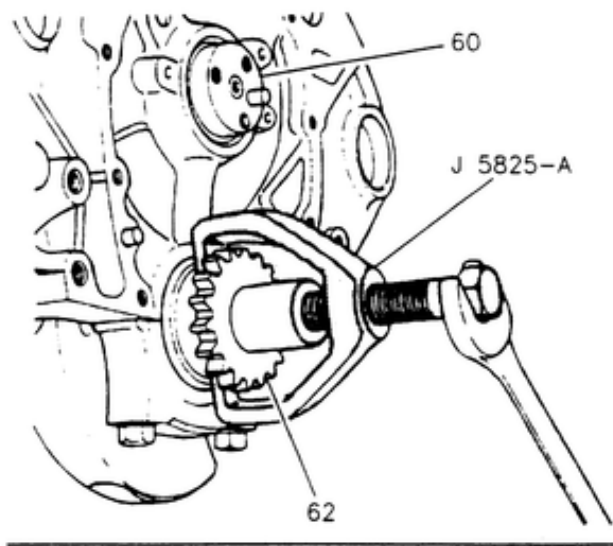


- 1** CAMSHAFT TIMING CHAIN IDLER SPROCKET
- 2** CRANKSHAFT SPROCKET
- 3** CYLINDER CASE

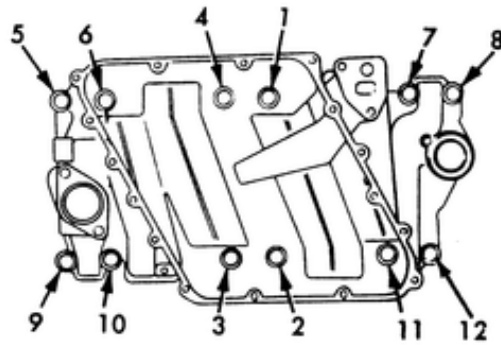


- A TIMING MARKS
- B KEYWAY
- C PIN
- 56 BOLT/SCREW, CAMSHAFT SPROCKET
- 57 SPROCKET, CAMSHAFT
- 58 BOLT/SCREW, CAMSHAFT RETAINER
- 59 RETAINER, CAMSHAFT
- 60 CAMSHAFT ASSEMBLY
- 61 CHAIN ASSEMBLY, TIMING
- 62 SPROCKET, CRANKSHAFT
- 63 DRIVESHAFT ASSEMBLY, WATER PUMP
- 64 BOLT/SCREW, WATER PUMP DRIVESHAFT BEARING RETAINER

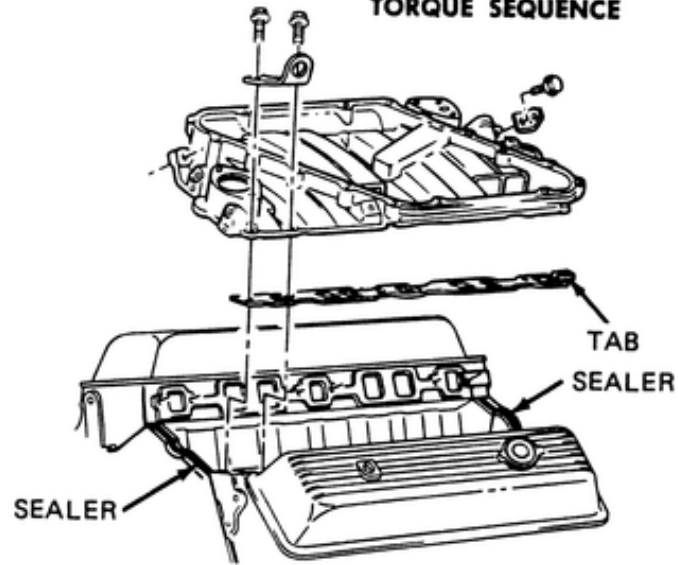




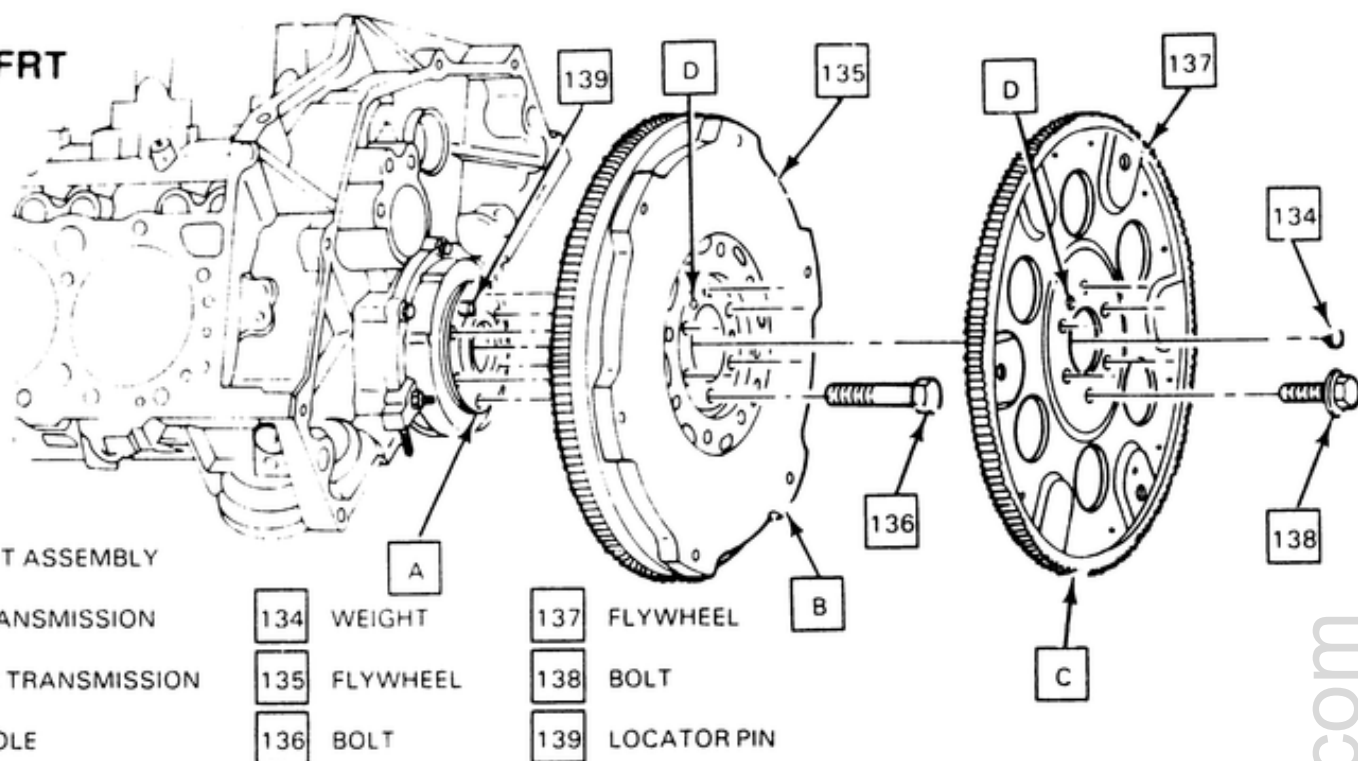
60 CAMSHAFT ASSEMBLY
62 SPROCKET, CRANKSHAFT

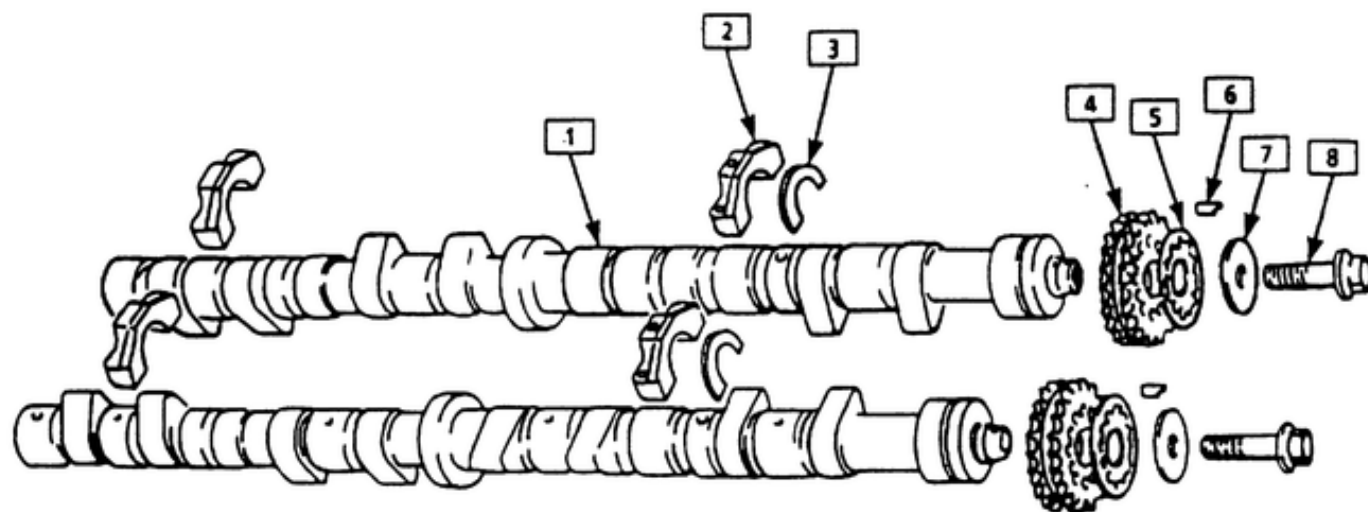


TORQUE SEQUENCE



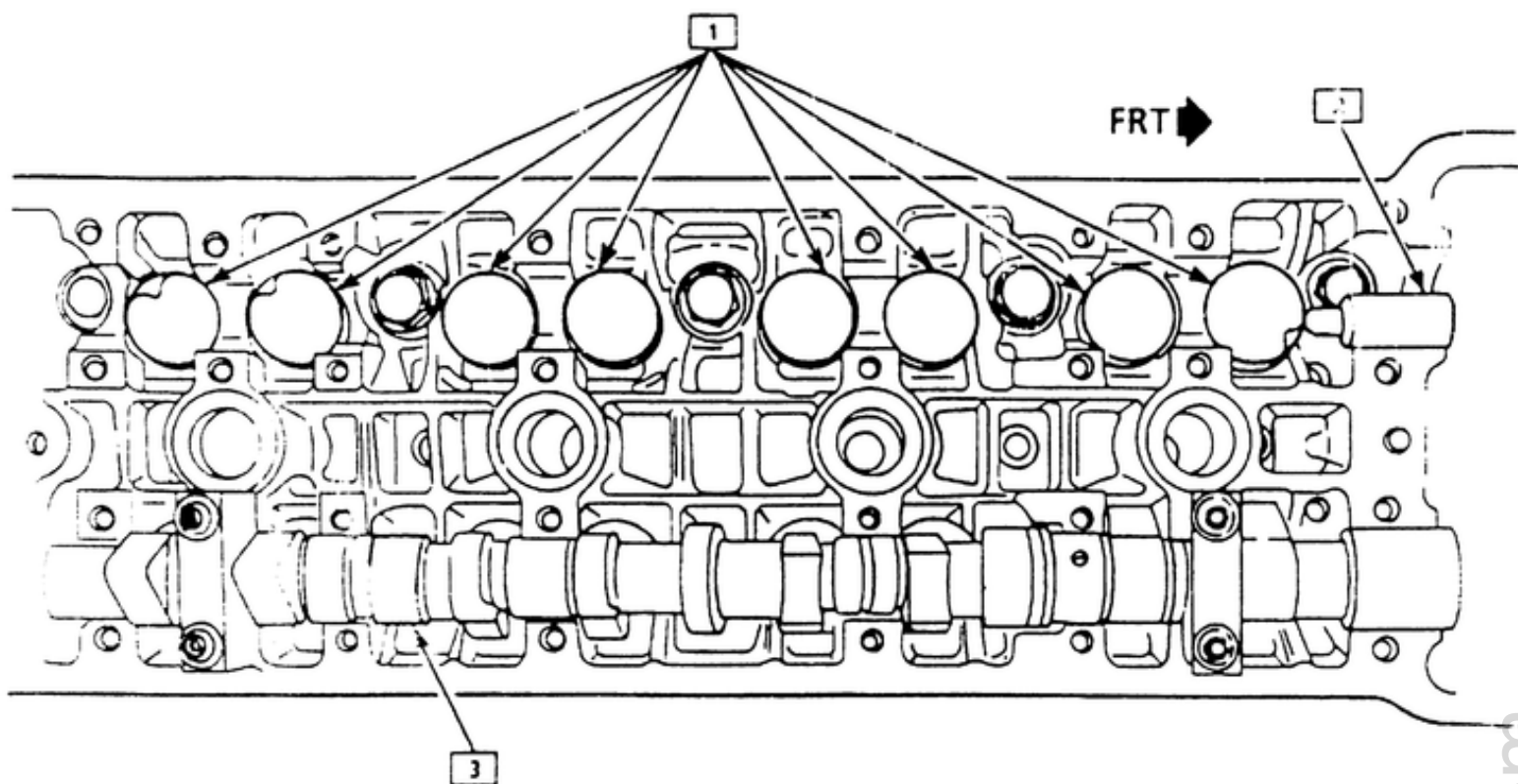
◀ FRT



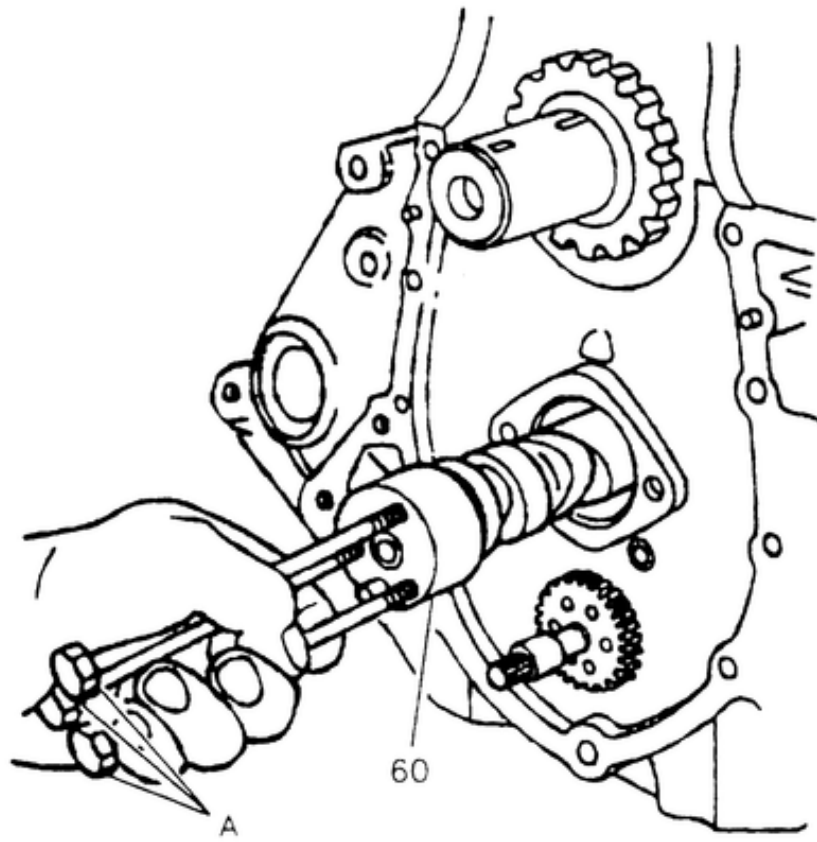


FRT ➡

- | | |
|---------------------------------|---|
| 1 CAMSHAFT | 5 CAMSHAFT SPROCKET TIMING PLATE |
| 2 CAMSHAFT RETAINER | 6 CAMSHAFT SPROCKET PIN |
| 3 CAMSHAFT THRUST WASHER | 7 CAMSHAFT SPROCKET WASHER |
| 4 CAMSHAFT SPROCKET | 8 CAMSHAFT SPROCKET BOLT |



- 1 INTAKE VALVE LIFTER
- 2 CYLINDER HEAD
- 3 EXHAUST CAMSHAFT - RH

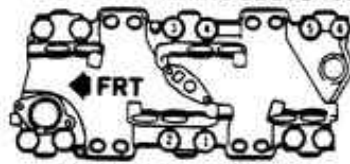


A 5/16-18 X 4" BOLTS
60 CAMSHAFT ASSEMBLY

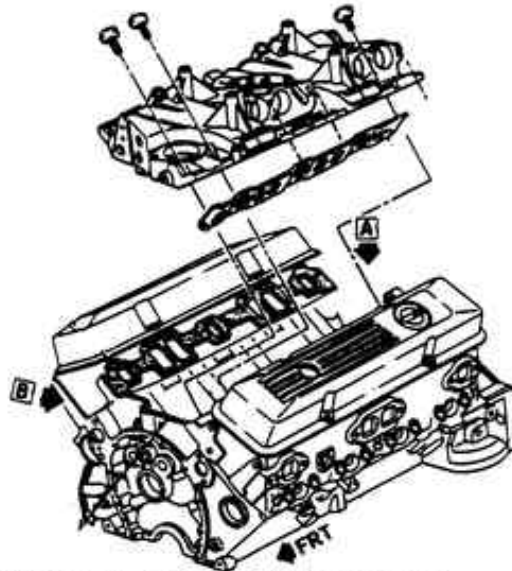
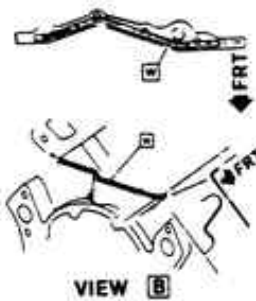
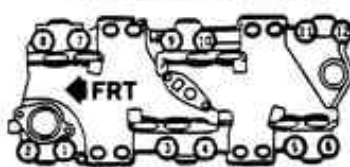
34-61 N•M (25-45 FT.LBS.)

VIEW A

SNUG TIGHTENING SEQUENCE



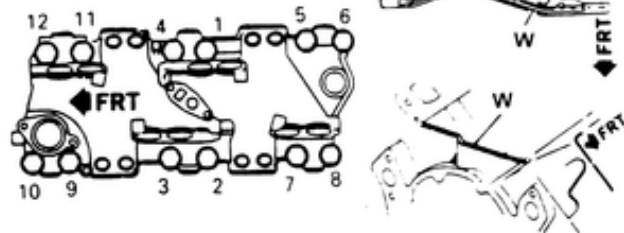
TIGHTENING SEQUENCE



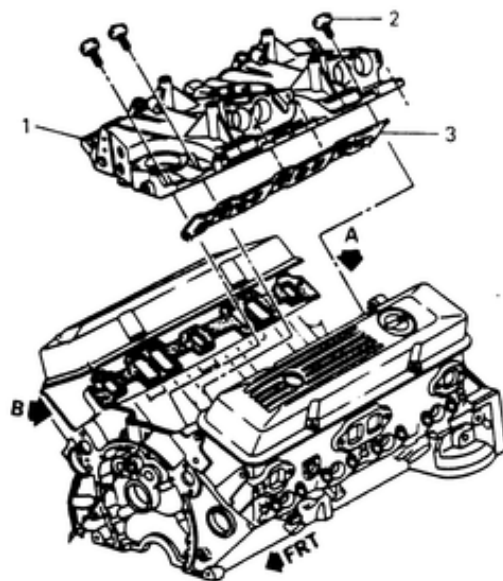
- (W) AT TIME OF INSTALLATION SURFACE AREA MUST BE FREE OF OIL AND SEALING COMPOUND MUST BE WET TO TOUCH WHEN BOLT/SCREWS ARE TORQUED. APPLY SEALING COMPOUND .12 THICK.

VIEW A

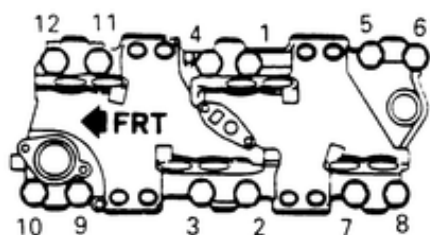
TIGHTENING SEQUENCE



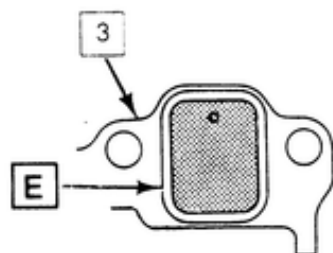
VIEW B



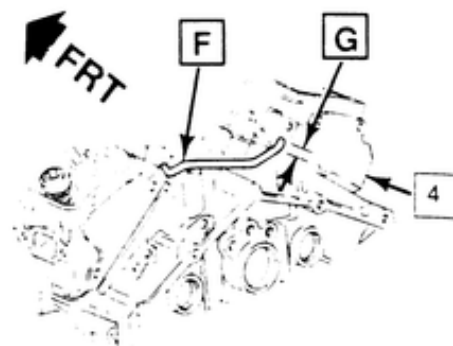
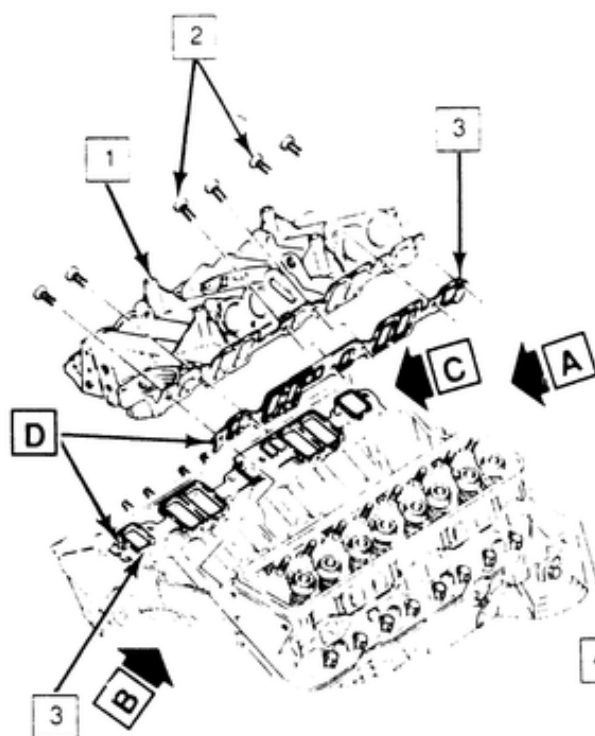
- 1 MANIFOLD, INTAKE
- 2 BOLT, INTAKE MANIFOLD
- 3 GASKET, INTAKE MANIFOLD



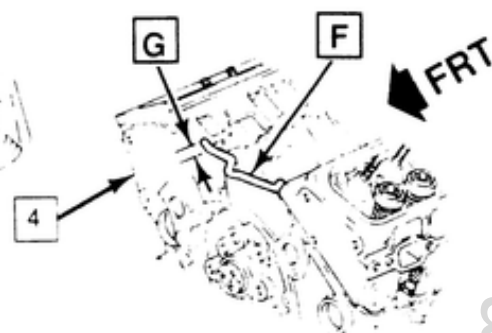
TIGHTENING SEQUENCE



VIEW C



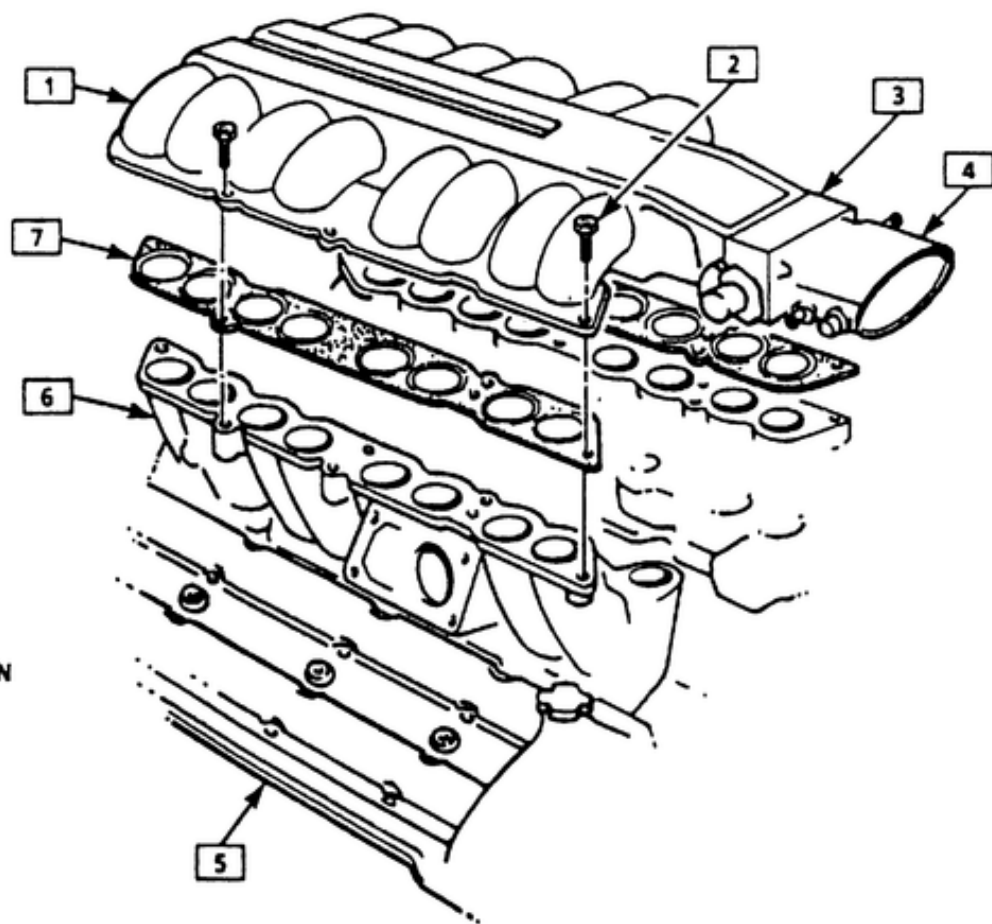
VIEW A



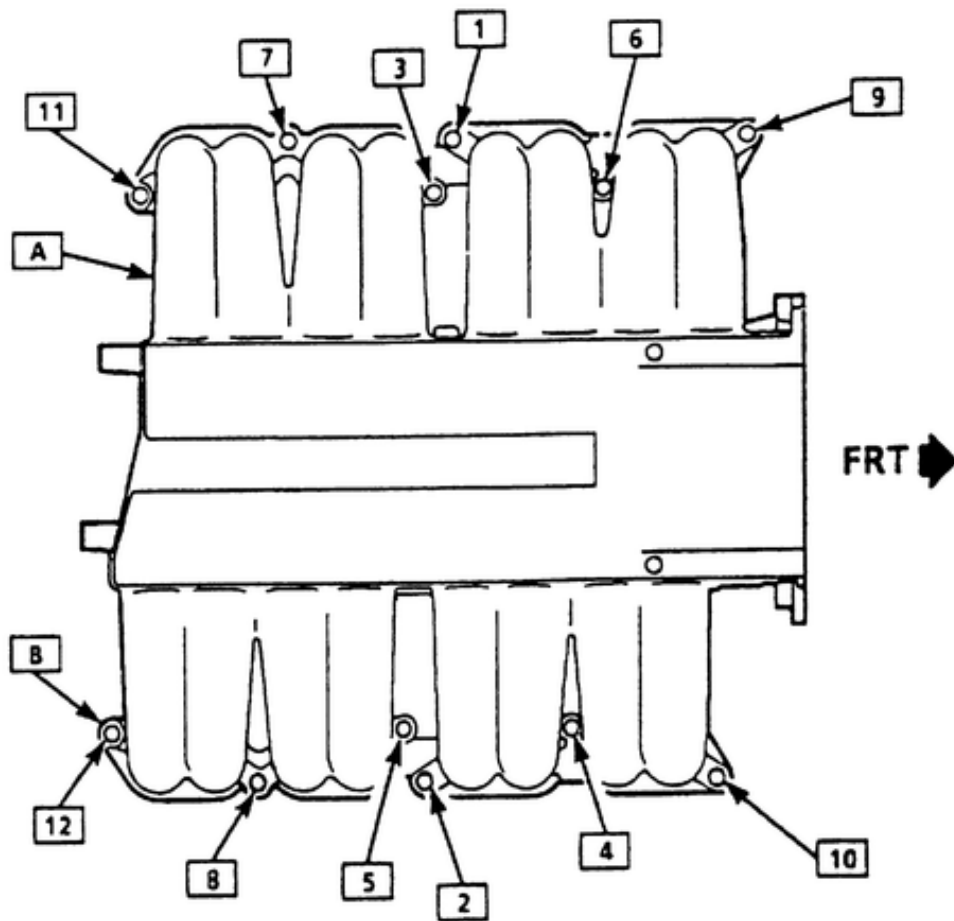
VIEW B

- D** TAB, INTAKE MANIFOLD GASKET
- E** COOLANT PASSAGE RESTRICTOR
- F** SEALER (RTV)
- G** 13 mm (0.5 in.)

- 1** MANIFOLD, INTAKE
- 2** BOLT
- 3** GASKET, INTAKE MANIFOLD
- 4** HEAD, CYLINDER



- 1** PLENUM
- 2** PLENUM BOLT
- 3** THROTTLE BODY
- 4** THROTTLE BODY EXTENSION
- 5** CAMSHAFT COVER
- 6** INJECTOR HOUSING
- 7** PLENUM GASKET



- A** PLENUM
- B** PLENUM BOLT

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

Camshaft Lobe Lift

Check the lift of each lobe in consecutive order and make a note of the reading.

1. Remove the fresh air inlet tube and the air cleaner. Remove the heater hose and crankcase ventilation hoses. Remove valve rocker arm cover(s).
2. Remove the rocker arm stud nut or fulcrum bolts, fulcrum seat and rocker arm.
3. Make sure the pushrod is in the valve tappet socket. Install a dial indicator so that the actuating point of the indicator is in the pushrod socket (or the indicator ball socket adapter tool is on the end of the pushrod) and in the same plane as the pushrod movement.
4. Disable the ignition and fuel systems.
5. Install a remote starter switch. Crank the engine with the ignition and fuel system disabled. Turn the crankshaft over until the tappet is on the base circle of the camshaft lobe. At this position, the pushrod will be in its lowest position.
6. Zero the dial indicator. Continue to rotate the crankshaft slowly until the pushrod is in the fully raised position.
7. Compare the total lift recorded on the dial indicator with the specification shown on the specification charts in this section.

To check the accuracy of the original indicator reading, continue to rotate the crankshaft until the indicator reads zero. If the lift on any lobe is below specified wear limits listed, the camshaft and the valve tappet operating on the worn lobe(s) must be replaced.
8. Install the rocker arm, fulcrum seat and stud nut or fulcrum bolts. Adjust the valves, if required (refer to the valves procedure in this section).
9. Install the valve rocker arm cover(s) and the air cleaner.

Camshaft End Play

NOTE: On all gasoline V8 engines, prying against the aluminum-nylon camshaft sprocket, with the valve train load on the camshaft, can break or damage the sprocket. Therefore, the rocker arm adjusting nuts must be backed off, or the rocker arm and shaft assembly must be loosened sufficiently to free the camshaft. After checking the camshaft end play, check the valve clearance. Adjust if required (refer to procedure in this section).

1. Push the camshaft toward the rear of the engine. Install a dial indicator or equivalent so that the indicator point is on the camshaft sprocket attaching screw.
2. Zero the dial indicator. Position a prybar between the camshaft gear and the block. Pull the camshaft forward and release it. Compare the dial indicator reading with the specifications.
3. If the end play is excessive, check the spacer for correct installation before it is removed. If the spacer is correctly installed, replace the thrust plate.
4. Remove the dial indicator.

1990 Chevrolet CORVETTE

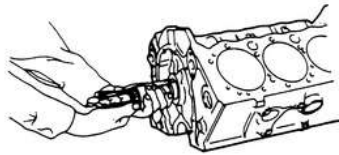
Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

5.7L (VIN 8) Engine

1. Take the vehicle to a reputable repair shop and have the A/C system properly discharged and recovered, using the proper tools.
2. Disconnect the negative battery cable. Drain the engine cooling system into a suitable container.
3. Remove the air cleaner assembly
4. Remove the radiator, as outlined in this section.
5. Remove the A/C condenser, as follows:
 - A. Unbolt the accumulator attaching screw(s), then reposition the accumulator away from the condenser.
 - B. Remove the accumulator bracket.
 - C. Disconnect the accumulator hose and compressor hose from the condenser, then cap or plug the hoses and openings immediately to prevent contaminating the A/C system.
 - D. Remove the condenser from the vehicle.
6. Remove the intake manifold from the vehicle.
7. Remove the rocker arm covers, then remove the rocker arms.
8. Remove the valve lifters, and place them in a rack, so they may be installed in the proper position. The lifters must be installed in the same bores as they were removed from.
9. Remove the timing chain.
10. Remove the camshaft assembly, as follows:
 - A. Install three 5/16-18 x 4-inch bolts in the camshaft bolt holes.
 - B. Carefully rotate and pull the camshaft assembly out of the bearings.

Fig. 1: Carefully pull the camshaft out, using the bolts threaded into the camshaft



11. Inspect the bearings for scratches, pits or loose fit. If necessary, remove the camshaft bearings as follows:
 - A. Drive the camshaft rear plug from the cylinder block.
 - B. Using tool J 6098-01, or equivalent camshaft bearing removal and installation tool, with the nut and thrust washer installed to the end of the threads, index the pilot in the camshaft front bearing and install the puller screw through the pilot.
 - C. Install the tool with the shoulder toward the bearing, making sure enough threads are engaged.
 - D. Using 2 wrenches, hold the puller screw while turning the nut. When the bearing has been pulled from the bore, remove the tool and bearing from the puller screw.
 - E. Remove the remaining bearings (except front and rear) using the same procedure. It will be necessary to index the pilot in the camshaft rear bearing to remove the rear intermediate bearing.
 - F. Assemble the tool on the driver handle and remove the camshaft front and rear bearings by driving towards the center of the cylinder block.

To install>

12. Install new camshaft bearings, as follows:

NOTE: The front and rear bearings should be installed first. They will act as guide for the pilot, and center the remaining bearings being pulled into place.

- A. Assemble the removal and installation tool on the driver handle, then install the camshaft front and rear bearings by driving toward the center of the cylinder block.
 - B. Using the camshaft bearing removal and installation tool set, with the nut and thrust washer installed to each end of the threads, index the pilot in the camshaft front bearing and install the puller screw through the pilot.
 - C. Index the camshaft bearing in the bore (with the oil hole aligned as outlined later), then install the removal and installation tool on the puller screw with the shoulder toward the bearing.
 - The No. 1 cam bearing oil hole must be positioned so that the oil holes are at the 1 and 5 o'clock positions.
 - The No. 2-4 bearing oil holes must be positioned at the 5 o'clock position (toward the left side of the engine and at a position even with the bottom of the cylinder bore).
 - The No. 5 bearing oil hole must be in the 12 o'clock position.
 - D. Using 2 wrenches, hold the puller screw while turning the nut. After the bearing has been pulled into the bore, remove the tool from the screw and check alignment of the oil hole in the camshaft bearing.
 - E. Install the remaining bearings in the same manner. It will be necessary to index the pilot in the camshaft rear bearing to install the rear intermediate bearing.
 - F. Coat a new camshaft rear plug outside diameter with sealant, then install flush to 0.031 in. (0.8mm) depth.
- NOTE: When a new camshaft is installed, install a new oil filter and new oil.**
13. When installing a new camshaft assembly, coat the camshaft lobes with "Molykote" or equivalent. When installing a new camshaft, replace all valve lifters to ensure durability of the camshaft lobes and lifter rollers.
14. Lubricate all camshaft journals with engine oil, then carefully install the camshaft assembly.
15. Install the timing chain.

16. Coat the lifters with a suitable prelube, then install them in the same positions as they were removed from.
17. Install the rocker arms and covers.
18. Install the intake manifold.
19. Install the condenser as follows:
 - A. Position the condenser in the vehicle.
 - B. Unplug or uncap the accumulator and condenser hoses, then connect the hoses to the condenser.
 - C. Install the accumulator bracket, then place the accumulator in position and install the attaching screw(s).
20. Install the radiator and the air cleaner assembly.
21. Fill the cooling system with the proper type and amount of coolant.
22. Connect the negative battery cable.
23. Take the vehicle to a reputable repair shop to have the A/C system properly evacuated and charged.

5.7L (VIN J) Engine

The VIN J engine utilizes 4 overhead camshafts. Certain shafts will have identifying bands between the first journal and lobe to distinguish between the right and left, intake and exhaust camshafts. The right intake has 1 flat band. The right exhaust has 1 raised band. The left intake has 1 flat and 1 raised band. The left exhaust has 2 raised bands.

1. If removing the left bank camshafts, take the vehicle to a reputable repair shop and have the A/C system properly discharged and recovered, using the proper tools.
2. Disconnect battery negative cable and drain the engine coolant into a suitable container.
3. To gain access to the right camshafts, remove the oil filter housing and right camshaft cover as follows:
 - A. Remove the air intake duct.
 - B. Remove the hoses and clamps from the coolant outlets, radiator inlet and inlet pipe.
 - C. Remove the hoses and inlet pipe assembly from the vehicle.
 - D. Remove the water pump pulley.
 - E. Release the belt tensioner and remove the serpentine belt.
 - F. Remove the retaining bolt and the belt tensioner from the engine.
 - G. Remove the oil filter.
 - H. Disengage the electrical connectors from the oil pressure sensor, oil temperature sensor and the low oil pressure switch.
 - I. Remove the oil pressure sensor from the oil filter housing.
 - J. Remove the alternator bracket from the oil filter housing.
 - K. Disconnect and plug the oil cooler lines from the filter housing.
 - L. Remove the oil filter housing mounting bolts and remove the assembly.

NOTE: If equipped with a 1 piece front cover/oil filter housing gasket, cut the old gasket along the front cover.

 - M. Remove spark plug wires from plugs in the right cylinder head.
 - N. Disengage the electrical connector from the blower motor resistor block.
 - O. Remove the screws attaching the evaporator housing quarter panel, then remove the panel.
 - P. Remove the bolts attaching the coolant outlet pipe bracket to the alternator bracket and the coolant outlet to the injector housing, then position aside.
 - Q. For 1993–95 vehicles, remove the upper EGR pipe bolts and pipe.
 - R. Remove the bolt attaching the fresh air pipe bracket to the injector housing.
 - S. Remove the camshaft cover attaching bolts and the camshaft cover.
4. To gain access to the left camshafts, remove the air conditioning compressor and left valve cover as follows:
 - A. Remove the throttle body assembly and the serpentine drive belt.
 - B. Remove the engine oil temperature sensor.
 - C. Remove the alternator assembly.
 - D. Remove the refrigerant hose from the A/C compressor, then immediately cap or plug the openings to prevent system contamination and damage.
 - E. Remove the compressor mounting bolts and electrical connection.
 - F. Remove the compressor from the vehicle.
 - G. Remove the power steering pump from the engine.
 - H. Remove the spark plug wires from the plugs in the left cylinder head.
 - I. Remove the ventilation breather pipe from the camshaft cover.
 - J. Remove the throttle and cruise control cable or control cable hold-down clamps from the plenum.
 - K. If not done already, remove the throttle body extension and coolant outlet pipe.
 - L. Remove the vacuum hose from the power brake booster and, if necessary, remove the booster assembly.
 - M. Remove the left camshaft cover attaching bolts and remove the cover.
5. Raise and support the vehicle safely.
6. Disengage the electrical connector from the crankshaft ignition timing sensor.
7. Remove the ignition timing sensor from the cylinder case.
8. Install the crankshaft timing slot locator tool J-38098 or equivalent, into the ignition timing sensor opening. Make sure the tool head is fully seated with the indicating pin inserted into the deep notch of the crankshaft timing disc.
9. Lower vehicle.
10. Remove the bolts attaching the secondary timing chain tensioner housing to the cylinder head, then remove the housing, O-ring and tensioner from the cylinder case.
11. Remove the bolts and washers attaching the camshaft to the sprockets.

NOTE: Install a wrench on the rear camshaft hex when removing the sprocket bolts, to prevent the camshafts from exerting force on the crankshaft timing slot locator tool.
12. Remove the camshaft timing plates and pins.
13. Remove the camshaft retainers and thrust washers.
14. Remove the camshafts and sprockets from the vehicle. Install timing chain retainers J-38099 or equivalent, to retain secondary chain loops.
15. Remove lifters from bores and inspect. Make sure any lifters, to be reused, are retained in proper order so each one can be returned to its original bore.

Fig. 2: View of 2 of the 4 camshafts used on the 5.7L (VIN J) engine

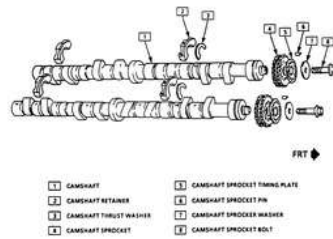
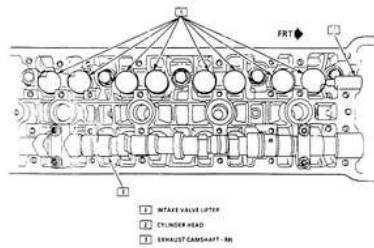


Fig. 3: Valve lifters MUST be install in the same bore as they were removed from



To install:

16. Inspect the camshaft bearing journals for wear or damage.
 17. Inspect the camshaft bearing surfaces in the cylinder head and camshaft cover for wear or damage.
- NOTE: The camshaft cover and cylinder head must be replaced as a set if excessive wear or damage to the bearing surfaces is found.**
18. Install the each camshaft and lifter assembly, 1 at a time:
 - A. Lubricate lifters and bores with clean engine oil, then install lifters into bores. If a camshaft is replaced, new lifters must also be used.
 - B. Install the camshaft sprocket onto the secondary timing chain, while removing the timing chain retainer.
 - C. Slide the camshaft into the sprocket, noting the position of the alignment hole for timing pin tool installation. Position the camshaft in the neutral position, no valves opened.
 - D. Lubricate camshaft journals, lobes, thrust washers and retainers with clean engine oil.
 - E. Install the camshaft thrust washers, retainers and bolts. Torque bolts to 89 inch lbs. (10 Nm).
 - F. Repeat Steps a–e for the remaining camshafts.
 19. Install timing pins J-37326 into camshaft retainers and the indexing holes in the camshafts. Camshafts can be rotated using the cast hex at the camshaft rear.
 20. Install the camshaft secondary chain pre-tensioner, J-37305 or equivalent. Hand-tighten to remove slack from the timing chain, but do not overtighten.
 21. Install timing plates, pins and washers. If no holes line up on the timing plate, reverse the plate.
 22. Apply Loctite® 262 or equivalent, on the NEW camshaft sprocket bolts, then install and finger-tighten the bolts. New camshaft bolts should be used each time the camshaft is removed. Tighten the bolts to 18 ft. lbs. (25 Nm) and turn 80–85 degrees using a torque angle meter. A backup wrench should be used on the rear camshaft hex to prevent damaging the timing pins.
 23. Remove timing pins J-37326.
 24. Remove the secondary timing chain pre-tensioner tool and install the new secondary timing chain tensioner, housing, new O-ring and bolts. Lubricate tensioner with engine oil. Make sure the oil hole in the tensioner piston be installed in a vertical position and that the fork on the end of the tensioner is properly engaged onto the chain guide. After installing, use a blunt punch to release the plunger. Torque chain tensioner bolts to 89 inch lbs. (10 Nm).
 25. Raise and support the vehicle safely.
 26. Remove crankshaft timing slot locator J-38098 from the cylinder case.
 27. Install the crankshaft position sensor into the cylinder case and tighten the retainer(s) to 71 inch lbs. (8 Nm).
 28. Engage the timing sensor electrical connector and lower the vehicle.
 29. Apply Permatex® A136 or equivalent, to the camshaft covers and Loctite® 565 or equivalent, to the end plugs. Install the end plugs and new spark plug bore O-rings prior to cover installation.
 30. Install the camshaft covers in the reverse order of removal. The camshaft cover retainers must be tightened in the proper sequence in order to assure proper camshaft operation. Tighten the M8 bolts to 15 ft. lbs. (20 Nm), repeat 3 times. Tighten the M6 screws to 89 inch lbs. (10 Nm). Also, be sure to install a new coolant outlet cover gasket and tighten the cover screws to 89 inch lbs. (10 Nm).
 31. For the right bank camshafts, install oil filter housing assembly.
 32. For the left bank camshafts, install the air conditioning compressor assembly.
 33. Reconnect the negative battery cable and properly fill the engine cooling system.
 34. If the left bank camshafts were removed, take the vehicle to a reputable repair shop to have the A/C system properly evacuated and charged.

5.7L (VIN P and 5) Engines

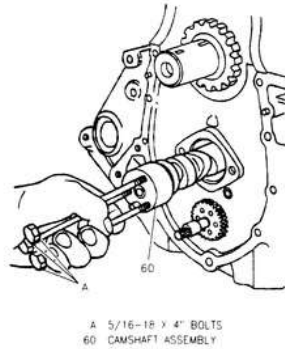
1. Disconnect the negative battery cable and remove the air cleaner assembly.
2. Remove the timing chain front cover.
3. Remove the intake manifold.
4. Remove the retaining bolt and lift the oil pump driveshaft assembly from the rear of the lifter valley.
5. Remove the rocker arm and pushrod assemblies.
6. Remove the camshaft sprocket from the engine.

7. Remove the valve lifters.
8. Remove the high fill reservoir hose from the radiator.
9. Remove the relay bracket from the left side of the radiator support.
10. Remove the AIR pump intake duct and bolts, then reposition the AIR pump.
11. Remove the retaining nuts and screws, then remove the upper radiator support.
12. Remove the radiator.
13. Raise and support the vehicle safely.
14. Unplug the cooling fan electrical connector.
15. Remove the lower fan shroud bolts and lower the vehicle.
16. Remove the fan shroud and fan assembly.
17. Disconnect the A/C condenser line bracket at the front crossmember.
18. Raise the front of the engine with a suitable lifting device.

NOTE: When raising and supporting the engine, NEVER place a jack under the oil pan, crankshaft pulley or any sheetmetal. There is a minimal clearance between the oil pan and the pump screen. Jacking against the pan could cause sufficient deformation to damage the oil pickup unit.

19. Remove the camshaft retainer bolts and retainer.
20. Install three $\frac{5}{16}$ -18 x 4 inch bolts into the camshaft bolt holes.
21. Using the bolts, carefully rotate the camshaft and pull from the bearings. All camshaft journals are the same diameter so care must be used to avoid damaging the bearings. Remove the camshaft from the vehicle.

Fig. 4: Thread screws into the end of the camshaft and carefully pull it straight out of the block — 5.7L (VIN P and 5) engines



To install:

22. Inspect the camshaft and bearings, replace as necessary.
23. If installing a new camshaft, coat the lobes with Molykote® or equivalent pre-lube and be sure to replace all lifters to assure camshaft durability.
24. Lubricate all camshaft journals with clean engine oil and carefully insert the camshaft into the engine block.
25. Install the camshaft retainer and tighten the bolts to 108 inch lbs. (12 Nm).
26. Lower the front of the engine and connect the A/C condenser line bracket to the front crossmember.
27. Install the fan and shroud assembly.
28. Raise and support the vehicle safely, then install the lower fan shroud bolts.
29. Engage the cooling fan electrical connections and lower the vehicle.
30. Install the radiator, followed by the upper radiator support, nuts and screws.
31. Install the AIR pump, bolts and intake duct.
32. Install the relay bracket to the left side of the radiator support.
33. Connect the high fill reservoir hose to the radiator.
34. Install the valve lifters.
35. Install the camshaft sprocket.
36. Install the valve rocker arm and pushrod assemblies.
37. Install the oil pump driveshaft assembly and bolt. Tighten the bolt to 13 ft. lbs. (18 Nm).
38. Install the intake manifold.
39. Install the timing chain front cover.
40. Install the air cleaner assembly and connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

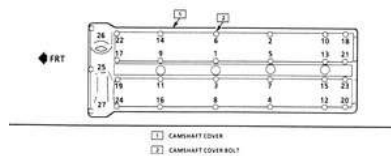
Fuel Delivery: FI | Fuel: GAS

5.7L (VIN J) Engine

RIGHT COVER

1. Disconnect the negative battery cable.
2. Drain the engine coolant into a suitable container.
3. Tag and disconnect the spark plug wires from the spark plugs.
4. Detach the electrical connector from the blower motor resistor block.
5. Unfasten the screws securing the evaporator housing quarter panel and panel from the vehicle.
6. Remove the oil pressure sensor from the oil filter housing.
7. Unfasten the bolt retaining the coolant outlet to the injector housing, then position the outlet aside.
8. Remove the upper EGR pipe bolts and pipe.
9. Remove the bolt securing the fresh air pipe bracket to the injector housing.
10. Unfasten the camshaft cover-to-cylinder head, then remove the cover from the head.
11. Thoroughly clean the cylinder head and cover mating surfaces.
12. Inspect the foam inserts for contamination. Remove the inserts and clean or replace them as necessary.
13. Check the secondary chain top guide wear strips.(1.0mm).To check the strips, you must remove the wear strip from the guide located inside the cover at the front. Remove the screws and guide from the camshaft cover. No wear groove should exceed a depth of 0.040 in. After checking, install the guide and screws. Apply Loctite® 262 to the screws and tighten to 53 inch lbs. (6 Nm). Install the wear strip onto the guide.

Fig. 1: It is essential to tighten the camshaft cover bolts in the proper sequence — 5.7L (VIN J) engine



To install:

14. Apply Permatex® A136 or equivalent to the camshaft cover. Apply Loctite® 565 to the end plugs. Make sure the camshaft end plugs and new spark plug bore O-rings are in place before installing the cover.
15. Install the camshaft cover and bolts. To be sure the camshaft operates properly, the cover retainers MUST be tightened to the following specifications, in the sequence shown in the accompanying figure:
 - A. Tighten the 24 M8 bolts to 15 ft. lbs. (20 Nm), 3 times.
 - B. Tighten the 3 M6 screws to 89 inch lbs. (10 Nm).
16. Install a new coolant outlet cover gasket, cover and retaining screws. Tighten the screws to 89 inch lbs. (10 Nm).
17. Install the bolt holding the fresh air pipe bracket to the injector housing and tighten the bolt to 19 ft. lbs. (26 Nm).
18. Install the upper EGR pipe and secure with the retaining bolts. Tighten the bolts to 89 inch lbs. (10 Nm).
19. Install the evaporative housing quarter panel and screws.
20. Attach the electrical connector to the blower motor resistor block.
21. Connect the spark plug wires to the spark plugs, as tagged during removal.
22. Refill the cooling system, then connect the negative battery cable.

LEFT COVER

1. Take the vehicle to a reputable repair shop to have the A/C system discharged using the proper equipment.
2. Disconnect the negative battery cable.
3. Remove the power steering pump, as outlined in Section 8 of this manual.
4. Unfasten the bolts securing the A/C suction/discharge hoses to the compressor. Plug or cover the openings to prevent contamination from entering the system.
5. Tag and disconnect the spark plug wires from the plugs.
6. Detach the ventilation breather pipe from the camshaft cover.
7. Remove the screws holding the control cable hold-down clamp screws to the plenum.
8. Remove the throttle body extension and the coolant outlet pipe.
9. Remove the brake power booster.
10. Unfasten the camshaft cover-to-cylinder head, then remove the cover from the head.
11. Thoroughly clean the cylinder head and cover mating surfaces.
12. Inspect the foam inserts for contamination. Remove the inserts and clean or replace them as necessary.
13. Check the secondary chain top guide wear strips.(1.0mm).To check the strips, you must remove the wear strip from the guide located inside the cover at the front. Remove the screws and guide from the camshaft cover. No wear groove should exceed a depth of 0.040 in. After checking, install the guide and screws. Apply Loctite® 262 to the screws and

tighten to 53 inch lbs. (6 Nm). Install the wear strip onto the guide.

To install:

14. Apply PermaBond® A136 or equivalent to the camshaft cover. Apply Loctite® 565 to the end plugs. Make sure the camshaft end plugs and new spark plug bore O-rings are in place before installing the cover.
15. Install the camshaft cover and bolts. To be sure the camshaft operates properly, the cover retainers **MUST** be tightened to the following specifications, in the sequence shown in the accompanying figure:
 - A. Tighten the 24 M8 bolts to 15 ft. lbs. (20 Nm), 3 times.
 - B. Tighten the 3 M6 screws to 89 inch lbs. (10 Nm).
16. Install the brake power booster.
17. Install the screws holding the cable hold-down clamps onto the plenum and tighten them to 18 inch lbs. (2 Nm).
18. Connect the ventilation breather pipe to the camshaft cover.
19. Attach the spark plug wires to the plugs, as tagged during removal.
20. Unplug the openings, then install the bolts retaining the A/C suction/discharge hoses to the A/C compressor.
21. Install the throttle body extension.
22. Install the coolant outlet pipe. Tighten the throttle body screws to 53 inch lbs. (6 Nm) and the outlet pipe screws to 89 inch lbs. (10 Nm). Tighten the bolt to 24 ft. lbs. (33 Nm).
23. Install the power steering pump and tighten the mounting bolts to 24 ft. lbs. (33 Nm).
24. Connect the negative battery cable. Take your vehicle to a reputable repair shop to have the A/C system charged.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

NOTE: On some vehicles, the crankshaft damper is also referred to as the balancer.

5.7L (VIN 8) Engine

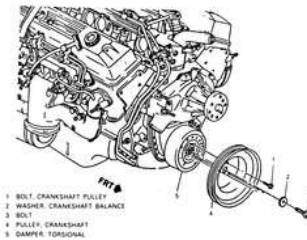
1. Disconnect the negative battery cable.
2. If necessary, remove the water pump damper.
3. Remove the retainers, then remove the crankshaft pulley
4. Remove the serpentine drive belt.
5. On some vehicles, it may be necessary to disconnect and plug the power steering line in order to get access to the damper with the removal puller.

WARNING

Using any other type of puller, such as a universal claw, which pulls on the outside of the hub, can destroy the damper. The outside ring is permanently bonded to hub. Using the wrong puller could break the bond.

6. Install a harmonic balancer removal tool, or suitable puller on the damper. Turn the puller screw, then remove the damper.
7. Check the front cover seal for damage.

Fig. 1: Exploded view of the crankshaft torsional damper — 1989 5.7L (VIN 8) engine shown



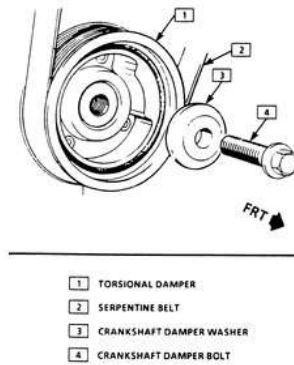
To install:

8. Use clean engine oil to coat the seal contact area on the damper.
9. Place the damper in position over the woodruff key on the crankshaft.
10. Pull the damper onto the crankshaft as follows:
 - A. Install the appropriate threaded end of the harmonic balancer tool into the crankshaft. Install the tool in the crankshaft so that at least $1\frac{1}{2}$ in. (13mm) of the threads are engaged.
 - B. Install the plate, thrust bearing and nut to complete tool installation.
 - C. Pull the damper into position.
 - D. Remove the tool from the crankshaft, then install the damper retaining bolt. Tighten the bolt to 60 ft. lbs. (81 Nm).
11. Install the crankshaft pulley.
12. If removed, unplug and install the power steering line. Tighten the center bolt to 70 ft. lbs. (95 Nm) and the outer bolts to 32 ft. lbs. (43 Nm).
13. If removed, install the water pump damper.
14. Install the serpentine drive belt.
15. Connect the negative battery cable.

5.7L (VIN J) Engine

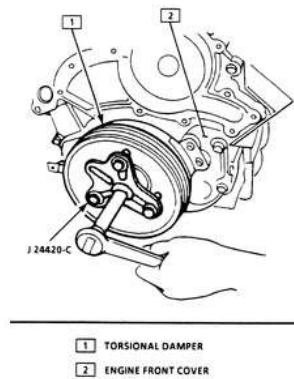
1. Disconnect the negative battery cable.
2. Remove the power steering gear, as outlined in Section 8 of this manual.
3. Remove the serpentine belt.
4. Remove the bolt and washer holding the damper to the crankshaft.

Fig. 2: Remove the damper bolt and washer



5. Using a suitable puller remove the damper from the crankshaft.

Fig. 3: You MUST use the proper type of puller when removing the damper from the crankshaft



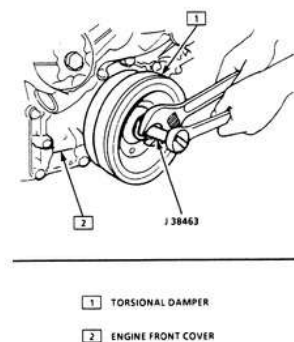
6. Remove the key from the crankshaft.

NOTE: If you are replacing the damper, you must install new balance weights in the same hold locations as found on the old damper.

To install:

7. Install the key in the crankshaft. The key should be checked to be sure it is properly seated in the keyway while installing the damper.
8. Install the damper using tool J 38463 or equivalent torsional damper installation tool.

Fig. 4: Installation of the crankshaft damper using the proper tools



9. Apply Loctite® 262, or equivalent to the damper bolts threads, then install the washer and bolt. Tighten the bolt to 148 ft. lbs. (200 Nm).
10. Install the serpentine drive belt.
11. Install the steering gear, as outlined in Section 8 of this manual.

5.7L (VIN P and 5) Engines

NOTE: This procedure covers both removal of the crankshaft balancer (damper) and hub assembly.

1. Disconnect the negative battery cable.
2. Remove the air intake duct.
3. Raise and safely support the vehicle.
4. Remove the motor mount nuts.
5. Remove the power steering fluid cooler.

WARNING

When raising and supporting the engine, NEVER place a jack under the oil pan, crankshaft pulley or any sheetmetal. There is a minimal clearance between the oil pan and the pump screen. Jacking against the pan could cause sufficient deformation to damage the oil pickup unit.

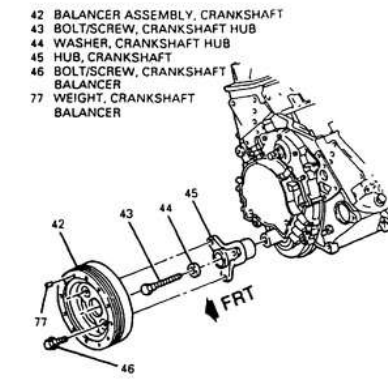
6. Raise the engine enough so that you can access the balancer with the removal tool.
7. Unfasten the balancer bolts/screws, then remove the balancer assembly.
8. Disconnect and plug the power steering line from the steering gear.

WARNING

Do NOT crank the engine over after marking the hub and front cover. Rotating the crankshaft will misalign the installation of the balancer to the crankshaft and possibly cause engine imbalance.

9. Matchmark the crankshaft hub to the engine front cover.
10. Remove the crankshaft hub bolt/screw and washer.
11. Remove the crankshaft hub using a suitable crankshaft hub removal/installation tool.

Fig. 5: Exploded view of the crankshaft balancer and hub assemblies

**To install:**

12. If the engine was accidentally cranked over after matchmarking the hub and front cover, you must perform the following steps before installing the crankshaft hub:
 - A. Set the No. 1 piston to Top Dead Center (TDC).
 - B. Install the crankshaft hub with the cast arrow on the hub in the 12 o'clock position.
13. Install the crankshaft hub using a suitable hub removal/installation tool.
14. Install the crankshaft hub washer and bolt/screw.
15. Raise the engine.
16. Install the crankshaft balancer and retaining bolts/screws.
17. Tighten the crankshaft hub bolt to 70–75 ft. lbs. (95–102 Nm), and the balancer bolts/screw to 60 ft. lbs. (81 Nm).
18. Unplug and connect the power steering line to the steering gear.
19. Carefully lower the engine.
20. Install the power steering fluid cooler.
21. Install the motor mount nuts and tighten to 40 ft. lbs. (54 Nm).
22. Carefully lower the vehicle.
23. Install the serpentine drive belt.
24. Install the air intake duct and connect the negative battery cable.
25. Properly bleed the power steering system, as outlined in Section 8 of this manual.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

NOTE: When servicing the engine, be absolutely sure to mark or tag vacuum hoses and wiring so that these items may be properly reconnected during installation. Also, when disconnecting fittings of metal lines (fuel, power brake vacuum), always use two flare nut (or line) wrenches. Hold the wrench on the large fitting with pressure on the wrench as if you were tightening the fitting (clockwise), THEN loosen and disconnect the smaller fitting from the larger fitting. If this is not done, damage to the line will result.

5.7L (VIN 8) Engine

RIGHT SIDE

1. Disconnect the negative battery cable. Drain the engine cooling system into a suitable container.
2. Remove the intake manifold, as outlined earlier in this section.
3. Disconnect the rear A/C brace from the exhaust manifold.
4. Unfasten the dipstick tube from the manifold, then remove the dipstick.
5. Remove the check valve from the manifold.
6. Disconnect the AIR hose from the converter AIR pipe.
7. Detach the wire from the temperature sending unit.
8. Tag and disconnect the spark plug wires from the plugs, head and rocker arm cover, then remove the plugs.
9. Raise and safely support the vehicle.
10. Unfasten the converter AIR pipe clamp from the manifold.
11. Disconnect the exhaust pipe at both manifolds.
12. Remove the front converter hanger bolts.
13. Remove the converter AIR pipe.
14. Carefully lower the vehicle.
15. Unfasten the exhaust manifold bolts, then remove the manifold with the EGR pipe.
16. Remove the spark plug wire retainers.
17. Remove the rocker arm (valve) cover.
18. Remove the serpentine drive belt from the A/C compressor.
19. Detach the electrical wires from the A/C compressor.
20. Loosen the 2 rear A/C compressor mounting bolts.
21. Remove the A/C compressor bracket nuts from the water pump
22. Loosen the front A/C mount bolt, then slide the compressor and bracket forward.

NOTE: When removing the pushrods, and all other valve train components, you must keep them in the same order as they were removed. These components **MUST** be reinstalled in the proper positions.

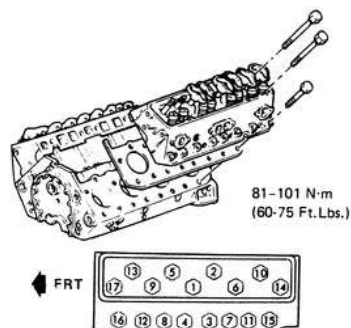
23. Loosen the rocker arm nuts, then remove the pushrods.
24. Unfasten the head bolts, then remove the cylinder head from the vehicle. Remove and discard the gasket.

The cylinder head should be properly cleaned and inspected before installation. Clean the gasket mating surfaces of all components. Be careful not to nick or scratch any surfaces as this will allow leak paths. Clean the bolt threads in the cylinder block and on the head bolts. Dirt will affect bolt torque. Refer to Engine Reconditioning for further details.

To install:

25. Position a new cylinder head gasket on the block. Place the cylinder head over the locator pins and head gasket.
26. Install the bolts finger-tight.
27. Tighten the long cylinder head bolts, in the sequence shown in the accompanying figure, to 60–75 ft. lbs. (81–101 Nm). Tighten the short cylinder head bolts, in the sequence shown in the accompanying figure to 55–65 ft. lbs. (74–88 Nm).

Fig. 1: Cylinder head mounting and bolt tightening sequence — 5.7L (VIN 8) engine



28. Install the pushrods and rocker arms. Install the rocker arm (valve) cover. Tighten the retaining bolts to the proper specifications.
29. The remainder of installation is the reverse of the removal procedure.
30. Fill the radiator with the proper type and amount of coolant. Connect the negative battery cable.
31. Start the engine, and allow to run (with the radiator cap still removed), until the upper hose is hot (thermostat is open). With the engine idling, add coolant to the radiator until it reaches the bottom of the filler neck.
32. Install the filler cap. Inspect for leaks. Turn the engine **OFF**.

LEFT SIDE

1. Disconnect the negative battery cable.
2. Drain the engine cooling system into a suitable container.
3. Remove the intake manifold, as outlined earlier in this section.
4. Disconnect the AIR hose from the check valve.
5. Remove the alternator brace.
6. Detach the wire from the fan temperature sensor.
7. Raise and safely support the vehicle.
8. Disconnect the exhaust pipe from the manifold.
9. Carefully lower the vehicle.
10. Remove the exhaust manifold bolts, then remove the manifold.
11. Either remove the serpentine drive belt, or you can just loosen it and remove it from the AIR pump pulley.
12. Remove the mounting bolts, then remove the AIR pump with the bracket.

Fig. 2: View of the AIR pump and bracket mounting bolts

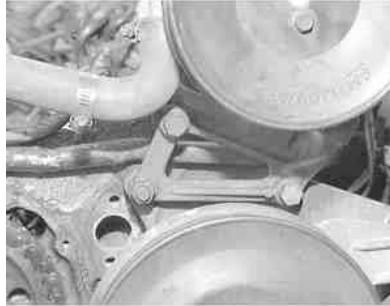


Fig. 3: Unfasten the retainers, then remove the AIR pump and bracket, as an assembly, from the engine



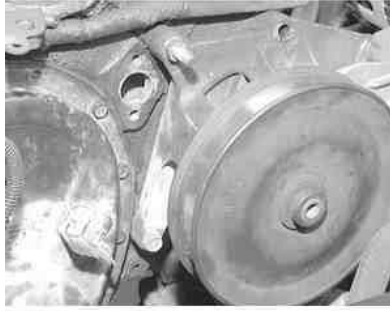
13. Remove the rocker arm (valve) cover.

Fig. 4: Remove the rocker arm (valve) cover



14. Tag and disconnect the spark plug wires, then remove the plugs.
15. Unfasten the power steering and alternator mounting bracket from the cylinder head.

Fig. 5: Remove the power steering and alternator mounting bracket from the cylinder head



NOTE: When removing the pushrods, and all other valve train components, you must keep them in the same order as they were removed. These components MUST be reinstalled in the proper positions.

16. Loosen or remove the rocker arm nuts, as applicable, then remove the pushrods. Make sure to keep all components in the proper order for installation.

Fig. 6: Loosen the rocker arm nuts (see arrows)

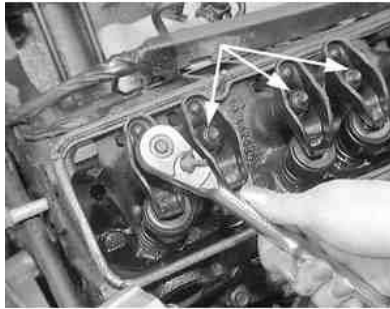


Fig. 7: Remove the rocker arm retaining nut (1) and rocker arm (2)



Fig. 8: Then, pull the pushrods from the cylinder head



17. Unfasten the head bolts, then remove the cylinder head from the vehicle. Remove and discard the gasket.

Fig. 9: Loosen the cylinder head bolts gradually, starting from the inside and working out



Fig. 10: When you remove the cylinder head bolts, keep them in order, because 2 different lengths of bolts are used

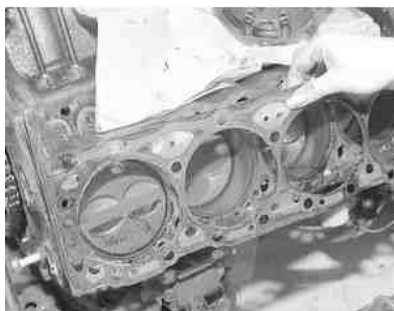


Fig. 11: Carefully lift the cylinder head off of the engine block and place on a suitable workbench



The cylinder head should be properly cleaned and inspected before installation. Clean the gasket mating surfaces of all components. Be careful not to nick or scratch any surfaces as this will allow leak paths. Clean the bolt threads in the cylinder block and on the head bolts. Dirt will affect bolt torque. Refer to Engine Reconditioning for further details.

Fig. 12: Remove and discard the cylinder head gasket, then thoroughly clean the gasket mating surfaces



To install:

18. Position a new cylinder head gasket on the block. Place the cylinder head over the locator pins and head gasket.
19. Install the bolts finger-tight.

20. Tighten the long cylinder head bolts, in the sequence shown in the accompanying figure, to 60–75 ft. lbs. (81–101 Nm). Tighten the short cylinder head bolts, in the sequence shown in the accompanying figure to 55–65 ft. lbs. (74–88 Nm).

Fig. 13: Always use a torque wrench to tighten the cylinder head bolts to specifications



21. Install the pushrods and rocker arms. Install the rocker arm (valve) cover. Tighten the retaining bolts to the proper specifications.
22. The remainder of installation is the reverse of the removal procedure.
23. Fill the radiator with the proper type and amount of coolant. Connect the negative battery cable.
24. Start the engine, and allow to run (with the radiator cap still removed), until the upper hose is hot (thermostat is open). With the engine idling, add coolant to the radiator until it reaches the bottom of the filler neck.
25. Install the filler cap. Inspect for leaks. Turn the engine **OFF**.

5.7L (VIN J) Engines

RIGHT SIDE

1. Disconnect the negative battery cable and properly relieve fuel system pressure.
2. Drain the engine coolant into a suitable container.
3. Remove the intake plenum assembly.
4. Remove the right injector housing.
5. Remove the right bank valve lifters.
6. Remove the alternator assembly.
7. Disconnect the right exhaust manifold from the cylinder head. It is not necessary to completely remove the exhaust manifold from the vehicle for cylinder head removal.
8. If raised, lower the vehicle for underhand access.
9. Remove the vacuum hose from secondary port throttle valve actuator.
10. Remove the access plug from the right cylinder head.
11. Remove the top bolt attaching the right secondary timing chain fixed guide.
12. Remove cylinder head bolts, then remove the cylinder head and gasket from the vehicle. Discard the gasket.

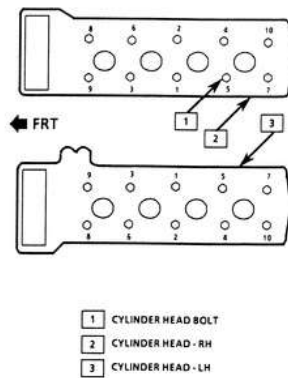
To install:

13. Thoroughly clean the cylinder head and cylinder case mating surfaces. Make sure both surfaces are free of any foreign matter, nicks or scratches. The threads in both the bolts and on the bolts must be clean and free of old sealer.

NOTE: Cylinder head gaskets are not interchangeable between cylinder banks.

14. Install the cylinder head locating dowels into block, if loosened or removed, then position the new gasket in place on the cylinder case.
15. Install the cylinder head over the dowels. Coat bolt threads and washers with clean engine oil and insert.
16. Tighten the cylinder head bolts, in the sequence shown in the accompanying figure, as follows:
 - 1st pass—45 ft. lbs. (60 Nm)
 - 2nd pass—74 ft. lbs. (100 Nm)
 - 3rd pass—118 ft. lbs. (160 Nm)
17. Apply Loctite® 262 to the fixed guide top bolt threads, install the bolt and tighten to 19 ft. lbs. (26 Nm).
18. Install the access plug into the cylinder head and torque to 15 ft. lbs. (20 Nm).
19. Connect the vacuum hose to the actuator.
20. Raise and support vehicle, drain the engine oil.
21. Install the exhaust manifold.
22. If still supported, lower the vehicle for underhood access.
23. Install the alternator.
24. Install valve lifters.
25. Install the right injector housing assembly.
26. Install the plenum assembly.
27. Fill the engine crankcase with the proper type and amount of engine oil.
28. Tighten the fuel filler cap and properly refill the cooling system.
29. Connect the negative battery cable.
30. If equipped, reset the CHANGE OIL indicator, as outlined in Section 1 of this manual.

Fig. 14: Cylinder head bolt tightening sequence — 5.7L (VIN J) engines



LEFT SIDE

1. Disconnect the negative battery cable and properly relieve fuel system pressure.
2. Drain the engine coolant into a suitable container.
3. Remove the intake plenum assembly.
4. Remove the left injector housing.
5. Remove the vacuum hose from the secondary port throttle valve actuator.
6. Remove the power brake booster assembly.
7. Remove the left bank valve lifters.
8. Remove the AIR control valve hoses, then disengage the electrical connector.
9. Remove the camshaft position sensor.
10. Disconnect the left exhaust manifold from the cylinder head. It is not necessary to completely remove the exhaust manifold from the vehicle for cylinder head removal.
11. Remove the access plug from the left cylinder head.
12. Remove the bolt attaching the left secondary timing chain guide.
13. Remove the cylinder head bolts. Remove the cylinder head and gasket from the vehicle. Discard the gasket.

To install:

14. Thoroughly clean the cylinder head and cylinder case mating surfaces. Make sure both surfaces are free of any foreign matter, nicks or scratches. The threads in both the bolts and on the bolts must be clean and free of old sealer.

NOTE: Cylinder head gaskets are not interchangeable between cylinder banks.

15. Install the cylinder head locating dowels into block, if loosened or removed, then position the new gasket in place on the cylinder case.
16. Install the cylinder head over the dowels. Coat bolt threads and washers with clean engine oil and insert.
17. Tighten the cylinder head bolts, in the sequence shown in the accompanying figure, as follows:
 - 1st pass—45 ft. lbs. (60 Nm)
 - 2nd pass—74 ft. lbs. (100 Nm)
 - 3rd pass—118 ft. lbs. (160 Nm)
18. Apply Loctite® 262 to the fixed guide bolt threads, install the bolt and tighten to 19 ft. lbs. (26 Nm).
19. Install the access plug into the cylinder head and tighten to 15 ft. lbs. (20 Nm).
20. Connect the vacuum hose to the actuator.
21. Raise and support vehicle, drain the engine oil and lower the vehicle.
22. Install the exhaust manifold.
23. Install the camshaft position sensor.
24. Connect the AIR control valve hoses and electrical connector.
25. Install the valve lifters.
26. Install the left injector housing assembly.
27. Install the plenum assembly.
28. Fill the engine crankcase with the proper type and amount of engine oil.
29. Tighten the fuel filler cap and properly refill the cooling system.
30. Connect the negative battery cable.
31. If equipped, reset the CHANGE OIL indicator, as outlined in Section 1 of this manual.

5.7L (VIN P and 5) Engines

RIGHT SIDE

1. Disconnect the negative battery cable and properly relieve the fuel system pressure.
2. Raise and support the vehicle safely.
3. Disconnect the catalytic converter.
4. Drain the engine cooling system, then lower the vehicle.
5. Remove the lower radiator and heater hoses from the water pump.
6. Disconnect the power steering pump reservoir from the cylinder head and reposition aside.
7. Remove the coil and bracket assembly.
8. Remove the intake manifold.
9. Remove the spark plug wires from the clips, then remove the front wire bracket.
10. Remove the oil level indicator tube.
11. Disconnect the spark plug wires from the plugs, then remove the spark plugs from the cylinder head.
12. Remove the right exhaust manifold.
13. Using a backup wrench on the pipe fitting, disconnect the coolant air bleed pipe from the left cylinder head.

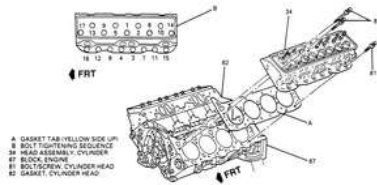
NOTE: When removing the pushrods, and all other valve train components, you must keep them in the same order as they were removed. These

components **MUST** be reinstalled in the proper positions.

14. Remove the right valve rocker cover, then remove the rocker arm and pushrod assemblies.
15. Remove the cylinder head bolts.
16. Remove the cylinder head along with the coolant air bleed pipe, then remove the head gasket.
17. If necessary, remove the coolant air bleed pipe from the cylinder head.

The cylinder head should be properly cleaned and inspected before installation. Clean the gasket mating surfaces of all components. Be careful not to nick or scratch any surfaces as this will allow leak paths. Clean the bolt threads in the cylinder block and on the head bolts. Dirt will affect bolt torque. Refer to Engine Reconditioning for further details.

Fig. 15: Exploded view of the cylinder head mounting and bolt tightening sequence — 5.7L (VIN P and 5) engine



To install:

18. Thoroughly clean the cylinder head and cylinder case mating surfaces. Make sure both surfaces are free of any foreign matter, nicks or scratches. The threads in both the bolts and on the bolts must be clean and free of old sealer.
19. If removed, install the coolant air bleed pipe to the cylinder head, finger-tight.
20. Position the new gasket in place on the cylinder case with the yellow tab facing up. Install the cylinder head over the dowel pins and gasket.
21. Coat the bolts with 1052080, or an equivalent sealant. Install and tighten the cylinder head bolts, using 3 passes of the proper sequence, to 65 ft. lbs. (88 Nm).
22. Install the rocker arm and pushrod assemblies.
23. Install the valve rocker cover and tighten the bolts to 75 inch lbs. (8 Nm) for 1992 vehicles or to 100 inch lbs. (11 Nm) for 1993–96 vehicles.
24. Connect the coolant air bleed pipe to the left cylinder head and torque the pipe to both cylinder heads. Using a backup wrench, tighten the coolant air bleed pipe to 30 ft. lbs. (41 Nm).
25. Install the right exhaust manifold.
26. Install the spark plugs and tighten to 11 ft. lbs. (15 Nm).
27. Connect the spark plug wires to the plugs, then install the oil level indicator tube.
28. Install the front wire bracket, then connect the spark plug wire harness assembly to the wire bracket.
29. Install the intake manifold.
30. Install the coil and bracket assembly.
31. Position and secure the power steering pump reservoir.
32. Install the lower radiator and heater hoses to the water pump.
33. Raise and support the vehicle safely.
34. Connect the catalytic converter, then lower the vehicle.
35. Properly fill the cooling system.
36. Tighten the fuel filler cap and connect the negative battery cable.

LEFT SIDE

1. Disconnect the negative battery cable and properly relieve the fuel system pressure.
2. Raise and support the vehicle safely.
3. Disconnect the catalytic converter.
4. Drain the engine cooling system, then lower the vehicle.
5. Remove the upper radiator hose.
6. Remove the serpentine drive belt.
7. Remove the intake manifold.
8. Remove the left wheel well lower center panel.
9. Disconnect the air conditioning compressor from the bracket and position aside. Use care not to kink or damage the refrigerant lines. Remove the compressor and alternator brace.
10. Remove the spark plug wire bracket, disconnect the wires from the spark plugs and remove the spark plugs from the cylinder head.
11. Remove the left exhaust manifold.
12. Remove the remaining alternator brace, then remove the alternator.
13. Disconnect the AIR diverter valve hose.
14. Remove the left valve rocker cover.
15. Remove the drive belt idler pulley, then remove the drive belt tensioner.
16. Disconnect the power steering lines from the pump, then remove the pump. Plug the openings to prevent system contamination or excessive fluid loss.
17. Remove the spark plug and coil wires from the distributor.
18. Remove the accessory mounting bracket.
19. Remove the rocker arm and pushrod assemblies.
20. Disconnect the coolant air bleed pipe from the cylinder head.
21. Remove the cylinder head bolts, then remove the cylinder head and gasket.

To install:

22. Thoroughly clean the cylinder head and cylinder case mating surfaces. Make sure both surfaces are free of any foreign matter, nicks or scratches. The threads in both the bolts and on the bolts must be clean and free of old sealer.
23. Position the new gasket in place on the cylinder case with the yellow tab facing up. Install the cylinder head over the dowel pins and gasket.
24. Coat the bolts with 1052080, or an equivalent sealant. Install and tighten the cylinder head bolts, using 3 passes of the proper sequence, to 65 ft. lbs. (88 Nm).

25. Connect the coolant air bleed pipe to the cylinder head and tighten to 30 ft. lbs. (41 Nm).
26. Install the rocker arm and pushrod assemblies.
27. Install the accessory mounting bracket and bolts. Tighten the bolts to 25 ft. lbs. (34 Nm) for 1992 vehicles or to 31 ft. lbs. (42 Nm) for 1993–96 vehicles.
28. Connect the spark plug and coil wires to the distributor.
29. Install the power steering pump, then remove the plugs from the openings and connect the lines.
30. Install the drive belt tensioner, then install the idler pulley. Tighten the tensioner and pulley bolts to 24 ft. lbs. (33 Nm).
31. Install the left valve rocker cover and bolts. Tighten the bolts to 75 inch lbs. (8 Nm) for 1992 vehicles or to 100 inch lbs. (11 Nm) for 1993–96 vehicles.
32. Connect the AIR diverter valve hose and install the alternator lower brace.
33. Install the left exhaust manifold.
34. Install the spark plugs and tighten to 11 ft. lbs. (15 Nm). Connect the spark plug wires to the plugs and insert the wires into the brackets.
35. Install the air conditioning compressor and alternator brace, then install the compressor.
36. Install the left wheel well lower center panel.
37. Install the intake manifold.
38. Install the serpentine drive belt and the upper radiator hose.
39. Raise and safely support the vehicle, then connect the catalytic converter and lower the vehicle.
40. Properly fill the engine cooling system.
41. Tighten the fuel filler cap and connect the negative battery cable.
42. Bleed the power steering system.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

CAUTION

To avoid personal injury, always keep your hands, tools and clothing away from the engine fan. The fan is electric and may come on at anytime, even if the engine is not running. The fan can start automatically in response to a heat sensor with the ignition in the

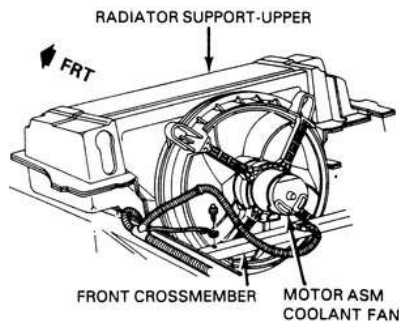
ON position.

5.7L (VIN 8 and J) Engine

1984-88 VEHICLES

1. Disconnect the negative battery cable.
2. Detach the fan electrical connector from the fan and shroud.
3. Unfasten any necessary retainers, then remove the fan assembly.
4. Installation is the reverse of the removal procedure.

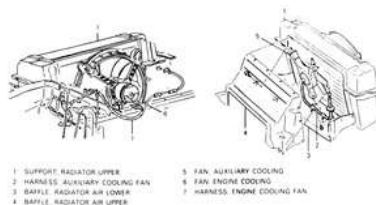
Fig. 1: View of the electric fan assembly mounting — 1984 5.7L (VIN 8) engine shown



1989 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the air cleaner and air intake duct.
3. If removing the engine cooling fan, perform the following:
 - A. Detach the MAF sensor electrical connector.
 - B. Unplug the electrical connector from the fan motor.
4. If removing the auxiliary cooling fan, perform the following:

Fig. 2: View of the engine cooling and auxiliary fan mounting — 1989 vehicles

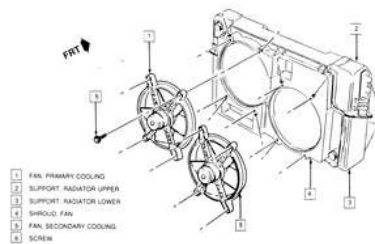


- A. Detach the fan electrical connector. Feed the grommet and harness through the baffle.
5. Remove the upper fan assembly screws.
 6. Remove the fan lower screw(s).
 7. Remove the fan assembly from the vehicle.
 8. Installation is the reverse of the removal procedure.

1990-95 VEHICLES

1. Disconnect the negative battery cable.
2. If removing the primary (left) fan, perform the following:
 - A. Remove the air intake duct.
 - B. Unfasten the power steering pump reservoir bracket-to-front crossmember bolts, then reposition the reservoir.
 - C. Detach the electrical connector from the fan motor.
 - D. Unfasten the screws holding the fan motor to the fan support.
 - E. Remove the bolts securing the fan assembly to the fan shroud.
 - F. Remove the end cap from the power steering pump pulley.
 - G. Remove the fan assembly from the vehicle.
3. If removing the secondary (right) fan, perform the following:
 - A. Remove the upper right bolt retaining the fan to the fan shroud.
 - B. Raise and safely support the vehicle.
 - C. Detach the electrical connector from the fan motor.
 - D. Unfasten the bolts retaining the fan to the fan shroud, then remove the fan assembly from the vehicle.

Fig. 3: Exploded view of the primary and secondary cooling fans — 1990–91 5.7L (VIN 8), and 5.7L (VIN J, P and 5) engines



To install:

4. If installing the secondary (right) fan, perform the following:
 - A. Install the fan and secure with the bolts retaining the fan to the shroud. Tighten the bolts to 89 inch lbs. (10 Nm).
 - B. Attach the electrical connector to the fan motor.
 - C. Carefully lower the vehicle.
 - D. Install the upper right bolt securing the fan to the shroud.
5. If installing the primary (left) fan, perform the following:
 - A. Position the fan assembly, then install the bolts holding the fan to the shroud. Tighten the bolts to 89 inch lbs. (10 Nm).
 - B. Install the screws securing the fan motor to the motor support and tighten the screws to 89 inch lbs. (10 Nm).
 - C. Install the power steering pump reservoir bracket-to-front crossmember bolts.
 - D. Attach the electrical connector to the fan motor.
 - E. Install the end cap on the power steering pump pulley.
 - F. Install the air intake duct.
6. Connect the negative battery cable.

5.7L (VIN P and 5) Engines

1992 VEHICLES

1. Disconnect the negative battery cable.
2. If removing the primary (left) fan, perform the following:
 - A. Remove the air intake duct.
 - B. Detach the electrical connector from the fan motor.
 - C. Unfasten the fan-to-shroud screws, then remove the fan from the vehicle.
3. If removing the secondary (right fan), perform the following:
 - A. Remove the upper right bolt retaining the fan to the fan shroud.
 - B. Raise and safely support the vehicle.
 - C. Detach the electrical connector from the fan motor.
 - D. Unfasten the bolts retaining the fan to the fan shroud, then remove the fan assembly from the vehicle.
- To install:**
4. If installing the secondary (right) fan, perform the following:
 - A. Install the fan and secure with the bolts retaining the fan to the shroud. Tighten the bolts to 89 inch lbs. (10 Nm).
 - B. Attach the electrical connector to the fan motor.
 - C. Carefully lower the vehicle.
 - D. Install the upper right bolt securing the fan to the shroud.
5. If installing the primary (left) fan, perform the following:
 - A. Position the fan assembly and install the bolts securing the fan to the shroud. Tighten to 89 inch lbs. (10 Nm).

- B. Install the screws retaining the fan motor to the motor support and tighten to 89 inch lbs. (10 Nm).
 - C. Attach the electrical connector to the fan motor.
 - D. Install the air intake duct.
6. Connect the negative battery cable.

1993–96 VEHICLES

1. Disconnect the negative battery cable.
2. If removing the primary (left) fan, perform the following:
 - A. Remove the surge tank/radiator pressure cap. Drain the engine coolant into a suitable container.
 - B. Remove the air cleaner assembly.
 - C. Remove the radiator upper deflector/shroud.
 - D. Detach the electrical connectors from the cooling fan relays.
 - E. Unfasten the bolts securing the A/C accumulator bracket to the radiator upper support, and position the bracket aside.
 - F. Remove the fan shroud-to-upper support retaining screws.
 - G. If equipped, remove the rubber access plug from the top of the radiator.
 - H. Unfasten the radiator air bleed/overflow hose clamp, then disconnect the hose.
 - I. Remove the nuts and bolt holding the upper support to the front side member.
 - J. Unfasten the bolts securing the oil cooler lines to the cooler.
 - K. Remove the seal retainers and seal from the oil cooler and A/C line.
 - L. If necessary, detach the electrical connection from the AIR pump and horn.
 - M. Remove the AIR pump.
 - N. Remove the bolt retaining the AIR pump bracket at the rear and loosen the front bolt.
 - O. Remove the air pump intake duct.
 - P. Unfasten the screws retaining the upper support to the lower support, then remove the upper support from the vehicle.
 - Q. Remove the shroud upper retaining bolts.
 - R. Raise and safely support the vehicle.
 - S. Remove the impact/skid bar.
 - T. Detach the fan motor electrical connectors.
 - U. Remove the right fan assembly.
 - V. Remove the fan shroud with the left fan still attached.
 - W. Remove the left fan assembly from the shroud, then disassemble the left fan motor and blade, if necessary.
3. If removing the secondary (right) side fan assembly, perform the following:
 - A. Remove the upper bolts retaining the fan to the shroud.
 - B. Raise and safely support the vehicle.
 - C. Remove the bolts retaining the impact bar.
 - D. Detach the fan electrical connector.
 - E. Unfasten the lower bolts holding the fan to the shroud.
 - F. Remove the fan assembly. If necessary disassemble the fan motor and blade.

To install:
4. If installing the secondary (right) side fan assembly, perform the following:
 - A. Assemble the fan motor and blade, then install the fan assembly.
 - B. Install the lower bolts securing the fan to the shroud and tighten to 89 inch lbs. (10 Nm).
 - C. Attach the fan motor electrical connector.
 - D. Install the bolts securing the impact bar to the front extension and front crossmember. Tighten the bolts to 20 ft. lbs. (27 Nm).
 - E. Install the upper bolts retaining the fan to the shroud.
5. If installing the primary (left side) cooling fan, perform the following:
 - A. Install the fan blade and motor, then install the bolts retaining the left fan assembly to the fan shroud. Tighten the bolts to 89 inch lbs. (10 Nm).
 - B. Install the fan shroud and lower mount bolts and tighten to 80 inch lbs. (9 Nm).
 - C. Install the bolts retaining the right fan to the fan shroud.
 - D. Install the bolts retaining the impact/skid bar to the front extension and front crossmember and tighten the bolts to 20 ft. lbs. (27 Nm).
 - E. Carefully lower the vehicle.
 - F. Install the upper support and secure with the retaining screws.
 - G. Install the nuts and bolts retaining the upper support to the front side member and tighten to 18 ft. lbs. (25 Nm).
 - H. Install the AIR pump intake duct. Install the bolts retaining the AIR pump bracket, then install the pump. Attach the electrical connectors to the AIR pump and horn, if necessary.
 - I. Attach the electrical connectors to the cooling fan relays.
 - J. Install the fan shroud-to-upper support screws and tighten to 80 inch lbs. (9 Nm).
 - K. Fasten the bolts securing the accumulator bracket to the upper support. Tighten to 80 inch lbs. (9 Nm).
 - L. Install the retainers to the oil cooler/A/C line seal.
 - M. Fasten the bolts retaining the oil cooler lines to the cooler and tighten to 89 inch lbs. (10 Nm).
 - N. Attach the air bleed hose/overflow hose and secure with the retaining clamp.
 - O. Install the access plug.
 - P. Attach the upper air deflector.
 - Q. Install the air cleaner assembly.
 - R. Fill the radiator with the proper type and amount of coolant.
 - S. Start the engine, and allow to run (with the radiator cap still removed), until the upper hose is hot (thermostat is open). With the engine idling, add coolant to the radiator until it reaches the bottom of the filler neck.
 - T. Install the filler cap. Inspect for leaks. Turn the engine **OFF**.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

In the process of removing the engine, you will come across a number of steps which call for the removal of a separate component or system, such as "disconnect the exhaust system" or "remove the radiator." In most instances, a detailed removal procedure can be found elsewhere in this manual.

It is virtually impossible to list each individual wire and hose which must be disconnected, simply because so many different model and engine combinations have been manufactured. Careful observation and common sense are the best possible approaches to any repair procedure.

Removal and installation of the engine can be made easier if you follow these basic points:

- If you have to drain any of the fluids, use a suitable container.
- Always tag any wires or hoses and, if possible, the components they came from before disconnecting them.
- Because there are so many bolts and fasteners involved, store and label the retainers from components separately in muffin pans, jars or coffee cans. This will prevent confusion during installation.
- After unbolting the transmission, always make sure it is properly supported.
- If it is necessary to disconnect the air conditioning system, have this service performed by a qualified technician using a recovery/recycling station. If the system does not have to be disconnected, unbolt the compressor and set it aside.
- When unbolting the engine mounts, always make sure the engine is properly supported. When removing the engine, make sure that any lifting devices are properly attached to the engine. It is recommended that if your engine is supplied with lifting hooks, your lifting apparatus be attached to them.
- Lift the engine from its compartment slowly, checking that no hoses, wires or other components are still connected.
- After the engine is clear of the compartment, place it on an engine stand or workbench.
- After the engine has been removed, you can perform a partial or full teardown of the engine using the procedures outlined in this manual.

1. Disconnect the negative, then the positive battery cables.
2. Drain the engine coolant into a suitable container.
3. Properly relieve the fuel system pressure, as outlined in Section 5 of this manual.
4. Disconnect the throttle, TV and cruise control cables at the engine.
5. Tag and disconnect the spark plug wires from the plugs, then remove the cap and wires as an assembly.
6. If necessary for clearance, remove the distributor.
7. Remove the cowl screen.
8. Remove the nut from the wiper motor arm. Disconnect the wiper motor wires, then remove the wiper motor cover.
9. Remove the air intake duct with the Mass Air Flow (MAF) sensor.
10. Disconnect the brake booster vacuum hose.
11. Detach the canister hose at the PCV pipe.
12. Tag and detach the necessary wires and vacuum hoses from the engine.
13. Disconnect the injector harness at the intake manifold.
14. Disconnect the heater hose from the pipe.
15. Disconnect the upper radiator hose from the housing.
16. Remove the serpentine drive belt.
17. Remove the A/C control valve at the A/C compressor.
18. Disconnect the fuel lines from the fuel rail.
19. Remove the catalytic converter A/C pipe.
20. Remove the A/C brace from the exhaust manifold.
21. Remove the A/C compressor mounting bracket.
22. Remove the accumulator from the fan shroud and brace.
23. Disconnect the fuel lines from the block.
24. Disconnect the lower radiator hose and the heater hose from the water pump.
25. Remove the alternator, as outlined in Section 2 of this manual.
26. Remove the A/C pump and bracket assembly.
27. Remove the power steering pump reservoir from the fan shroud and crossmember.
28. Unbolt the power steering pump and wire it aside.
29. Remove the water pump pulley.
30. Remove the crankshaft pulley (balancer/damper).
31. Raise and safely support the vehicle.
32. Detach the wiring from the oxygen, ESC and temperature sensors.
33. Remove the temperature sensor wire retainer from the block.
34. Disconnect the ground wires from the block.
35. Remove the catalytic converter A/C pipe from the manifold.
36. Disconnect and plug the transmission cooler lines from the flywheel cover.
37. Remove the starter motor.
38. Disconnect the front crossover pipe from the exhaust manifolds.
39. Drain the engine oil into a suitable container, then remove the oil filter.
40. Remove the oil cooler adapter from the engine block.
41. Remove the flywheel cover.
42. Disconnect and plug the oil cooler line from the oil pan.
43. Remove the exhaust from the converter hanger.
44. If equipped with a manual transmission, remove the clutch assembly.
45. Remove the engine mount through bolts and nuts.
46. If equipped with an automatic transmission, remove the transmission-to-engine bolts.
47. Carefully lower the vehicle.
48. Support the transmission assembly with a jack, then install a suitable engine lifting device.
49. Make sure that all retainers, wiring and vacuum lines are disconnected, then carefully lift the engine out of the vehicle. Mount the engine on a suitable stand.
50. Installation is the reverse of the removal procedure.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

5.7L (VIN 8) Engine

RIGHT SIDE — 1984–88 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly.
3. Drain the engine cooling system into a suitable container.
4. For 1985–88 vehicles, remove the plenum extension.
5. For 1985–88 vehicles, remove the EGR pipe bolts from the intake manifold.
6. Unfasten the rear A/C compressor brace, then allow the brace to hang at the compressor.
7. For 1985–88 vehicles, disconnect the dipstick tube from the manifold, then remove the dipstick.
8. Disconnect the AIR hose from the exhaust check valve and the converter pipe check valve.
9. For 1984 vehicles, detach the heater hose from the rear of the intake.
10. For 1985–88 vehicles, detach the wire at the temperature sending unit.
11. Tag and disconnect the spark plug wires from the plugs, and at the valve cover.
12. Remove the spark plugs, after the engine has cooled.
13. For 1984 vehicles, remove the temperature sending unit from the right head.
14. Raise and safely support the vehicle.
15. For 1984 vehicles, perform the following:
 - A. Disconnect the exhaust pipe from the manifold.
 - B. Detach the AIR pipe from the exhaust manifold.
 - C. Unfasten the 2 rear exhaust manifold mounting bolts.
 - D. Separate the dipstick tube from the manifold.
 - E. Carefully lower the vehicle.
 - F. Unfasten the remaining manifold bolts. Remove the exhaust manifold.
16. For 1985–88 vehicles, perform the following:
 - A. Raise and safely support the vehicle.
 - B. Remove the catalytic converter AIR pipe clamp from the manifold.
 - C. Detach the exhaust crossover pie from both manifolds.
 - D. Remove the bolts from the catalytic converter front hanger.
 - E. Remove the catalytic converter AIR pipe.
 - F. Carefully lower the vehicle.
 - G. Unfasten the exhaust manifold mounting bolts. Remove the manifold and EGR pipe assembly.
 - H. If replacing the manifold, install the EGR pipe and clamp on the new manifold.
17. Remove and discard the manifold gaskets. Thoroughly clean the gasket mating surfaces.

Fig. 1: Exploded view of the exhaust manifold mounting — 1984 5.7L (VIN 8) engines

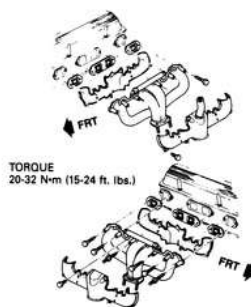
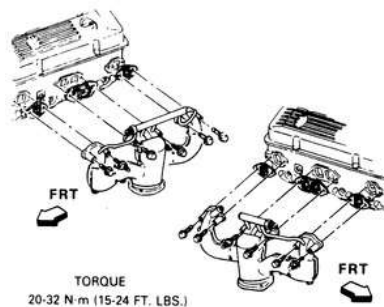


Fig. 2: Exhaust manifold attachment — 1985–88 vehicles shown, later years similar



To install:

18. Place new gaskets in position, then install the manifold and secure with the mounting bolts. It may be necessary to install the 2 rear bolts with the vehicle raised. Tighten the bolts to 20 ft. lbs. (27 Nm).
19. Raise and safely support the vehicle.
20. For 1984 vehicles, attach the dipstick tube to the manifold.
21. For 1985–88 vehicles, install the AIR pipe with a new clamp and install the bolts at the converter hanger.
22. Connect the converter AIR pipe to the manifold.
23. Attach the exhaust pipe/crossover pipe to the manifold.
24. Carefully lower the vehicle.
25. Install the temperature sending unit.
26. Install the spark plugs, then attach the wires, as tagged during removal. Make sure the wires are properly routed.
27. If removed, attach the heater hose.
28. Connect the AIR hose, or install the AIR check valve, as applicable.
29. For 1985–88 vehicles, attach the dipstick tube to the manifold and install the dipstick.
30. Install the A/C compressor brace.
31. For 1985–88 vehicles, install the EGR pipe bolts and the manifold, and connect the sensor wire.
32. For 1985–88 vehicles, install the plenum extension.
33. Install the air cleaner assembly.
34. Connect the negative battery cable.
35. Fill the cooling system with the proper type and amount of coolant.

RIGHT SIDE — 1989–91 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the EGR valve pipe and position it aside.
3. Unfasten the A/C compressor brace.
4. Remove the oil level indicator and guide tube.
5. Remove the AIR check valve from the manifold.
6. Detach the electrical connector from the temperature sending unit.
7. Tag and disconnect the spark plug wires from the plugs, unroute from the retainers.
8. Remove the spark plugs, after the engine has cooled.
9. Raise and safely support the vehicle.
10. Remove the AIR pipe clamp from the manifold.
11. Unfasten the front crossover pipe-to-manifold flange nuts, from the left and right sides.
12. Carefully lower the vehicle.
13. Unfasten the exhaust manifold mounting bolts, then remove the manifold. Remove and discard the gaskets, then thoroughly clean the gasket mating surfaces.

To install:

14. Position new gaskets, then install the exhaust manifold and secure with the mounting bolts. Tighten the bolts to 19 ft. lbs. (26 Nm).
15. Raise and safely support the vehicle.
16. Install the left and right side front crossover pipe-to-manifold flange nuts and tighten to 15 ft. lbs. (20 Nm).
17. Install the AIR pipe clamp on the manifold.
18. Carefully lower the vehicle.
19. Install the spark plugs, connect the wires and install the retainers.
20. Attach the electrical connector to the temperature sending unit.
21. Install the AIR check valve to the manifold.
22. Attach the guide tube and oil level indicator.
23. Install the A/C compressor brace.
24. Connect the EGR valve pipe.
25. Connect the negative battery cable.

LEFT SIDE — 1984–91 VEHICLES

1. Remove the air cleaner assembly.
2. Remove the PCV hose from the intake and rocker cover.
3. Detach the AIR hose from the exhaust check valve.

Fig. 3: Unfasten the retaining screws . . .



Fig. 4: . . . then disconnect the AIR hose from the exhaust check valve



4. Disconnect the rear alternator brace from the manifold, then let the brace hang from the alternator.

Fig. 5: The rear alternator brace is secured with a bolt at the top and a nut at the bottom



5. For 1989–91 vehicles,
 - A. Tag and disconnect the spark plug wires from the plugs, unroute from the retainers.
 - B. Remove the spark plugs, after the engine has cooled.
6. Raise and safely support the vehicle.
7. For vehicles through 1988, disconnect the exhaust pipe from the manifold.

Fig. 6: Top view of the exhaust manifold, after the pipe is disconnected



8. For 1989–91 vehicles, unfasten the left and right side front crossover pipe-to-manifold flange nuts.
9. Carefully lower the vehicle.

Fig. 7: You will probably have to move the check valve pipe aside in order to remove the exhaust manifold



10. Remove the exhaust manifold. Remove and discard the manifold gaskets. Thoroughly clean the gasket mating surfaces.

Fig. 8: Use a scraper to carefully clean the mating surfaces of the manifold



Fig. 9: Also, make sure to thoroughly clean the head-to-manifold mating surfaces



To install:

11. Place new gaskets in position, then install the manifold and secure with the mounting bolts. Tighten the bolts to 20 ft. lbs. (27 Nm) for 1984–88 vehicles. For 1989–91 vehicles, tighten the bolts to 19 ft. lbs. (26 Nm).
12. Raise and safely support the vehicle.
13. Attach the exhaust pipe to the manifold, or the crossover pipe-to-manifold flange nuts. Tighten the nuts to 15 ft. lbs. (20 Nm).
14. Carefully lower the vehicle.
15. For 1989–91 vehicles, install the spark plugs, connect the wires and install the retainers.
16. Fasten the alternator brace.
17. Connect the AIR hose.
18. Attach the PCV hose.
19. Install the air cleaner assembly.
20. Connect the negative battery cable.

5.7L (VIN J) Engines

RIGHT SIDE — 1990–91 VEHICLES

1. Disconnect the negative battery cable.

2. Remove the wheelhouse lower rear and center panels.
3. Unfasten the bolt retaining the oil level indicator and guide tube to the exhaust manifold, then remove the indicator/tube assembly from the vehicle.
4. Unfasten the front exhaust manifold-to-cylinder head bolts.
5. Remove the stud nut from the center of the manifold.
6. Raise and safely support the vehicle.
7. Detach the converter oxygen sensor electrical connector. In order to access the connector, the following steps may be necessary:
 - A. Remove the bolts from the right front of the oil pan, securing the ignition timing sensor/oxygen sensor connector bracket.
 - B. Slide the connector/bracket assembly to the rear.
8. Remove the AIR hose from the manifold.
9. Unfasten the screws retaining the center head shields, then remove the shields from the vehicle.
10. Remove the bolts securing the manifold/converter flanges to the exhaust pipe flanges.
11. Remove the bolts at the rear, holding the manifold to the head; remove the gasket and the manifold/converter assembly from the vehicle. Discard the gasket(s).
12. If the manifold is being replaced, transfer the oxygen sensors and heat shields to the new manifold.
13. Thoroughly clean the manifold and head mating surfaces.

Fig. 10: The exhaust manifold/converter assembly is removed as a single unit — 1990–91 and early 1992 5.7L (VIN J) engine



To install:

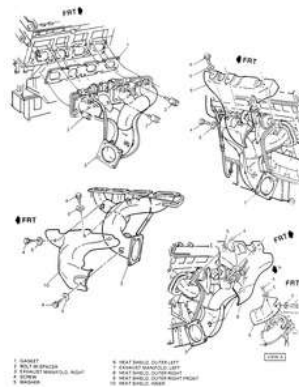
14. Position the manifold/converter assembly to the engine. Install the bolts securing the manifold/converter flanges to the exhaust pipe flanges. Finger-tighten the bolts.
15. Carefully lower the vehicle.
16. Install the manifold gasket on the head.
17. Install the bolts at front, holding the manifold to the head. Finger-tighten the bolts.
18. If the stud at the center of the manifold was removed, or is loose, clean the threads then apply Loctite® 620 to the threads. Tighten the stud to 11 ft. lbs. (15 Nm).
19. Install the stud nut at the center of the manifold and finger-tighten the nut.
20. Raise and safely support the vehicle.
21. Install the bolts at the rear, securing the manifold to the head. Tighten the manifold rear bolts to 11 ft. lbs. (15 Nm) and the exhaust pipe flange bolts to 15 ft. lbs. (20 Nm).
22. Install the converter head shields and screws.
23. Attach the electrical connector to the converter oxygen sensor. If the oxygen sensor bracket was removed, tighten the oil pan bolts to 19 ft. lbs. (26 Nm).
24. Connect the air hose to the manifold.
25. Carefully lower the vehicle.
26. Tighten the manifold front bolts and stud nut to 11 ft. lbs. (15 Nm).
27. Install the wheel house lower rear and center panels.

RIGHT SIDE — 1992–95 VEHICLES

NOTE: Early and late production vehicles in the 1992 vehicles utilized 2 different exhaust manifolds.

1. Disconnect the negative battery cable.
2. Raise and safely support the vehicle. Remove the wheel and tire assembly.
3. Remove the wheel house lower rear and center panels.
4. On early 1992 models, remove the center stud nut.
5. On late 1992 and 1993–95 models, remove the manifold outer heat shields.
6. Remove the exhaust system assembly.
7. Remove the engine block heat shield.
8. On late 1992, and 1993–95 models, remove the catalytic converter from the manifold.
9. Detach the oxygen sensor connector.
10. On early 1992 models, remove the converter heat shields.
11. Remove the rear exhaust manifold bolts, spacers and nuts.
12. Carefully lower the vehicle.
13. Remove the AIR check valve and hose from the manifold.
14. Unfasten the bolt retaining the oil level indicator guide tube.
15. Remove the oil level indicator tube from the engine.
16. Remove the remaining exhaust manifold bolts and spacers.
17. Remove the exhaust manifold and gasket from the vehicle. Discard the gasket. If installing a new manifold, transfer the oxygen sensor and heat shields to the new manifold.
18. Thoroughly clean the manifold and cylinder head mating surfaces.

Fig. 11: View of the exhaust manifolds used on late 1992 and 1993–95 vehicles — 5.7L (VIN J) engines



To install:

19. Position a new gasket, then install the manifold to the engine.
20. Install the front and center manifold bolts and spacers.
21. Install the oil level indicator tube.
22. Tighten the manifold bolts to 18 ft. lbs. (24 Nm).
23. Install the AIR check valve and hoses.
24. Raise and safely support the vehicle.
25. Install the rear manifold bolts, spacers and nuts. Tighten the bolts and nuts to 18 ft. lbs. (24 Nm).
26. If removed, install the converter heat shields.
27. Attach the oxygen sensor electrical connector.
28. If removed, install the catalytic converter and bolts to the manifold. Tighten the bolts to 17 ft. lbs. (23 Nm).
29. Install the engine block heat shield.
30. Install the exhaust system.
31. If removed, install the manifold outer heat shields.
32. Carefully lower the vehicle.
33. If removed, install the center stud nut and tighten to 18 ft. lbs. (24 Nm).
34. Install the wheel house lower rear and center panels.
35. Install the wheel and tire assembly
36. Connect the negative battery cable.

LEFT SIDE — 1990-91 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the wheelhouse lower rear and center panels.
3. Disconnect the AIR hose from the exhaust manifold.
4. Unfasten the bolts retaining the manifold to the head.
5. Remove the stud nut from the center, retaining the manifold to the head.
6. Unfasten the bolts holding the manifold to the head. Remove the gasket from the manifold.
7. Raise and safely support the vehicle.
8. Detach the converter oxygen sensor electrical connector.
9. Unfasten the heat shield retaining screws, then remove the heat shields.
10. Unfasten the bolts retaining the manifold/converter flange to the front exhaust pipe flange. Remove the manifold/converter from the vehicle.
11. If the manifold is being replaced, transfer the oxygen sensors and heat shields to the new manifold.
12. Thoroughly clean the manifold and head mating surfaces.

To install:

13. Position the manifold/converter assembly to the engine. Install the bolts securing the manifold/converter flanges to the exhaust pipe flanges. Finger-tighten the bolts.
14. Carefully lower the vehicle.
15. Install the manifold gasket on the head.
16. Install the bolts securing the manifold to the cylinder head. Finger-tighten the bolts.
17. If the stud at the center of the manifold was removed, or is loose, clean the threads then apply Loctite® 620 to the threads. Tighten the stud to 11 ft. lbs. (15 Nm).
18. Install the stud nut at the center of the manifold and finger-tighten the nut.
19. Raise and safely support the vehicle.
20. Tighten the exhaust pipe flange bolts and tighten to 15 ft. lbs. (20 Nm).
21. Install the heat shields and secure with the retaining screws.
22. Attach the electrical connectors to the converter oxygen sensors.
23. Carefully lower the vehicle.
24. Attach the AIR hose onto the exhaust manifold.
25. Install the wheel house lower rear and center panels.
26. Connect the negative battery cable.

LEFT SIDE — 1992-95 VEHICLES

1. Disconnect the negative battery cable.
2. Raise and safely support the vehicle. Remove the wheel and tire assembly.
3. Remove the wheel house lower rear and center panels.
4. Remove the exhaust system assembly.
5. Remove the left floor pan heat shield.
6. Remove the left heat shield from the frame.
7. Remove the engine block heat shield.
8. Detach the oxygen sensor electrical connector.

9. On early 1992 vehicles, remove the converter heat shields.
10. Remove the AIR check valves, houses and pipe.
11. On late 1992, and 1993–95 vehicles, remove the manifold outer heat shield.
12. On late 1992, and 1993–95 vehicles, remove the catalytic converter from the manifold.
13. Remove the exhaust manifold bolts, spacers and nut.
14. On early 1992 vehicles, remove the center stud nut.
15. Remove the exhaust manifold and gasket from the vehicle. Discard the gasket. If installing a new manifold, transfer the oxygen sensor and heat shields to the new manifold.
16. Thoroughly clean the manifold and cylinder head mating surfaces.

To install:

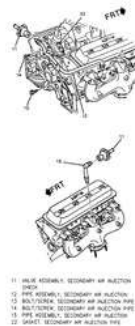
17. Position a new gasket, then install the manifold to the engine.
18. Install the manifold bolts, spacers and nut.
19. If removed, install the center stud nut.
20. Tighten the bolts and nut to 18 ft. lbs. (24 Nm).
21. If removed, install the catalytic converter and bolts to the manifold and tighten to 17 ft. lbs. (23 Nm).
22. The remainder of installation is the reverse of the removal procedure.
23. Install the wheel house lower rear and center panels.
24. Install the wheel and tire assembly
25. Connect the negative battery cable.

5.7L (VIN P and 5) Engines

RIGHT SIDE

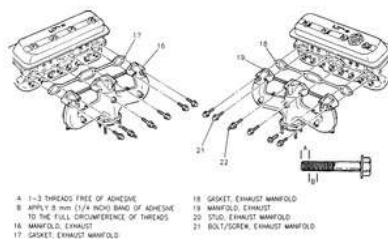
1. Disconnect the negative battery cable.
2. Raise and safely support the vehicle.
3. On 1993–96 convertibles, remove the underbody crossbrace.
4. Remove the catalytic converter from the exhaust manifold.
5. For 1993–96 vehicles, remove the complete exhaust system.
6. Carefully lower the vehicle.
7. Remove the fuel rail covers.
8. Detach the wiring harness connectors from the fuel injectors.
9. Disconnect the vacuum hose from the fuel pressure regulator.
10. Unfasten the fuel rail mounting bolts, then remove the fuel injectors and fuel rail from the manifold.
11. Tag and disconnect the spark plug wires from the spark plugs, then unfasten the wire clips from the supports.
12. Remove the spark plugs.
13. Remove the front spark plug bracket and bolt.
14. Remove the oil level indicator and tube.
15. Disconnect the AIR pipe (secondary air injection), then remove the gasket and check valve as an assembly from the intake and exhaust manifolds and cylinder head.

Fig. 12: View of the secondary air injection valve and related components — 1995 vehicle shown, other years similar



16. Unfasten the exhaust manifold studs and bolts, then remove the heat shields, exhaust manifold and gasket. Discard the gasket and replace with new ones during installation. Thoroughly clean the gasket mating surfaces. For 1995–96 vehicles, clean the exhaust manifold bolt holes with a $\frac{3}{8}$ in. tag, then flush the holes with a suitable cleaning solvent.

Fig. 13: Exploded view of the exhaust manifold assemblies — 5.7L (VIN P and 5) engines



To install:

17. Position a new gasket, then install the exhaust manifold and heat shields. For 1995–96 vehicles, apply a $\frac{1}{4}$ in. (8mm) band of suitable adhesive to the bolt threads.
18. For Install the retaining studs and bolts, then tighten to the following specifications:
 - A. 1993 vehicles: 26 ft. lbs. (35 Nm)
 - B. 1994 vehicles: 35 ft. lbs. (47 Nm)
 - C. 1995 vehicles: 26 ft. lbs. (35 Nm)
 - D. 1996 vehicles: 30 ft. lbs. (40 Nm).
19. Install the AIR pipe, gasket and check valve and secure with the mounting bolts. Tighten the AIR pipe fitting-to-exhaust manifold to 25 ft. lbs. (34 Nm). Tighten the bracket bolt to 25 ft. lbs. (34 Nm). Tighten the AIR pipe flange bolts to 19 ft. lbs. (26 Nm).
20. Apply a suitable sealant around the oil level indicator tube, about $\frac{1}{2}$ in. (13mm) below the bead. Install the oil level indicator and tube to the cylinder block.
21. Install the front spark plug bracket and bolt. Install the spark plugs. Tighten the bracket bolts to 105 inch lbs. (12 Nm), and the spark plugs to 11 ft. lbs. (15 Nm).
22. Attach the spark plug wires and retaining clips.
23. Install the fuel injector and rail assembly to the intake manifold. Install the mounting bolts and tighten to 15 ft. lbs. (20 Nm).
24. Connect the vacuum hose to the fuel pressure regulator, and attach the wiring harness connectors to the fuel pressure regulator.
25. Install the fuel rail covers.
26. Raise and safely support the vehicle.
27. If removed, install the complete exhaust system.
28. Install the catalytic converter to the exhaust manifold and secure with the retaining nuts. Tighten the nuts to 15 ft. lbs. (21 Nm).
29. On 1993–96 convertibles, install the underbody crossbrace.
30. Carefully lower the vehicle, then connect the negative battery cable.

LEFT SIDE

1. Disconnect the negative battery cable.
2. Raise and safely support the vehicle.
3. On 1993–96 convertibles, remove the underbody crossbrace.
4. Remove the catalytic converter from the exhaust manifold.
5. For 1993–96 vehicles, remove the complete exhaust system.
6. Carefully lower the vehicle.
7. Remove the air intake duct.
8. Remove the serpentine drive belt.
9. For 1992 vehicles, remove the left wheel well center panel.
10. For 1993–96 vehicles, remove the ASR adjuster from the wheel well center panel and position it aside.
11. For 1992 vehicles, remove the A/C compressor/alternator top brace. Unbolt the A/C compressor and position it aside. Do NOT disconnect the refrigerant lines.
12. For 1993–96 vehicles, unbolt and reposition the alternator and A/C compressor. Do NOT disconnect the refrigerant lines from the compressor.
13. Remove the AIR pipe, check valve and hose as an assembly from the exhaust manifold.
14. Tag and disconnect the spark plug wires from the plugs, then detach the wire clips from the supports.
15. Remove the A/C compressor and accessory bracket braces.
16. Remove the spark plug wire supports, then remove the spark plugs.
17. Unfasten the exhaust manifold studs and bolts. Remove the heat shields, and the exhaust manifold and gasket.
18. Discard the gasket and thoroughly clean the gasket mating surfaces. For 1995–96 vehicles, clean the exhaust manifold bolt holes with a $\frac{3}{8}$ in. tag, then flush the holes with a suitable cleaning solvent.

To install:

19. Position a new gasket, then install the exhaust manifold and heat shields. For 1995–96 vehicles, apply a $\frac{1}{4}$ in. (8mm) band of suitable adhesive to the bolt threads.
20. For Install the retaining studs and bolts, then tighten to the following specifications:
 - A. 1993 vehicles: 26 ft. lbs. (35 Nm)
 - B. 1994 vehicles: 35 ft. lbs. (47 Nm)
 - C. 1995 vehicles: 26 ft. lbs. (35 Nm)
 - D. 1996 vehicles: 30 ft. lbs. (40 Nm)
21. Install the spark plug and secure with the spark plug supports. Tighten the spark plugs to 11 ft. lbs. (15 Nm) and the wire supports to 105 inch lbs. (12 Nm).
22. Install the A/C compressor and accessory bracket braces to the exhaust manifold.
23. Connect the spark plug wires and install the retaining clips.
24. Install the AIR pipe, check valve and hose assembly. Tighten the AIR pipe fitting-to-exhaust manifold to 25 ft. lbs. (34 Nm).
25. For 1993–96 vehicles, install the compressor and alternator.
26. For 1992 vehicles, install the A/C compressor and the compressor and alternator top brace.
27. Install the left wheel well center panel or ASR adjuster assembly, as applicable.
28. Install the serpentine drive belt and the air intake duct.
29. Raise and safely support the vehicle.
30. If removed, install the complete exhaust system.

31. Install the catalytic converter to the exhaust manifold and secure with the retaining nuts. Tighten the nuts to 15 ft. lbs. (21 Nm).
32. On 1993–96 convertibles, install the underbody crossbrace.
33. Carefully lower the vehicle.
34. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. For 5.7L (VIN 8) engines, remove the clutch cover assembly and clutch disc.
2. Remove the transmission.
3. Unfasten the bolts attaching the flywheel to the crankshaft flange. If may be necessary to use tool J 37096 or equivalent to hold the flywheel in place when removing the bolts. Remove the flywheel.

Fig. 1: Manual and automatic transmission flywheel applications — 1992 vehicle shown

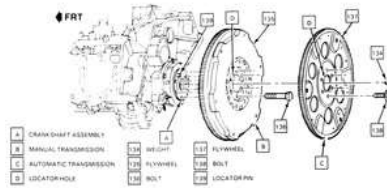
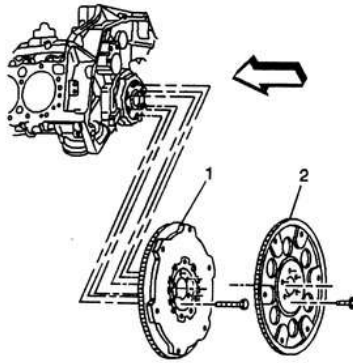


Fig. 2: Exploded view of the flywheel mounting — 1996 vehicle shown



4. Inspect the flywheel for cracks, and inspect the ring gear for burrs or worn teeth. Replace the flywheel if any damage is apparent. Remove burrs with a mill file.

To install:

5. Install the flywheel. The flywheel will only attach to the crankshaft in one position, as the bolt holes are unevenly spaced.
6. Install the bolts and tighten the bolts in a crisscross pattern to 74 ft. lbs. (100 Nm).
7. Install the transmission.
8. If removed, install the clutch disc and clutch cover assembly.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

5.7L (VIN 8) Engine

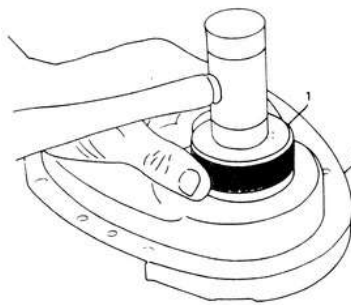
COVER REMOVED

1. Remove the front cover from the vehicle.
2. Use a suitable tool to pry the oil seal out of the cover from the front, being very careful not to damage the cover.

To install:

3. Support the rear of the cover at the seal area.
4. Install the seal using tool J 35468 or equivalent front cover aligner and oil seal installer, so that the open end of the seal is toward the inside of the cover.
5. Install the front cover in the vehicle.

Fig. 1: You must use the suitable tool to drive the seal into the front cover — 5.7L (VIN 8) engine



- 1 J 35468
- 2 COVER, ENGINE FRONT

COVER INSTALLED

1. Remove the crankshaft (torsional) damper.
2. Use a suitable tool to pry the oil seal out of the cover from the front, being very careful not to damage the cover.

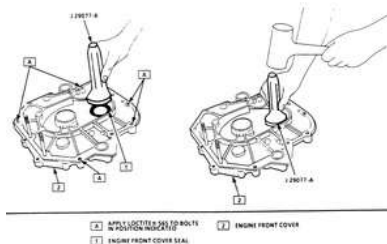
To install:

3. Install the seal using tool J 35468 or equivalent front cover aligner and oil seal installer, so that the open end of the seal is toward the inside of the cover.

5.7L (VIN J) Engine

1. Disconnect the battery negative cable.
2. Remove the timing chain front cover assembly.
3. Remove the seal from the front cover using J-29077-A or equivalent seal remover tool.
4. Thoroughly clean the cylinder case, front cover and water pump sealing surfaces.

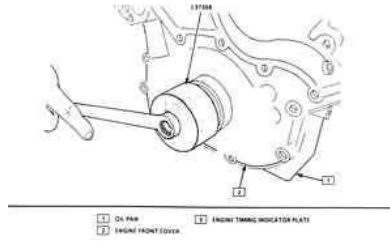
Fig. 2: Removing the timing chain front cover seal, using the proper tools



To install:

5. Apply Loctite® 262 to studs and Loctite® 565 to the bolt threads.
6. Install a new cover gasket and the cover, nuts and bolts.

Fig. 3: Installation of the front cover seal — 5.7L (VIN J) engine



7. Install the new seal coated with engine oil using tool J-37309 or equivalent.

NOTE: Do not remove seal installing tool J-37309, until the front cover bolts are tightened.

8. Tighten the front cover attaching bolts to 19 inch lbs. (26 Nm) and the stud nuts to 21 ft. lbs. (28 Nm).
9. Complete the front cover installation procedure and connect the negative battery cable.

5.7L (VIN P and 5) Engines

1. Disconnect the battery negative cable.
2. Remove the engine front cover.
3. Using a suitable tool, remove the crankshaft, distributor shaft and/or water pump driven gear shaft seals, as necessary.
4. As applicable; use tool J-35468 or equivalent aligner and installer, to install the crankshaft seal, tool J-39090 or equivalent, to install the distributor shaft seal and/or tool J-39088 or equivalent, to install the water pump shaft seal.
5. Install the engine front cover.
6. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

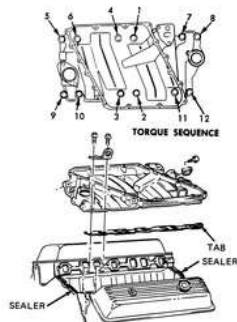
Fuel Delivery: FI | Fuel: GAS

5.7L (VIN 8) Engine

1984 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly.
3. Disconnect the fuel inlet and return lines.
4. Tag and disconnect the necessary vacuum lines.
5. Label and detach the necessary electrical connections.
6. Disconnect the accelerator, cruise control and detent cables.
7. Disconnect the cable from the accelerator bracket.
8. Remove the intake cover nuts and bolts, then remove the cover.
9. Drain the cooling system into a suitable container.
10. Disconnect the radiator hose from the thermostat outlet and alternator brace.
11. Remove the distributor cap.
12. Matchmark the installed position of the distributor, then remove the distributor from the engine.
13. Disconnect the heater hose from the rear of the intake.
14. Remove the accessory drive belt.
15. Remove the AIR pump pulley.
16. Remove the AIR pump valve adapter, pump mounting bolts, then remove the pump.
17. Detach the coolant temperature sensor electrical connector.
18. Unfasten the intake manifold bolts, then remove the intake manifold.
19. Remove the gasket(s), then thoroughly clean the gasket mating surfaces.

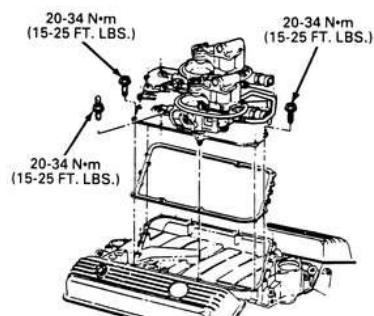
Fig. 1: Exploded view of the intake manifold and gaskets, and bolt tightening sequence — 1984 5.7L (VIN 8) engine



To install:

20. Position the gaskets on the cylinder head, with the blocked openings in the gaskets positioned at the rear of the engine.
21. Bend the gasket tab flush with the face of the cylinder head, then apply a $\frac{3}{16}$ in. (5mm) bead of RTV sealant on the front and rear ridges of the cylinder case.
22. Apply Loctite® 1052624 or equivalent to the manifold mounting bolts.
23. Install the intake manifold mounting bolts and tighten, in the sequence shown in the accompanying figure, to 35 ft. lbs. (47 Nm).
24. The remainder of installation is the reverse of the removal procedure.
25. Tighten the intake cover (TBI assembly) retainers to the specifications shown in the accompanying figure.

Fig. 2: The TBI assembly/intake cover retainers must be tightened to the proper specifications



26. Connect the negative battery cable.

27. Fill the cooling system with the proper type and amount of coolant.

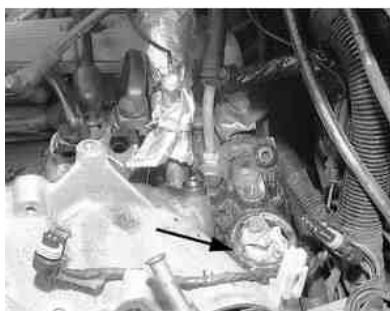
1985-91 VEHICLES

1. Disconnect the negative battery cable.
2. Properly relieve the fuel system pressure, as outlined in section 5 of this manual.
3. Drain the engine coolant into a suitable container.
4. Disconnect the throttle and cruise control cables from the throttle body and bracket.
5. If equipped, disconnect the TV cable from the throttle body and bracket.
6. Remove the bracket from the intake plenum.
7. Detach the electrical connectors from the following components:
 - Coolant temperature sensor
 - Throttle Position Sensor (TPS)
 - Intake Air Temperature (IAT) sensor
 - Idle Air Control (IAC) valve
 - Manifold Absolute Pressure (MAP) sensor
8. Remove the air intake duct from the throttle body.
9. Tag and disconnect the vacuum hoses from the throttle body and intake plenum.
10. Disconnect the heater hoses from the throttle body.
11. Remove the power brake vacuum booster fitting from the plenum.
12. Unfasten the runner-to-plenum bolts, then remove the plenum from the engine.
13. Detach the vacuum harness from the EGR solenoid.
14. Remove the EGR solenoid from the coolant outlet, then remove the EGR valve from the manifold.
15. Unfasten the injector harness retaining nuts.
16. Remove the runner-to-manifold bolts, then remove the runner.
17. Detach the injector harness connectors.
18. Disconnect the fuel lines, then remove the fuel rail and injector assembly. For more information, please refer to Section 5 of this manual.
19. Remove the distributor assembly, as outlined in Section 2 of this manual.

Fig. 3: Remove the distributor from the engine



Fig. 4: Stuff a rag or shop towel into the distributor hold, to prevent debris from falling into the engine



20. Remove the AIR pump brace.

Fig. 5: Remove the retaining bolts, then remove the AIR pump brace



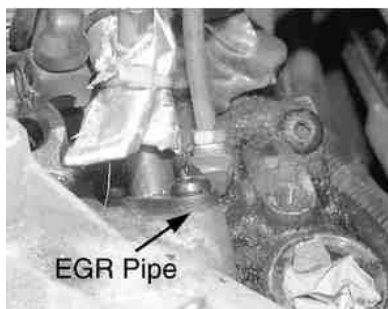
21. Disconnect the radiator upper hose at the coolant outlet. If necessary, remove the coolant outlet.

Fig. 6: If necessary, unfasten the mounting bolts and remove the coolant outlet



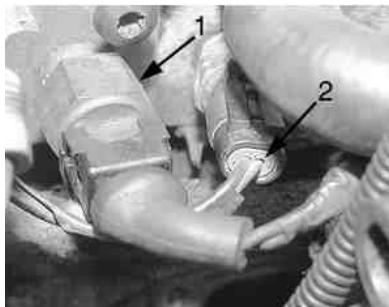
22. Disconnect the EGR pipe and position it aside.

Fig. 7: Remove the 2 retaining screws, then position the EGR pipe aside



23. Disconnect the PCV valve hose and the crankcase vent tube from the manifold.
24. Detach the coolant temperature sensor and temperature switch electrical connectors.

Fig. 8: Unplug the electrical connectors from the coolant temperature switch (1) and sensor (2)



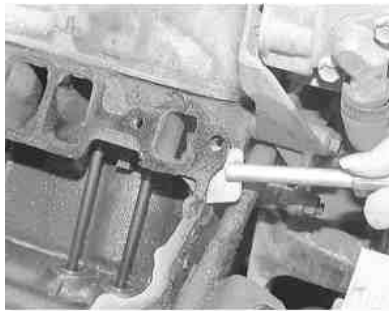
25. Unfasten the intake manifold mounting bolts, then remove the manifold. If the manifold is stuck on the cylinder block, carefully use a pry tool on the end mounting boss of the manifold only, to pry the manifold up. Never pry under the sides of the manifold!

Fig. 9: If the manifold sticks to the block, carefully use a block of wood and a prytool to carefully pry up on the mounting boss on the end of the manifold



26. Remove the gasket(s), then thoroughly clean the gasket mating surfaces.

Fig. 10: Remove and discard the intake manifold gaskets



To install:

27. Position new gaskets on the cylinder head. The coolant passage restrictor in the gaskets must be positioned at the rear of the engine. Bend the gasket tab flush with the front face of the cylinder head.
 28. Place a 0.2 in. (5mm) bead of RTV sealant on the front and rear ridges of the cylinder case. Apply a suitable thread locking sealer to the manifold bolts.
- NOTE: When installing the manifold, the sealant must still be wet to the touch when installing the bolts.**
29. Position the intake manifold, then install the manifold bolts. Tighten, in the sequences shown in the accompanying figure, to the following specifications:
 - A. 1985–88 vehicles: 25–45 ft. lbs. (34–61 Nm).
 - B. 1989 vehicles: 35 ft. lbs. (47 Nm).
 - C. 1990–90 vehicles: all bolts except 1 & 4: 35 ft. lbs. (47 Nm). Bolts 1 & 4 to 45 ft. lbs. (61 Nm).

Fig. 11: Exploded view of the intake manifold and bolt tightening sequence — 1985–88 vehicles

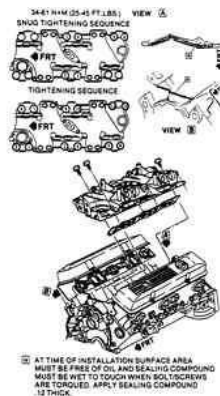


Fig. 12: You must tighten the intake manifold bolts in the proper sequence — 1989 vehicles

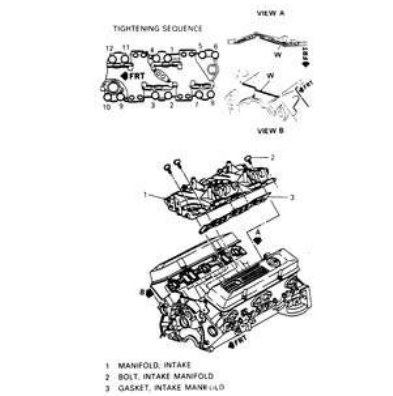
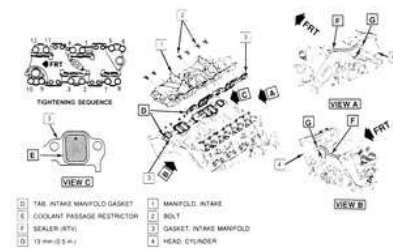


Fig. 13: Exploded view of the intake manifold installation and bolt tightening sequence — 1990–91 vehicles



30. Connect the crankcase vent tube and PCV valve hose to the manifold.
31. Install the EGR valve pipe and the AIR pump brace.
32. Connect the radiator upper hose at the coolant outlet.
33. Install the distributor.
34. Install the fuel rail and injector assembly, then connect the fuel lines.
35. Attach the injector harness connectors.
36. Install the runners, gaskets and the runner-to-manifold bolts and tighten to 25 ft. lbs. (34 Nm).
37. Install the injector harness and nuts. Tighten the nuts to 89 inch lbs. (10 Nm).
38. Install the EGR valve to the manifold and tighten the mounting bolts to 12 ft. lbs. (16 Nm).
39. Install the EGR solenoid on the coolant outlet and tighten the coolant outlet bolt to 25 ft. lbs. (34 Nm).
40. Connect the vacuum harness to the EGR solenoid.
41. Install the plenum and runner-to-plenum bolts. Tighten the bolts to 25 ft. lbs. (34 Nm).
42. Connect the power brake vacuum fitting at the plenum. Tighten the fitting to 108 inch lbs. (12 Nm).
43. Attach the heater hoses to the throttle body.
44. Connect all vacuum hoses, as tagged during removal.
45. Install the air intake duct.
46. Attach the electrical connector to the following components:
47. Manifold Absolute Pressure (MAP) sensor
48. Idle Air Control (IAC) valve
49. Intake Air Temperature (IAT) sensor
50. Throttle Position Sensor (TPS)
51. Coolant temperature sensor
52. Install the cable bracket to the plenum.
53. If equipped, install the TV cable, to the bracket and throttle body.
54. Connect the throttle and cruise control cables to the bracket and throttle body.
55. Connect the negative battery cable.
56. Fill the cooling system with the proper type and amount of coolant.

5.7L (VIN J) Engine

NOTE: These vehicles use an intake plenum instead of a conventional intake manifold assembly.

1. Disconnect the negative battery cable.
2. Properly relieve the fuel system pressure.
3. Drain the engine coolant into a suitable container.
4. Remove the air intake duct.
5. Unfasten the screws and nuts securing the cable shield and shield.
6. Disconnect the control cable from the throttle body.
7. Unfasten the screws securing the cable hold-down clamps from the plenum.
8. Remove the fresh air hose from the left and right side of the throttle body extension.
9. Tag and detach the electrical connections from the following components:
 - Throttle Position Sensor (TPS)
 - Idle Air Control (IAC) valve
 - Manifold Air Temperature (MAT)

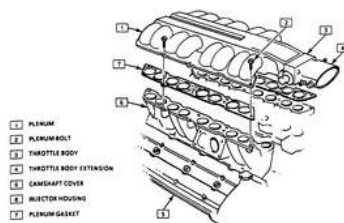
10. Disconnect the coolant bleed hose from the plenum.
11. Detach the power brake booster vacuum hose from the plenum.
12. Disconnect the vacuum hose from between the fuel pressure regulator and plenum.
13. Tag and disconnect vacuum hoses from the mid-plenum; left and right sides.
14. Detach the vacuum hose from the MAP sensor and plenum.
15. Disconnect the fuel lines from the fuel rail.
16. Unfasten the bolts securing the plenum to the injector housing.
17. Detach the electrical connectors from the ignition module.
18. Unplug the electrical connector from the MAP sensor.
19. Remove the purge solenoid/PCV valve hose fitting from the plenum.
20. Tag and detach the purge canister hose connectors.
21. Remove the upper EGR pipe bolts and pipe.

WARNING

You must install some type of cover on the intake openings whenever the plenum is removed.

22. Remove the plenum assembly and gaskets from the vehicle. Cover the injector housing openings with a piece of tape, or something that will keep debris out.
23. If the plenum is being replaced, transfer the following parts to the new plenum:
 - A. MAP sensor and bracket; tighten the bracket-to-plenum screws to 89 inch lbs. (10 Nm).
 - B. Throttle body; tighten the throttle body-to-plenum screws to 19 ft. lbs. (26 Nm).
 - C. Throttle body extension; tighten the extension-to-plenum screws to 53 inch lbs. (6 Nm).
 - D. Ignition module; tighten the module-to-plenum screws to 89 inch lbs. (10 Nm).
24. Thoroughly clean the injector housing and intake plenum mating surfaces.

Fig. 14: Exploded view of the intake plenum, gaskets and related components — 5.7L (VIN J) engines



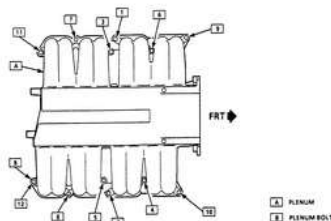
To install:

25. Remove the covering or tape from the injector housings.
26. Attach the electrical connectors onto the ignition module.
27. Position the intake plenum, with the MAP sensor, over the fuel pressure regulator.
28. Attach the MAP sensor electrical connector.
29. Connect the vacuum hose to the MAP sensor and plenum.

NOTE: Before securing the plenum to the injector housings, be sure that the remaining vacuum hoses and wiring are accessible.

30. Position new plenum gaskets, then install the plenum and secure with the retaining bolts. Tighten the bolts, in the sequence shown in the accompanying figure, to 19 ft. lbs. (26 Nm).

Fig. 15: Intake plenum bolt tightening sequence — 5.7L (VIN J) engines



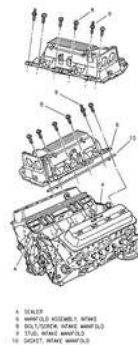
31. Connect the vacuum hoses to the mid-plenum.
32. Attach the fuel lines to the fuel rail and tighten the fittings to 19 ft. lbs. (26 Nm).
33. Connect the vacuum hose between the fuel pressure regulator and plenum.
34. Attach the power brake booster vacuum hose onto the plenum.
35. Fasten the fresh air hose onto the left and right side of the throttle body extension.
36. Install the purge solenoid/PCV valve hose fitting onto the plenum.
37. Connect the rear right side purge canister connection.
38. Attach the electrical connectors to:
 - Throttle Position Sensor (TPS)
 - Idle Air Control (IAC) valve

- Manifold Air Temperature (MAT)
39. Install the screws securing the cable hold-down clamps onto the plenum and tighten to 18 inch lbs. (2 Nm).
 40. Connect the coolant bleed hose onto the plenum.
 41. Attach the control cable to the throttle body. Install the cable shield, screws and nuts onto the throttle body. Tighten to 27 inch lbs. (3 Nm).
 42. Install the upper EGR pipe and bolts and tighten to 89 inch lbs. (10 Nm).
 43. Install the air intake duct.
 44. Connect the negative battery cable.
 45. Fill the cooling system with the proper type and amount of coolant.

5.7L (VIN P and 5) Engines

1. Disconnect the negative battery cable.
2. Properly relieve the fuel system pressure.
3. Drain the engine coolant into a suitable container.
4. Remove the throttle body air duct.
5. Remove the fuel rail covers.
6. Tag and detach the wiring harness connectors from the fuel injectors.
7. Disconnect the left and right wiring harness and position them aside.
8. Remove the accelerator cable bracket bolts/screws, then remove the bracket and cables from the throttle body.
9. Disconnect the secondary air injection diverter valve hoses.
10. Remove the electrical ground strap from the intake manifold assembly.
11. Unfasten the fuel rail bolts/screws, then remove the fuel rail from the manifold and position it aside.
12. Disconnect the vacuum and crankcase vent hoses.
13. Remove the EGR control valve nut, then remove the control valve.
14. Unfasten the emission canister purge control valve bracket nut, then remove the control valve.
15. Unfasten the EGR valve retaining bolts, then remove the EGR valve.
16. Disconnect the secondary air injection pipe from the intake and right exhaust manifold assemblies.
17. Unfasten the retainers, then remove the alternator brace.
18. Disconnect the coolant hoses from the throttle body.
19. Unfasten the retaining bolts/screws then remove the throttle body and gasket.
20. Remove the intake manifold bolts/screw and studs, then remove the intake manifold and gaskets. Discard the gaskets and replace with new ones. Clean the intake manifold retaining bolts/screws and studs. Clean the cylinder head, block and intake manifold mating surfaces.

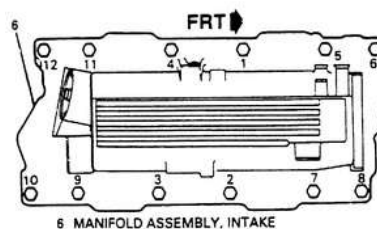
Fig. 16: Exploded view of the intake manifold



To install:

21. Apply a $\frac{3}{16}$ in. (5mm) bead of RTV sealant to the front and rear of the engine block. Extend the bead of sealant $\frac{1}{2}$ in. (13mm) up each cylinder head assembly to seal and retain the gaskets.
22. Position new gaskets, then install the cylinder head. Install the intake manifold retaining bolts/screw and studs and tighten, in the sequences shown in the accompanying figure, to the following specifications:
 - A. Step 1 (all vehicles): tighten all bolts, in sequence, to 71 inch lbs. (8 Nm).
 - B. Step 2 (1992 vehicles): tighten all bolts, in sequence, to 19 ft. lbs. (26 Nm).
 - C. Step 2 (1993–96 vehicles): tighten all bolts, in sequence, to 35 ft. lbs. (48 Nm).

Fig. 17: The intake manifold bolts must be tightened in the proper sequence



23. Install the throttle body gasket, and throttle body and secure with the retaining bolts/screws. Tighten to 18 ft. lbs. (25 Nm).

24. Connect the coolant hoses to the throttle body.
25. Install the alternator brace.
26. Install the accelerator cable bracket and cables. Tighten the cable bracket bolts/screw to 89 inch lbs. (10 Nm).
27. Install the secondary air injection pipe fitting. Tighten the air injection pipe exhaust manifold fitting to 41 ft. lbs. (55 Nm). Tighten the air injection pipe flange-to-intake manifold bolts/screws to 19 ft. lbs. (26 Nm). Tighten the air injection pipe bracket-to-cylinder head bolt/screw to 25 ft. lbs. (34 Nm).
28. Install the EGR valve assembly and secure with the retaining bolts/screws. Install the EGR control valve and secure with the retaining nut. Tighten the valve bolts/screws and the nut to 18 ft. lbs. (25 Nm).
29. Install the emission canister purge control valve and nut. Tighten the nut to 15 ft. lbs. (20 Nm).
30. Connect the vacuum and crankcase hoses.
31. Install the fuel rail to the manifold. Connect the fuel pressure regulator vacuum tube. Install the fuel rail bolts/screws and tighten to 89 inch lbs. (10 Nm).
32. Attach the electrical ground strap to the intake manifold.
33. Connect the secondary air injection diverter valve hoses.
34. Attach the wiring harness connectors to the fuel injectors. Make sure to match the proper electrical connector with its corresponding cylinder.
35. Connect the throttle body air duct.
36. Install the fuel rail covers.
37. Connect the negative battery cable.
38. Fill the cooling system with the proper type and amount of coolant.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

5.7L (VIN 8) Engine

NOTE: The 1984–85 vehicles are equipped with separate oil pan side gaskets and end seals which must be replaced every time the oil pan is removed. The 1986 and later vehicles have a one piece gasket/seal, that can be reused if it is not damaged during removal.

1. Disconnect the negative battery cable.
2. Raise and safely support the vehicle. Drain the engine oil into a suitable container.
3. On 1986–91 vehicles, perform the following:
 - A. Disconnect the transmission oil cooler lines from the flywheel cover. Plug the lines to avoid contaminating the system.
 - B. Unfasten the catalytic converter AIR pipe clamps from the manifold and exhaust pipe.
4. Disconnect the starter wiring and remove the starter brace nut.
5. Unfasten the starter mounting bolts, then remove the starter and position it aside.
6. On 1986–91 vehicles, remove the oil filter, then remove the oil cooler adapter from the block.
7. If not already done, remove the retainers, then remove the flywheel cover.
8. On 1986–91 vehicles, disconnect and plug the oil cooler line from the oil pan, and remove the ESC sensor shield, if equipped.
9. On 1986–91 vehicles, if necessary, remove the front crossmember braces.
10. Unfasten the oil pan bolts, noting their sizes and locations for installation, then carefully lower the oil pan and remove it from the vehicle.
11. Thoroughly clean the oil pan and block sealing surfaces.

To install:

Fig. 1: Exploded view of the oil pan, including the 4-piece gasket/end seal assemblies — 1984–85 5.7L (VIN 8) engine

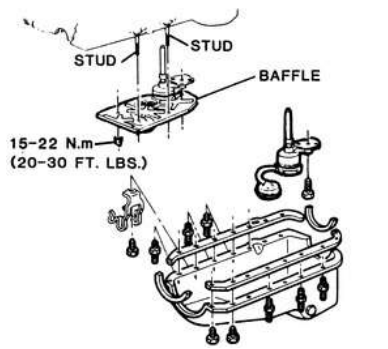
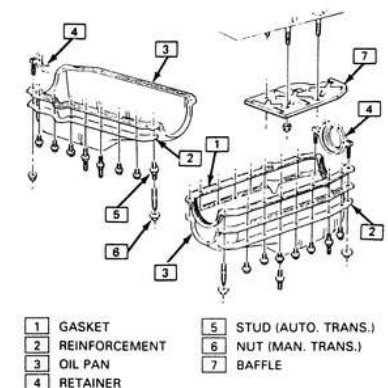


Fig. 2: On 1986–91 vehicles, the oil pan uses a 1-piece gasket which can be reused, if it is not damaged during oil pan removal



12. On 1986–91 vehicles, apply a small amount of RTV sealant to the front and rear corners of the oil pan.
13. Install the oil pan, using new seals and gaskets on 1984–85 vehicles, or reusing the old gasket, if it is in good condition on 1986–91 vehicles.
14. Install the oil pan retainers, in their proper positions, and tighten them as follows:
 - A. 1984–85 vehicles: 80 inch lbs. (9 Nm).
 - B. 1986 vehicles: tighten the oil pan-to-crankcase nuts to 14 ft. lbs. (19 Nm) and the oil pan studs to 80 inch lbs. (9 Nm).
 - C. 1987–88 vehicles: tighten the oil pan-to-crankcase nuts to 16 ft. lbs. (22 Nm), the corner oil pan-to-crankcase studs to 15 inch lbs. (2 Nm) and the oil pan-to-case studs to 8 ft. lbs. (11 Nm).
 - D. 1989–91 vehicles: 16 ft. lbs. (22 Nm).
15. If removed, install the front crossmember braces and install the ESC sensor shield.
16. Install the flywheel cover/splash shield.
17. Install the starter and secure with the mounting bolts.
18. Attach the starter wiring and install the starter brace.

19. On 1986–91 vehicles, perform the following:
 - A. Unplug and attach the oil cooler line to the oil pan. Attach the oil cooler adapter to the block, then install a new oil filter.
 - B. Attach the catalytic converter AIR pipe clamps to the manifold and exhaust pipe.
 - C. Unplug and connect the transmission oil cooler lines to the flywheel cover.
20. If removed, unplug and connect the transmission oil cooler lines.
21. Carefully lower the vehicle.
22. Fill the engine crankcase with the proper type and amount of clean engine oil.
23. Connect the negative battery cable.

5.7L (VIN J) Engine

1. Disconnect negative battery cable and remove the oil level indicator from the guide tube.
2. Raise and support the vehicle safely, then drain the engine oil.
3. Remove the clutch housing cover attaching bolts, then remove the cover from the vehicle.
4. If equipped, remove the left and right wiring harness heat shields from the oil pan.
5. Disconnect the low oil sensor connection and remove the sensor from the pan.
6. Remove the bolts attaching the AIR pipe bracket to the oil pan, then remove the left and right converter heat shields.
7. Remove the nuts attaching the engine mounts at the front crossmember rear brace on the left and right sides. Remove the bolts attaching the front crossmember to the rear braces.
8. Remove the bolts attaching the left front crossmember rear brace to the left front side member, then remove the brace from the vehicle.
9. Remove the bolts attaching the right front crossmember rear brace to the right front side member, then remove the brace from the vehicle.
10. Remove the bolts attaching the oil pan and crankcase. Remove the oil pan and gasket from the vehicle.

Fig. 3: Exploded view of the oil pan and related components — 1990 5.7L (VIN J) engine shown

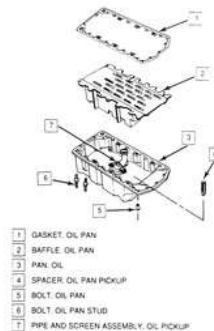
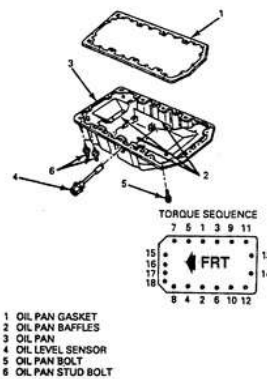


Fig. 4: Oil pan mounting and retainer tightening sequence — 1995 5.7L (VIN J) engine shown



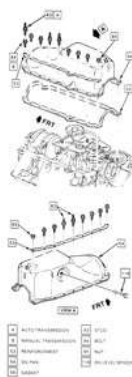
To install:

11. Apply Loctite® 242 to the oil pan screw threads.
12. Install the oil pan and new gasket to the engine crankcase. Tighten the oil pan front screws to 106 inch lbs. (12 Nm). Tighten the oil pan bolts to 23 ft. lbs. (31 Nm).
13. Install the front crossmember rear braces and bolts retaining the braces to the front crossmember bolts. Finger-tighten the bolts.
14. Install the bolts retaining the left front crossmember rear brace to the left front side member, finger-tight.
15. Install the bolts retaining the right front crossmember rear brace to the left front side member, finger-tight.
16. Tighten the left and right front crossmember rear brace to front crossmember bolts to 59 ft. lbs. (80 Nm), then tighten the left and right front crossmember rear brace to front side member bolts to 46 ft. lbs. (62 Nm).
17. Install the nuts retaining the engine mounts to the front crossmember and tighten to 40 ft. lbs. (54 Nm).
18. Install the converter heat shields and screws.
19. Install the bolts retaining the AIR pipe bracket to the oil pan and tighten to 89 inch lbs. (10 Nm).
20. Install the oil level sensor in the pan and tighten to 18 ft. lbs. (25 Nm), then engage the wiring harness to the sensor.
21. Install the left and right wiring harness heat shields, if equipped, and tighten the bolts to 89 inch lbs. (10 Nm).
22. Install the clutch housing cover and tighten the bolts to 80 inch lbs. (9 Nm).
23. Lower the vehicle and insert the oil level indicator into the guide tube.
24. Properly fill the crankcase with clean engine oil.
25. Connect the negative battery cable.
26. If equipped, reset the CHANGE OIL indicator, as outlined in Section 1 of this manual..

5.7L (VIN P and 5) Engines

1. Disconnect the negative battery cable.
2. Raise and support the vehicle safely, then drain the engine oil.
3. Disengage the oil level sensor electrical connector and remove the sensor assembly from the side of the oil pan.
4. Remove the oil filter, then remove the oil filter adapter bolts and the adapter assembly.
5. Remove the starter motor assembly.
6. Remove the left catalytic converter.
7. Remove the flywheel cover.
8. Remove the knock sensor retaining nuts and shields.
9. Remove the oil pan bolts, nuts and studs. Be sure to note the location of stud bolts.
10. Remove the oil pan, reinforcements and gasket.

Fig. 5: Exploded view of the oil pan and related components — 5.7L (VIN P) engine shown, VIN 5 similar



To install:

11. Thoroughly clean all gasket mating surfaces and apply a small amount of 1052914 or equivalent sealer, to the front cover and cylinder block junction and the rear seal retainer and cylinder block junction. Extend the bead of sealer approximately 1 inch (25mm) in either direction of these junctions.
12. Install the gasket onto the oil pan and reinforcements.
13. Install the gasket, pan and reinforcement assembly to the cylinder block with the bolts, studs and nuts.
14. Tighten the corner bolts or stud and nuts to 17 ft. lbs. (23 Nm) on 1992 vehicles or to 15 ft. lbs. (20 Nm) for 1993–96 vehicles. Tighten the remainder of the bolts and studs to 8 ft. lbs. (11 Nm).
15. Install the oil level sensor and tighten to 16 ft. lbs. (22 Nm).
16. Install the knock sensor shields and nuts. Tighten the nuts to 75 inch lbs. (8.5 Nm).
17. Install the flywheel cover.
18. Install the left catalytic converter.
19. Install the starter motor assembly.
20. Engage the wiring harness to the oil level sensor terminal.
21. Install the oil filter adapter and tighten the retainers to 17 ft. lbs. (23 Nm), then install the oil filter.
22. Lower the vehicle and properly fill the crankcase with clean engine oil.
23. Connect the negative battery cable.
24. If equipped, reset the CHANGE OIL indicator, as outlined in Section 1 of this manual.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

5.7L (VIN 8) Engine

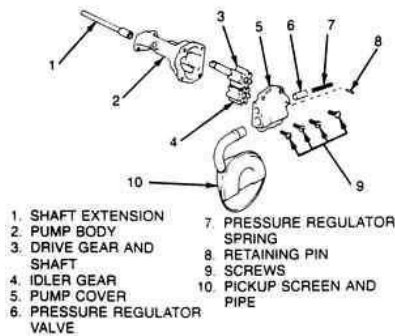
1. Disconnect the negative battery cable.
2. Raise and safely support the vehicle, then drain the engine oil into a suitable container.
3. Remove the oil pan, as outlined earlier in this section.

Fig. 1: Once the oil pan is removed, the oil pump can be accessed



4. Remove the pump-to-rear main bearing cap bolt, then remove the pump and extension shaft.

Fig. 2: Exploded view of the oil pump assembly — 5.7L (VIN 8) engine



To install:

5. Assemble the pump and extension shaft to the rear main bearing cap, aligning the slot on the top end of the extension shaft with the drive tang on the lower end of the distributor driveshaft.
6. Install the pump-to-rear bearing cap bolt and tighten to 80 ft. lbs. (108 Nm).
 - A. Install the oil pan, as outlined earlier in this section.

5.7L (VIN J) Engine

1. Disconnect battery negative cable.
2. Remove the primary timing chain and crankshaft sprocket.
3. Remove bolts attaching the oil pump to the cylinder case, then remove the oil pump from the vehicle.
4. Remove O-rings from crankshaft and, if applicable, the oil pump.
5. For 1993–95 vehicles, remove the oil pickup seal.

Fig. 3: Exploded view of the oil pick-up and crankcase baffle — 5.7L (VIN J) engine

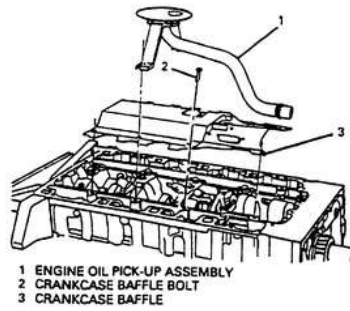


Fig. 4: View of the oil pick-up assembly — 5.7L (VIN J) engine

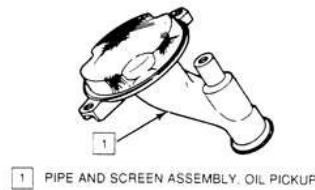
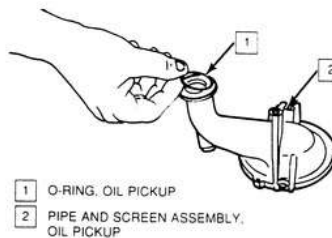


Fig. 5: On 1993–95 vehicles, remove the oil pickup seal — 5.7L (VIN J) engine



To install:

6. Install new O-rings onto the crankshaft and oil pump, as applicable.
7. If applicable, install the oil pickup assembly seal.
8. Apply Loctite® 262 to the oil pump bolts and install them along with the oil pump, finger-tight.

NOTE: Make sure the 2 flats of the pump drive gear are aligned with the 2 flats on the crankshaft. Do not force pump onto crankshaft.

9. Using oil pump aligning tool J-38135 or equivalent pump aligner/seal installer, align oil pump on the crankshaft. Tighten the oil pump bolts to 19 ft. lbs. (26 Nm).
10. Install a new oil pump shaft seal using tools J-38135 and J-38463 or equivalent aligner and seal installer.

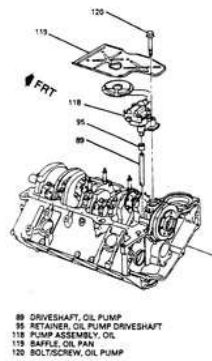
NOTE: Install a new oil pump shaft seal whenever the pump is removed from the vehicle.

11. Install the primary timing chain and crankshaft sprocket.
12. Connect the negative battery cable.

5.7L (VIN P and 5) Engines

1. Disconnect the negative battery cable.
2. Raise and support the vehicle safely.
3. Drain the engine oil and remove the oil pan.
4. Remove the oil pan baffle nuts.
5. Support the oil pump by hand and remove the bolt attaching the oil pump to the main bearing cap.
6. Carefully remove the baffle, the oil pump assembly, driveshaft and retainer.

Fig. 6: Exploded view of the oil pump and related components — 5.7L (VIN P and 5) engines



To install:

NOTE: The oil pump pickup should be submerged in oil and the pump primed prior to installation. Failure to prime the pump may result in oil pump failure or internal engine damage. Also, if the pickup screen and pipe assembly was removed from the pump, they must be replaced to assure a proper interference fit.

7. Install the oil pump assembly, shaft and retainer, aligning the slot on the top of the pump driveshaft with the drive tang on the lower end of the distributor driveshaft.
8. Install the oil pan baffle, then install the bolt to the main bearing cap, followed by the baffle nuts. Tighten the retaining bolt to 65 ft. lbs. (88 Nm) and the baffle nuts to 25 ft. lbs. (34 Nm).
9. Install the oil pan and lower the vehicle.
10. Properly fill the engine crankcase with clean engine oil.
11. Connect the negative battery cable.
12. If equipped, reset the CHANGE OIL indicator, as outlined in Section 1 of this manual..

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

CAUTION

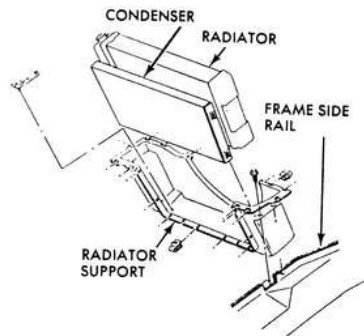
Never open, service or drain the radiator or cooling system when hot; serious burns can occur from the steam and hot coolant. Also, when draining engine coolant, keep in mind that cats and dogs are attracted to ethylene glycol antifreeze and could drink any that is left in an uncovered container or in puddles on the ground. This will prove fatal in sufficient quantities. Always drain coolant into a sealable container. Coolant should be reused unless it is contaminated or is several years old.

5.7L (VIN 8) Engines

1984-88 VEHICLES

1. Disconnect the negative battery cable.
2. Drain the cooling system into a suitable container.
3. Unfasten the hose clamp, then disconnect the upper radiator hose.
4. Remove the lower radiator hose.
5. Disconnect the overflow hose from the radiator.
6. Unbolt the A/C accumulator and position it aside, out of the way.
7. If equipped with an automatic transmission, disconnect and plug the transmission cooler line.
8. Detach the fan wiring from the fan and shroud.
9. Remove the fan in order to gain access to the lower cooler line.
10. If equipped with an automatic transmission, unfasten the transmission cooler line at the fitting, then plug the line.
11. Remove the upper shroud mounting bolts, then remove the upper shroud.
12. Carefully remove the radiator from the vehicle.

Fig. 1: Exploded view of the radiator mounting — 1984-88 vehicles



To install:

13. Position the radiator on the lower support.
14. If equipped, unplug, then connect the lower transmission cooler line.
15. Install the upper shroud and secure with the mounting bolts.
16. Install the fan and connect the wiring.
17. If equipped, unplug and connect the upper transmission cooler line.
18. Connect the upper and lower radiator hose. Secure with the hose clamps, if applicable.
19. Attach the overflow hose.
20. Place the A/C accumulator in position and secure with the mounting bolts.
21. Fill the radiator with the proper type and amount of coolant.
22. Start the engine, and allow to run (with the radiator cap still removed), until the upper hose is hot (thermostat is open). With the engine idling, add coolant to the radiator until it reaches the bottom of the filler neck.
23. Install the filler cap. Inspect for leaks. Turn the engine **OFF**.

1989-91 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the radiator cap, then drain the cooling system into a suitable container.
3. Remove the air cleaner and intake duct assembly.
4. Detach the Mass Air Flow (MAF) sensor electrical connector.
5. Unfasten the upper and lower hose clamp, then disconnect the hoses.
6. Disconnect the overflow hose from the radiator.
7. Remove the engine cooling fan upper screws from the shroud.
8. Unbolt the A/C accumulator bracket from the shroud and position aside.
9. If equipped with an automatic transmission, disconnect and plug the oil cooler line.
10. Remove the wire harness and relay from the shroud.
11. Unfasten the power steering reservoir bracket bolts from the shroud and frame.
12. Remove the shroud retaining screws, then remove the shroud.
13. Carefully remove the radiator from the vehicle.

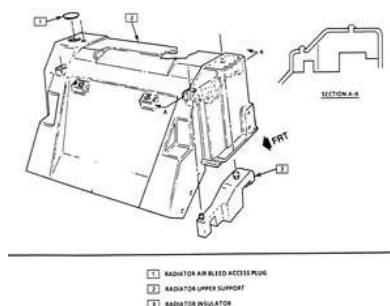
To install:

14. Position the radiator into the vehicle.
15. Install the shroud and secure with the retaining screws.
16. Fasten the power steering reservoir bracket bolts at the shroud and frame.
17. Install the wire harness and relay onto the shroud.
18. Unplug and connect the automatic transmission oil cooler line. Tighten the fittings to 20 ft. lbs. (27 Nm).
19. Position the A/C accumulator bracket on the shroud, then install the retainers.
20. Install the cooling fan screws on the shroud.
21. Connect the overflow hose to the radiator.
22. Install the lower and upper radiator hose and secure with the clamps.
23. Install the air cleaner and intake duct assembly.
24. Connect the MAF sensor electrical connector.
25. Fill the radiator with the proper type and amount of coolant.
26. Start the engine, and allow to run (with the radiator cap still removed), until the upper hose is hot (thermostat is open). With the engine idling, add coolant to the radiator until it reaches the bottom of the filler neck.
27. Install the filler cap. Inspect for leaks. Turn the engine **OFF**.

5.7L (VIN J, P and 5) Engines

1. Disconnect the negative battery cable.
2. Remove the surge tank/radiator pressure cap. Drain the engine coolant into a suitable container.
3. Remove the air cleaner assembly.
4. Remove the radiator upper deflector/shroud.
5. Detach the electrical connectors from the cooling fan relays.
6. Unfasten the bolts securing the A/C accumulator bracket to the radiator upper support, and position the bracket aside.
7. Remove the fan shroud-to-upper support retaining screws.
8. If equipped, remove the rubber access plug from the top of the radiator.
9. Unfasten the radiator air bleed/overflow hose clamp, then disconnect the hose.
10. Remove the nuts and bolt holding the upper support to the front side member.
11. Unfasten the bolts securing the oil cooler lines to the cooler.
12. Remove the seal retainers and seal from the oil cooler and A/C line.
13. If necessary, detach the electrical connection from the AIR pump and horn.
14. Remove the AIR pump.
15. Remove the bolt retaining the AIR pump bracket at the rear and loosen the front bolt.
16. Remove the air pump intake duct.
17. Unfasten the screws retaining the upper support to the lower support, then remove the upper support from the vehicle.

Fig. 2: You must remove the upper support for access to the radiator — 5.7L (VIN J, P and 5) engines



18. Loosen the radiator inlet and outlet hose clamps, then disconnect the hoses.
 19. Carefully remove the radiator from the vehicle.
- To install:**
20. Position the radiator in the vehicle.
 21. Attach the inlet and outlet hoses and secure with the retaining clamps.
 22. Install the upper support and secure with the retaining screws.
 23. Install the nuts and bolts retaining the upper support to the front side member and tighten to 18 ft. lbs. (25 Nm).
 24. Install the AIR pump intake duct. Install the bolts retaining the AIR pump bracket, then install the pump. Attach the electrical connectors to the AIR pump and horn, if necessary.
 25. Attach the electrical connectors to the cooling fan relays.
 26. Install the fan shroud-to-upper support screws and tighten to 80 inch lbs. (9 Nm).
 27. Fasten the bolts securing the accumulator bracket to the upper support. Tighten to 80 inch lbs. (9 Nm).
 28. Install the retainers to the oil cooler/A/C line seal.
 29. Fasten the bolts retaining the oil cooler lines to the cooler and tighten to 89 inch lbs. (10 Nm).
 30. Attach the air bleed hose/overflow hose and secure with the retaining clamp.
 31. Install the access plug.
 32. Attach the upper air deflector.
 33. Install the air cleaner assembly.
 34. Fill the radiator with the proper type and amount of coolant.
 35. Start the engine, and allow to run (with the radiator cap still removed), until the upper hose is hot (thermostat is open). With the engine idling, add coolant to the radiator until it reaches the bottom of the filler neck.
 36. Install the filler cap. Inspect for leaks. Turn the engine **OFF**.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

[5.7L \(VIN 8, P and 5\) Engine](#)

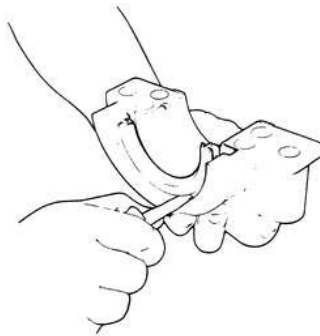
NOTE: The rear main seal on 1984–85 vehicles is a 2-piece seal. On 1986–91 vehicles, the rear main seal is a 1-piece seal.

[1984–85 VEHICLES](#)

NOTE: Always replace the upper and lower seal as a unit. On these vehicles, both halves of the seal can be replaced without removing the crankshaft. Be very careful when installing the seal to protect the sealing bead located in the channel on the outer diameter of the seal. There is an installation tool which can be used to protect the seal during positioning.

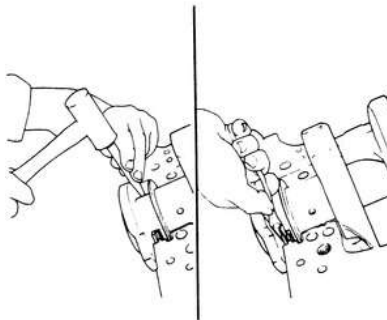
1. Remove the oil pan and oil pump.
2. Remove the oil seal from the bearing cap by carefully prying it from the bottom with a small prytool.

Fig. 1: Carefully pry the lower half of the seal out of the bearing cap



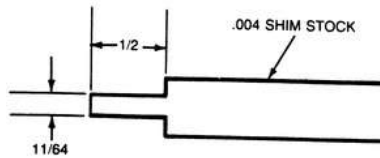
3. To remove the upper half of the seal, use a small hammer to tap a brass punch on one end of the seal until it protrudes far enough to be removed with pliers.

Fig. 2: Tap the upper half of the seal with a hammer and drift, then remove the seal with pliers



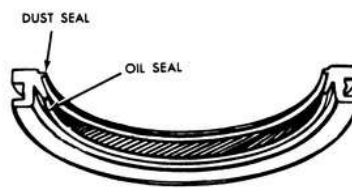
4. Use a non abrasive cleaner to removal all of the sealant and foreign material from the cylinder case bearing cap and crankshaft.
5. Inspect the components for nicks, scratches, burrs and/or machining defects at all sealing surfaces, case assembly and crankshaft.
6. Coat the seal lips and seal bead with light engine oil, but keep the oil off the seal mating ends.
7. Position the tip of the installation tool between the crankshaft and seal seat in the cylinder case.

Fig. 3: Oil seal installation tool



8. Place the seal between the crankshaft and tip of the tool so the seal bead contacts the tip of the tool. Make sure the oil seal lip is positioned toward the front of the engine.

Fig. 4: During installation, make sure the oil seal lip is toward the front of the engine

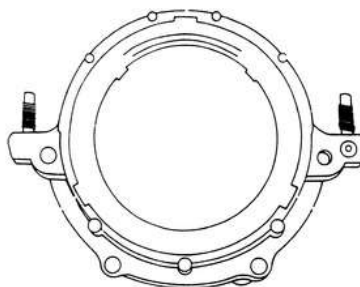


9. Roll the seal around the crankshaft, using the tool as a "shoe horn" to protect the seal bead from the sharp corner of the seal seat surface in the cylinder case. The tool must remain in position until the seal is properly positioned with both ends flush with the block.
10. Remove the tool, being careful not to withdraw the seal.
11. Install the seal half in the bearing cap, again using the tool as a "shoe horn", feeding the seal into the cap using light pressure with your thumb and finger.
12. Install the bearing cap to the case with sealant applied to the cap-to-case interface, being careful to keep the sealant off the seal split line.
13. Install the rear main bearing cap (with new seal) and tighten to 10–12 ft. lbs. (14–16 Nm). Tap the end of the crankshaft rearward then forward with a lead hammer. This will line up the thrust surfaces.

1986–96 VEHICLES

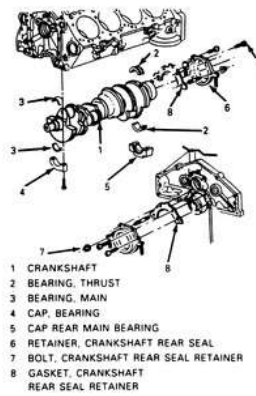
1. Disconnect the negative battery cable.
2. Remove the transmission assembly.
3. For manual transmission vehicles, remove the clutch cover and disc assembly.
4. Remove the flywheel bolts and remove the flywheel from the vehicle.
5. Using the notches provided in the seal retainer and a small suitable tool, pry the old seal from the engine. Be careful not to nick the crankshaft sealing surface when removing the seal.

Fig. 5: Rear main seal removal — 1986–91 vehicles, except 5.7L (VIN J) engine



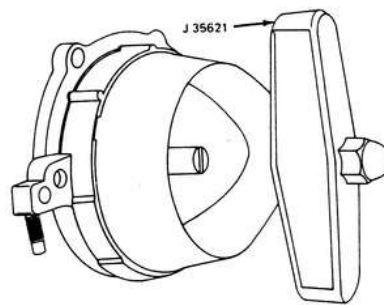
To install:

Fig. 6: Exploded view of the rear main seal and related components



6. Lubricate the inside and outside of a new seal with clean engine oil.
7. Install the seal on tool J-35621 or equivalent rear main seal installer.

Fig. 7: Use the proper tool to install the rear main seal

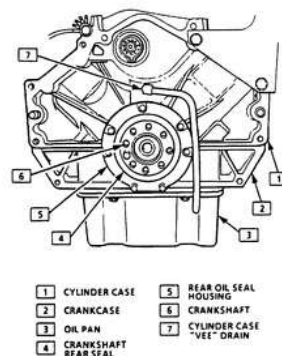


8. Thread the screws of the tool into the rear of the crankshaft and tighten the screws snugly to assure proper seal alignment and installation.
9. Tighten the tool wingnut until it bottoms and then remove the tool.
10. Install the flywheel and tighten the bolts to 74 ft. lbs. (100 Nm).
11. If equipped, install the clutch cover and disc assembly.
12. Install the transmission assembly.
13. Lower the vehicle and connect the negative battery cable.

5.7L (VIN J) Engine

1. Disconnect the negative battery cable.
2. Remove transmission assembly.
3. Remove the clutch cover and disc assembly.
4. Remove the flywheel bolts and flywheel.
5. Remove the screws attaching the crankshaft rear main oil seal/housing assembly to the cylinder case.
6. Remove the retaining screws, then remove the seal/housing assembly from the engine.
7. Remove the seal from the housing.

Fig. 8: Location of the crankshaft rear main seal — 5.7L (VIN J) engine



To install:

8. Lubricate the seal lip with engine oil.
9. Install seal into housing using crankshaft rear seal tool J-37312 or equivalent. Make sure the seal is installed 1.0–1.5mm below the housing surface.
10. Install the housing and tighten the bolts to 89 inch lbs. (10 Nm).
11. Apply Loctite® 242 or equivalent, to the bolts threads, then install the flywheel and tighten the bolts to 74 ft. lbs. (100 Nm).
12. Install the clutch cover and disc assembly.
13. Install the transmission assembly.

14. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

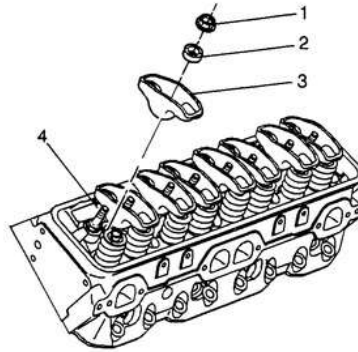
Fuel Delivery: FI | Fuel: GAS

Be sure to keep all the components in the exact order of removal so they may be installed in their original location; adjust the valve lash after replacing the rocker arms. Coat the replacement rocker arm and ball with engine oil before installation.

Rocker arm studs that have damaged threads or are loose in the cylinder heads may be replaced by reaming the bore and installing oversize studs. Oversizes available are 0.003 in. (0.076mm) and 0.013 in (0.33mm). The bore may also be tapped and screw-in studs installed. Several aftermarket companies produce complete rocker arm stud kits with installation tools.

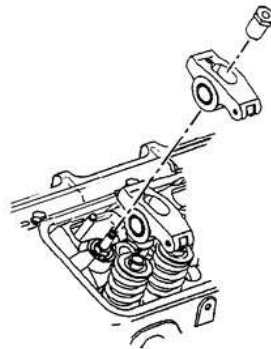
1. Disconnect the negative battery cable.
2. Remove the rocker arm cover as outlined in this section
3. For all engines, except 1996 5.7L (VIN 5) engines, remove the rocker arm nuts, balls and rocker arms.

Fig. 1: Exploded view of the rocker arm nut (1), ball (2), rocker arm (3) and stud (4)



4. For 1996 5.7L (VIN 5) engines, remove the rocker and nuts and rocker arms.

Fig. 2: For 5.7L (VIN 5) engines, unfasten the nut, then remove the rocker arm



5. If necessary, you can remove the pushrods at this time. Place components in a rack so they can be reinstalled in the same location.

To install:

6. Coat the bearings surfaces with a thin coating of Molykote® or its equivalent.
7. Install the pushrods and make sure the rod is properly seated in the lifter seat.
8. Install the rocker arm, balls (if equipped) and nut. For all engines, except the VIN 5, tighten the nut until all lash is eliminated. This can be determined by rotating the pushrod while turning the adjusting nut.
9. For vehicles through 1995, adjust the valves as follows:
 - A. The engine must be on the No. 1 firing position before proceeding. This may be determined by placing your fingers on the No. 1 rocker arms as the mark crankshaft damper is rotated towards the "0" on the timing tab. If the arms did not move, it is in the No. 1 firing position. If they did move, turn the crankshaft one full revolution to reach the No. 1 position. Remember, the mark on the crankshaft balancer must be aligned with the "0" on the timing tab.
 - B. With the engine on the number 1 firing position, exhaust valves 1, 3, 4 and 8, intake valves 1, 2, 5 and 7 may be adjusted.
 - C. Back out the adjusting nut until lash is felt at the pushrod. Tighten the adjusting nut until all lash is removed, then tighten an additional 1 turn to center the lifter plunger.
 - D. Turn the engine one revolution until the 0 timing mark is once again aligned. Exhaust valves 2, 5, 6 and 7, intake valves 3, 4, 6 and 8 may be adjusted.
10. For 1996 5.7L (VIN 5) engines, install the rocker arm nuts and tighten to 18 ft. lbs. (25 Nm).
11. Install the rocker arm cover.
12. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

5.7L (VIN 8) Engine

1984 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly.
3. Remove the accessory drive belt.
4. To remove the right side rocker arm (valve) cover, perform the following:
 - A. Disconnect the AIR hose from the exhaust check valve.
 - B. Disconnect the fuel inlet and return lines at the TBI units.
 - C. Remove the two rear A/C compressor braces.
 - D. Remove the A/C compressor lower mounting bolt.
 - E. Unfasten the idler pulley bracket nuts at the water pump, then slide the A/C compressor mounting bracket forward.
 - F. Disconnect the wiring from the compressor.
 - G. Remove the upper A/C compressor mounting bolts, then position the compressor aside. Do NOT disconnect the refrigerant lines!
5. To remove the left side rocker arm (valve) cover bolts, perform the following:
 - A. Disconnect the PCV valve and hose from the intake manifold and rocker arm cover.
 - B. Disconnect the brake vacuum pipe from the intake manifold.
 - C. Remove the radiator hose bracket from the alternator brace.
 - D. Unbolt the alternator and position it aside, out of the way.
 - E. Tag and disconnect the spark plug wires from the spark plugs.
6. Remove the rocker arm (valve) cover bolts.
7. If necessary, bend the bracket at the rear of the cylinder head, then remove the cover. If the cover sticks to the cylinder head, shear it off by carefully bumping the end of the rocker arm cover with palm of your hand or a rubber mallet. If the cover still will not come loose, CAREFULLY pry until loose. DO NOT DISTORT THE SEALING FLANGE.

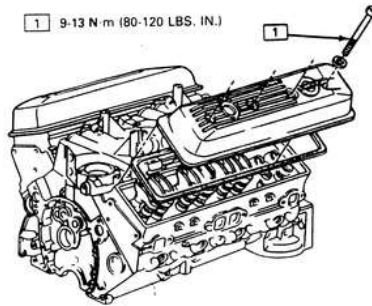
To install:
8. Clean the sealing surface of the cylinder head and rocker cover. Make sure no oil or old gasket is present when applying the new gasket.

WARNING
When applying the RTV sealant, make sure to keep the sealant out of the bolt holds, as could cause a "hydraulic" condition and damage the head casting.
9. Place a $\frac{1}{8}$ in. (3mm) bead of RTV sealant around the perimeter of the cover sealing surface. When going around the attaching bolt holes, always flow the RTV sealant on the inboard side of the holes.
10. Install the cover and secure with the mounting bolts, while the RTV is still wet. Tighten the bolts to 50 inch lbs. (6 Nm).
11. The remainder of installation is the reverse of the removal procedure.
12. Connect the negative battery cable.

1985-88 VEHICLES

1. Disconnect the negative battery cable.
2. To remove the right side rocker arm (valve) cover, as follows:
 - A. Remove the right side exhaust manifold and EGR pipe assembly.
 - B. Remove the fresh air pipe.
 - C. Loosen the spark plug retainer from the back of the right side cylinder head, then remove the other wire retainers.
 - D. Remove the injector harness retaining nuts, then position the harness aside.
 - E. Disconnect the heater control valve harness vacuum hose from the intake.
3. To remove the left side rocker arm (valve) cover, as follows:
 - A. Disconnect the PCV valve from the rocker arm cover.
 - B. Detach the injector harness from the intake.
 - C. Disconnect the canister hose from the pipe.
 - D. Detach the brake booster vacuum hose at the pipe, and the brake booster pipe from the plenum.
 - E. Loosen the AIR pump pulley bolts, then remove the serpentine belt from the AIR pump.
 - F. Remove the AIR pump pulley, and the pump lower mounting bolt.
4. Unfasten the rocker arm cover mounting bolts, then remove the cover and gasket.

Fig. 1: Exploded view of the rocker arm cover



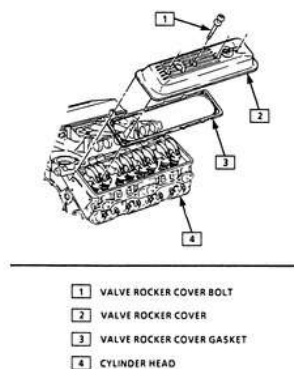
To install:

5. Clean the sealing surface of the cylinder head and rocker cover. Make sure no oil or old gasket is present when applying the new gasket.
6. Place a new gasket in proper position.
7. Install the cover and secure with the mounting bolts. Tighten the bolts to 80–120 inch lbs. (9–13 Nm) for 1985–87 vehicles or to 60–90 inch lbs. (7–10 Nm) for 1988 vehicles.
8. The remainder of installation is the reverse of the removal procedure.
9. Connect the negative battery cable.

1989–91 VEHICLES

1. Disconnect the negative battery cable.
2. To remove the right side rocker arm (valve) cover, perform the following:
 - A. Drain the engine coolant into a suitable container.
 - B. Disconnect the EGR valve and the crankcase vent pipes.
 - C. Tag and disconnect the spark plug wires from the spark plugs and the wire retainers from the brackets. Set the wiring harness aside.
 - D. Unfasten the nuts securing the injector harness, then set the harness aside.
 - E. Disconnect the engine cooling air bleed pipe assembly.
 - F. Detach the heater core-to-plenum coolant hose.
 - G. Disconnect the AIR hoses at the control valve.
 - H. Unbolt the A/C compressor and position it aside. Do NOT disconnect the refrigerant lines from the compressor.
3. To remove the left side rocker arm (valve) cover, perform the following:
 - A. Remove the PCV valve and hose.
 - B. Unfasten the nuts securing the injector harness, then position the harness aside.
 - C. Tag and disconnect the spark plug wires from the spark plugs and the wire retainers from the brackets. Set the wiring harness aside.
 - D. Remove the serpentine drive belt from the AIR pump pulley.
 - E. Remove the AIR pump pulley and the pump lower mounting bolt.

Fig. 2: Exploded view of the rocker arm (valve) cover assembly



4. Unfasten the rocker arm cover mounting bolts, then remove the cover and gasket.

To install:

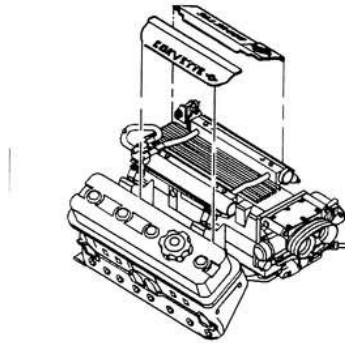
5. Clean the sealing surface of the cylinder head and rocker cover. Make sure no oil or old gasket is present when applying the new gasket.
6. Place a new gasket in proper position. Install the rocker arm cover and secure with the retaining bolts. Tighten the bolts to 89 inch lbs. (10 Nm).
7. If installing the left side rocker arm cover, perform the following:
 - A. Install the AIR pump lower mounting bolt and pulley.
 - B. Install the serpentine drive belt.
 - C. Install the spark plug wire retainers, and connect the wires to the plugs, as tagged during removal.
 - D. Install the nuts securing the injector harness.
 - E. Install the PCV valve and hose.
8. If installing the right side rocker arm cover, perform the following:
 - A. Place the A/C compressor in position and secure with the mounting bolts.
 - B. Attach the AIR hoses to the control valve.
 - C. Connect the heater core-to-plenum coolant hose.
 - D. Install the engine cooling air bleed pipe assembly.

- E. Install the nuts retaining the injector harness.
 - F. Install the spark plug wire retainers, then connect the wires to the plugs, as tagged during removal.
 - G. Connect the crankcase and EGR pipes.
 - H. Refill the engine coolant.
9. Connect the negative battery cable.

5.7L (VIN P) Engines

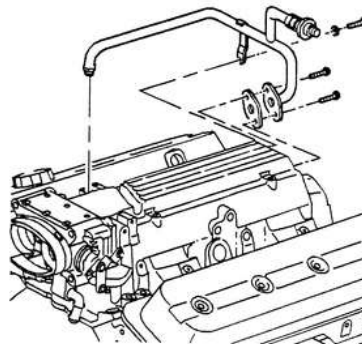
- 1. Disconnect the negative battery cable.
- 2. Remove the fuel rail cover(s).

Fig. 3: Unfasten the necessary retainers, then remove the fuel rail cover(s)



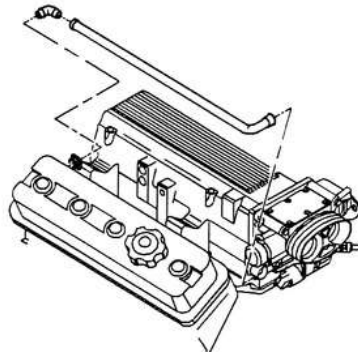
- 3. To remove the right side rocker arm cover, perform the following:
 - A. Remove the fuel rail retaining bolts/screws.
 - B. Disconnect the fuel pressure regulator vacuum tube assembly.
 - C. Unfasten the retainers, then remove the fuel rail from the intake manifold.
 - D. Remove the fuel rail cover studs, then position the wiring harness aside.
 - E. Disconnect the secondary air injection pipe and check valve assemblies from the exhaust and intake manifold assemblies.

Fig. 4: Remove the secondary air injection check valve pipe from the exhaust manifold



- F. Detach the crankcase vent hose.

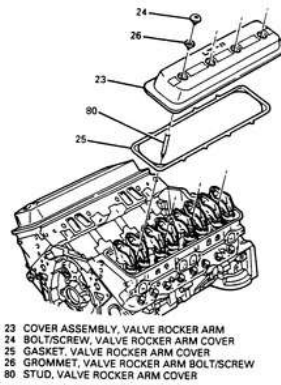
Fig. 5: Disconnect the crankcase vent hose



- 4. On 1992–95 vehicles, if removing the left side rocker arm cover perform the following:
 - A. Unfasten the alternator brace bolts/screws, then remove the brace.
 - B. Remove the alternator mounting bolts, then position the alternator aside.
 - C. Disconnect the secondary air injection diverter valve hose from the check valve assembly.

- D. Position the wiring harness aside.
- 5. On 1996 vehicles, if removing the left side rocker arm cover perform the following:
 - A. Disconnect the brake booster vacuum hose from the intake manifold.
 - B. Detach the distributor vent hose from the intake manifold.
 - C. Remove the fuel rail cover attaching studs.
 - D. Disconnect the secondary air injection diverter valve hose from the check valve assembly.
 - E. Loosen the secondary air injection check valve tube at the exhaust manifold. Pivot the check valve away from the rocker arm cover.
 - F. Remove the air intake duct.
 - G. Remove the serpentine drive belt.
 - H. Remove the alternator bracket bolts and brace.
 - I. Unbolt the alternator and position it aside.
- 6. Unfasten the rocker arm (valve) cover bolts/screws, then remove the cover and gasket.

Fig. 6: Exploded view of the rocker arm (valve) cover and related components



To install:

- 7. Clean the sealing surface of the cylinder head and rocker cover. Make sure no oil or old gasket is present when applying the new gasket.
- 8. Place a new gasket in proper position. Install the rocker arm cover and secure with the retaining bolts. Tighten the bolts to the following specifications:
 - A. 1992 vehicles: 90 inch lbs. (10 Nm).
 - B. 1993–95 vehicles: 100 inch lbs. (11 Nm).
 - C. 1996 vehicles: 106 inch lbs. (12 Nm).
- 9. For 1992–95 vehicles, if installing the left side rocker arm cover, perform the following:
 - A. Connect the secondary air injection diverter valve hoses.
 - B. Install the alternator and secure with the mounting bolts/screws.
 - C. Install the alternator brace and secure with the mounting bolts/screws.
 - D. Position the wiring harness and secure with the clips.
- 10. For 1996 vehicles, if installing the left side rocker arm cover, perform the following:
 - A. Install alternator and secure with the mounting bolts. Install the alternator bracket and retaining bolts.
 - B. Connect the secondary air injection check valve to the exhaust manifold. Align and tighten the pipe to 41 ft. lbs. (55 Nm).
 - C. Attach the secondary air injection check valve hoses to the check valve.
 - D. Connect the brake booster vacuum hose to the intake manifold.
 - E. Attach the distributor vent hose to the manifold.
 - F. Install the fuel rail cover studs and wiring harness clips to the intake manifold. Tighten the studs to 106 inch lbs. (12 Nm).
 - G. Install the fuel rail cover.
 - H. Install the drive belt.
 - I. Install the air intake duct.
- 11. If installing the right side rocker arm cover, perform the following:
 - A. Connect the crankcase vent hose.
 - B. Install the secondary air injection pipe and check valve assemblies. Tighten the secondary air injection pipe fitting-to-exhaust manifold to 41 ft. lbs. (55 Nm). Install the secondary air injection pipe flange bolts/screws and tighten to 19 ft. lbs. (26 Nm).
 - C. Install the fuel rail cover studs and wiring harness clips to the intake manifold.
 - D. Install the fuel rail to the manifold and install the retaining bolts/screws. Tighten to 89 inch lbs. (10 Nm).
 - E. Connect the fuel pressure regulator vacuum tube.
- 12. Install the fuel rail covers.
- 13. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

CAUTION

Never open, service or drain the radiator or cooling system when hot; serious burns can occur from the steam and hot coolant. Also, when draining engine coolant, keep in mind that cats and dogs are attracted to ethylene glycol antifreeze and could drink any that is left in an uncovered container or in puddles on the ground. This will prove fatal in sufficient quantities. Always drain coolant into a sealable container. Coolant should be reused unless it is contaminated or is several years old.

5.7L (VIN 8) Engines

1. Disconnect the negative battery cable.
2. Remove the air intake duct and air cleaner assembly.
3. Making sure the engine is cool, remove the surge tank cap.
4. Drain the cooling system, to a level below the thermostat, into a suitable container.
5. Use a suitable pair of pliers to unfasten the hose clamp, then disconnect the upper radiator hose from the outlet.
6. For 1990–91 vehicles, perform the following:
 - A. Disconnect the coolant hose from the throttle body.
 - B. Detach the electrical connector and vacuum harness at the EGR solenoid.
7. Unfasten the thermostat housing attaching bolts, then remove the housing. Remove the thermostat from the manifold.

Fig. 1: Exploded view of the thermostat and water pump assembly — 1984–89 5.7L (VIN 8) engine

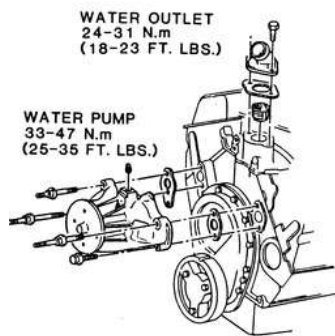
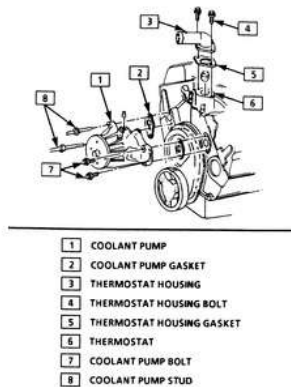


Fig. 2: Exploded view of the thermostat and water pump assembly — 1990–91 5.7L (VIN 8) engine



8. Thoroughly clean the gasket mating surfaces of the water outlet and upper intake manifold.
- To install:
9. For 1984–89 vehicles, perform the following:
 - A. Place a $\frac{1}{8}$ in. (3mm) bead of RTV sealant, all around the thermostat housing sealing surface on the intake manifold.
 - B. Place the thermostat in the intake manifold.
 - C. While the RTV is still wet, position the thermostat housing. Tighten the housing retaining bolts to 18–23 ft. lbs. (24–31 Nm).
10. For 1990–91 vehicles, perform the following:
 - A. Install the thermostat, a new gasket, and the housing on the manifold.
 - B. Install the housing bolts and tighten to 25 ft. lbs. (34 Nm).
 - C. Attach the electrical connector and vacuum harness at the EGR solenoid.
 - D. Connect the coolant hose to the throttle body.
11. Install the air cleaner assembly and air intake duct.
12. Connect the negative battery cable.
13. Start the engine and run, with the radiator cap removed, until the upper radiator hose is hot (thermostat open).
14. With the engine idling, add a suitable coolant/water mixture until the level reaches the bottom of the radiator filler neck.
15. Install the radiator cap, making sure the arrows line up with the overflow tube.

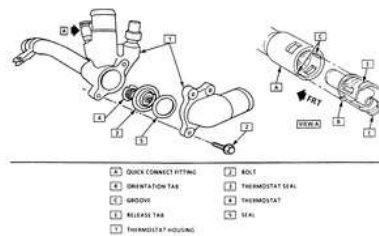
16. Turn the engine off, then recheck the coolant level and add if necessary, through the recovery reservoir.

5.7L (VIN J) Engine

NOTE: This procedure covers removal of the thermostat and housing.

1. Disconnect the negative battery cable.
2. Making sure the engine is cool, remove the surge tank cap.
3. Drain the cooling system into a suitable container.
4. Raise and safely support the vehicle.
5. Unfasten the bolts retaining the thermostat housing assembly brackets to the front side member.
6. Use a suitable pair of pliers to unfasten the clamps securing the following hoses from the thermostat:
 - Radiator outlet hose
 - Radiator bypass hose
 - Engine hose
7. Detach the quick-connect fittings at the heater hose-thermostat housing junction.
8. Remove the thermostat housing assembly from the vehicle.
9. Unfasten the housing bolts, then remove the thermostat and seal.
10. Inspect the housing for hairline cracks or other damage. If you are replacing the housing, transfer the necessary parts to the new housing.

Fig. 3: Exploded view of the thermostat and housing assemblies



11. Thoroughly clean the gasket mating surfaces of the thermostat housing.

To install:

NOTE: The seal on the thermostat **MUST** be installed with the taper toward the radiator. Make sure the seal remains seated in the housing groove when assembling the housing sections.

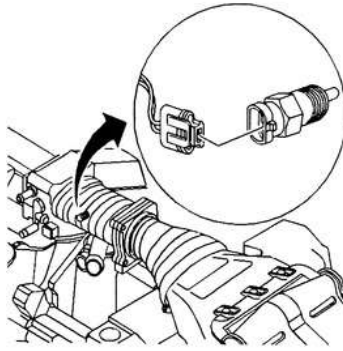
12. Place the thermostat and seal in the housing.
13. Install the thermostat housing bolts and tighten to 18 ft. lbs. (25 Nm).
14. Attach the quick-connect fittings at the heater hose-thermostat housing junction.
15. Connect the following hoses and secure with the hose clamps:
 - Radiator outlet hose
 - Radiator bypass hose
 - Engine hose
16. Tighten the hose clamps to 35 inch lbs. (4 Nm).
17. Install the bolts holding the thermostat housing brackets to the front side member. Tighten the bolts to 18 ft. lbs. (25 Nm).
18. Carefully lower the vehicle.
19. Refill the engine cooling system with the proper type and amount of coolant.

5.7L (VIN P and 5) Engines

NOTE: On these vehicles, when adding cooling you must use DEX-COOL® , or equivalent orange colored, silicate-free coolant.

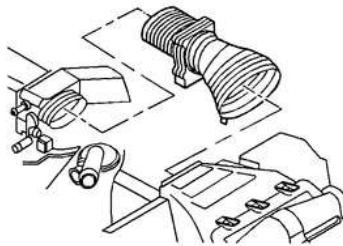
1. Disconnect the negative battery cable.
2. Detach the Intake Air Temperature (IAT) sensor electrical connector.

Fig. 4: Unplug the IAT sensor electrical connector. The IAT sensor is located in the air cleaner intake duct



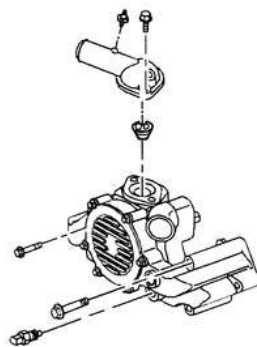
3. Remove the air intake duct and air cleaner.

Fig. 5: Unfasten the retainers, then remove the air intake duct



4. Use a suitable pair of pliers to unfasten the hose clamp, then disconnect the lower radiator hose from the thermostat housing inlet of the water pump.
5. Unfasten the thermostat housing bolts, then remove the housing. Remove the thermostat and the gasket.
6. Thoroughly clean the thermostat housing and water pump gasket mating surfaces.

Fig. 6: Exploded view of the thermostat housing and thermostat



To install:

7. Install the thermostat and gasket with the taper up. Install the housing and bolts to the water pump. Tighten the housing bolts to 89 inch lbs. (10 Nm).
8. Attach the radiator lower hose on the inlet side of the water pump. Secure the hose with the retaining clamp.
9. Fill the cooling system to the proper level with a 50/50 mixture of DEX-COOL® or equivalent, silicate free coolant.
10. Install the air cleaner and air intake duct.
11. Attach the IAT sensor electrical connector.
12. Connect the negative battery cable. Start the engine and check for coolant leaks. Check the coolant level and add if necessary.

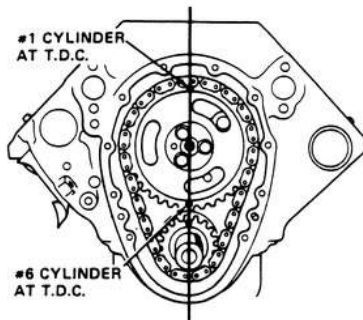
1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

5.7L (VIN 8) Engine

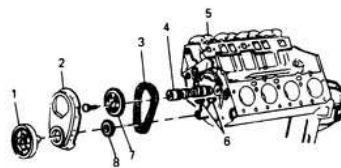
1. Disconnect the negative battery cable.
2. Remove the engine front cover.
3. Rotate the crankshaft and align the timing marks.

Fig. 1: The timing marks MUST be aligned before proceeding



4. Unfasten the camshaft sprocket retaining bolt(s).
5. Remove the timing chain and camshaft sprocket as an assembly.
6. If necessary, remove the crankshaft sprocket using a suitable puller.

Fig. 2: Exploded view of the timing chain, sprockets and related components



- 1 DAMPER, TORSIONAL
- 2 COVER, ENGINE FRONT
- 3 CHAIN, TIMING
- 4 CAMSHAFT, ENGINE
- 5 BLOCK, ENGINE
- 6 KEY, WOODRUFF
- 7 SPROCKET, CAMSHAFT
- 8 SPROCKET, CRANKSHAFT

To install:

7. If removed, install the crankshaft sprocket.
8. Align the timing marks on the camshaft and crankshaft sprockets.
9. Install the timing chain and camshaft sprocket.
10. Install the camshaft sprocket retaining bolts and tighten to 20 ft. lbs. (27 Nm).
11. Install the front cover in the vehicle, then connect the negative battery cable.

5.7L (VIN J) Engine

PRIMARY TIMING CHAIN AND CRANKSHAFT SPROCKET

1. Disconnect the negative battery cable.
2. Remove the timing chain front cover assembly.
3. Remove the left and right intake camshafts.
4. Remove the bolts attaching the primary chain guide to the oil pump, then remove the guide from the vehicle.
5. Remove the idler sprocket assembly attaching bolts, then disengage the primary timing chain from the idler and crankshaft sprockets. Remove the chain from the vehicle.
6. Using the crankshaft torsional damper puller along with J-38211 or equivalent sprocket tool, remove the crankshaft sprocket. Note which side of the sprocket faces forward for installation purposes.
7. Remove the key and oil pump seal seat from the crankshaft.

Fig. 3: Primary and secondary timing chain assembly — 5.7L (VIN J) engine



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inch lbs. (10 Nm).

NOTE: When installing guide, do not use any leverage tools, finger pressure is sufficient.

14. Install the left and right intake camshafts.
15. Install the timing chain front cover.
16. Connect the negative battery cable.

SECONDARY TIMING CHAINS AND IDLER SPROCKET ASSEMBLY

1. Disconnect the negative battery cable.
2. Remove the camshafts.
3. Remove the primary timing chain and crankshaft sprocket.
4. Disengage the left and right secondary chains from the idler sprocket.
5. Remove the idler sprocket assembly.
6. Remove the left and right secondary chains from the vehicle.

To install:

7. Inspect chains and sprockets for abnormal wear or damage. If abnormal wear or damage is present on either the secondary timing chain, cam sprockets or idler sprockets, the entire assembly must be replaced.
8. Inspect the idler sprocket shaft bearings for wear or damage. If necessary, replace idler sprocket shaft bearings as follows:
 - A. Remove the idler sprocket screw, washer and shaft.
 - B. Using tool J-37328 or equivalent, remove bearings from idler sprocket.
 - C. When installing bearings, ensure the manufacture's name and part Nos. are visible from either end of the sprocket assembly.
 - D. Using a press, carefully push in the bearings until they are flush with idler sprocket. Apply minimum pressure to obtain a fit 0.0–1.3mm below the surface.
9. Install the shorter (inner) secondary chain through the right head and install J-38099 or equivalent timing chain retaining tool.
10. Locate the right chain onto the rear idler sprocket.
11. Install the longer (outer) secondary chain through the left head and install J-38099 or equivalent timing chain retaining tool.
12. Locate the left chain onto the middle idler sprocket.
13. Install the primary timing chain.
14. Install the camshafts.
15. Connect the negative battery cable.

5.7L (VIN P and 5) Engines

1. Disconnect the negative battery cable.
2. Remove the timing chain front cover.
3. Rotate the crankshaft until the timing marks on the timing chain sprockets are aligned nearest each other. The camshaft sprocket mark should be at the 6 o'clock position while the mark on the crankshaft sprocket should be at the 12 o'clock position.
4. Remove the camshaft sprocket bolts.
5. Remove the camshaft sprocket and timing chain.

Fig. 7: Exploded view of the timing chain, sprockets and related components — 5.7L (VIN P and 5) engines

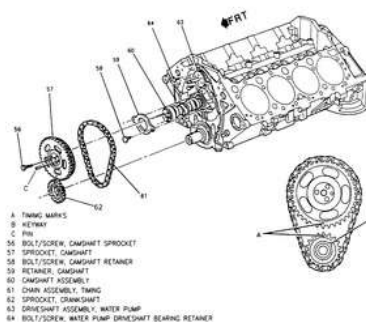
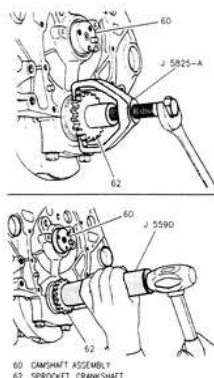


Fig. 8: Removal and installation of the crankshaft sprocket — 5.7L (VIN P and 5) engines



NOTE: To prevent piston or valve damage, do not turn the crankshaft after the timing chain has been removed.

6. Remove the water pump bearing retainer bolts, then remove the driveshaft assembly using J-39243 or equivalent driven gear assembly remover.
7. Remove the crankshaft sprocket using J-5825-A or equivalent crankshaft sprocket remover.
8. If necessary, remove the crankshaft key.

To install:

9. If removed, install the crankshaft key.
10. Install the crankshaft sprocket using a suitable installation tool.
11. Install the water pump driveshaft assembly using a suitable tool. Install the retainer bolts and tighten to 108 inch lbs. (12 Nm).
12. Align the timing marks and install the camshaft sprocket and timing chain. The gears of the camshaft sprocket and water pump driveshaft must mesh or damage to the thrust plate retainer could occur.
13. Install the camshaft sprocket bolts and tighten to 21 ft. lbs. (28 Nm).
14. Install a new O-ring to the water pump driven gear shaft using a suitable seal installation tool.
15. Install the timing chain front cover and connect the negative battery cable.

1990 Chevrolet CORVETTE

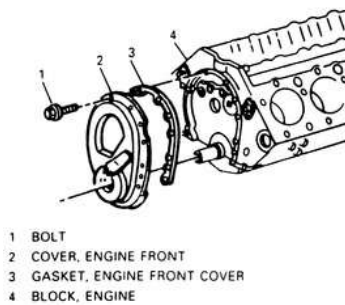
Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

5.7L (VIN 8) Engine

1. Disconnect the negative battery cable. Properly relieve the fuel system pressure.
2. Drain the engine cooling system and engine oil into suitable containers.
3. Remove the oil pan.
4. Remove the AIR pump pulley.
5. Remove the air management valve adapter.
6. Unfasten the AIR pump bolts, then remove the AIR pump.
7. Disconnect the fuel inlet and return lines from the TBI units. Plug the lines to avoid getting dirt or debris in the fuel system.
8. Remove the rear A/C compressor braces.
9. Remove the lower A/C compressor mounting bolt.
10. Remove the compressor bracket nuts from the water pump.
11. Slide the mounting bracket forward, then remove the compressor mounting bolt.
12. Detach the wires, then position the compressor aside. Do NOT disconnect the refrigerant lines!
13. Disconnect the AIR hose from the right exhaust manifold.
14. Remove the compressor mounting bracket.
15. Remove the upper AIR pump bracket with the power steering reservoir.
16. Remove the lower AIR pump bracket.
17. Disconnect the radiator and heater hoses from the water pump.
18. Remove the front cover bolts, then remove the front cover.
19. Thoroughly clean the gasket mating surfaces.

Fig. 1: Exploded view of the timing chain cover — 5.7L (VIN 8) engine shown



To install:

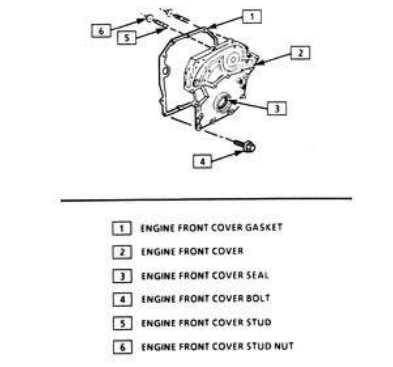
20. Use a sharp knife or other suitable cutting tool to remove any excess oil pan gasket material that may be protruding at the oil-to-engine block junction.
21. Check the front cover for any damage or distortion, and replace if necessary. Apply a $\frac{1}{8}$ in. (3mm) bead of RTV sealant to the joint formed at the oil pan and cylinder block. Coat the cover gasket with gasket sealant and position it on the cover.
22. Install the cover and loosely install the cover-to-block upper attaching bolts.
23. Tighten the bolts alternately and evenly while pressing downward on the cover so the dowels in the block align with their corresponding holes in the cover. You must position the cover so the dowels enter the holes in the cover without binding. Do not force the cover over the dowels and cause the cover flange or holes to be distorted.
24. Install the remaining cover bolts and tighten to 80 inch lbs. (9 Nm).
25. Install the oil pan.
26. Install the water pump and crankshaft damper.
27. The remainder of installation is the reverse of the removal procedure.
28. Fill the engine crankcase with the proper type and amount of oil.
29. Connect the negative battery cable, properly fill the engine cooling system and check for leaks.
30. Check the coolant and oil levels, and add if necessary.

5.7L (VIN J) Engine

1. Take the vehicle to a reputable repair shop and have the A/C system properly discharged and recovered, using the proper tools.
2. Disconnect the negative battery cable and drain the engine coolant into a suitable container.
3. Remove the water pump assembly.
4. Remove the air conditioning compressor as follows:
 - A. Remove the throttle body.
 - B. Remove the serpentine drive belt.
 - C. Remove the engine oil temperature sensor.
 - D. Remove the alternator.
 - E. Remove the refrigerant hose from the A/C compressor, then immediately cap or plug the openings to prevent system contamination and damage.
 - F. Remove the compressor mounting bolts and electrical connection.
 - G. Remove the compressor from the vehicle.
5. Remove the steering gear for access to the damper.

6. Remove the bolt and washer attaching the torsional damper to the crankshaft.
7. Using tool J-24420-C, or an equivalent torsional damper puller, remove the damper from the crankshaft.
8. Remove the drift key, from the crankshaft.
9. Remove the nuts and/or bolts attaching the front cover to the engine.
10. Remove the front cover and gasket from the vehicle. If necessary, remove the old seal from the front cover using J-29077-A or an equivalent oil seal remover.

Fig. 2: Exploded view of the front timing chain cover — 5.7L (VIN J) engine



To install:

11. Thoroughly clean the cylinder case, front cover and water pump sealing surfaces.
12. Apply Loctite® 262 to the stud threads and Loctite® 565 to the bolt threads.
13. Install a new cover gasket and the cover, nuts and bolts.
14. If removed, install a new front cover oil seal using J-37309 or equivalent front cover seal installer.
15. Tighten the front cover attaching bolts to 19 inch lbs. (26 Nm) and the stud nuts to 21 ft. lbs. (28 Nm).
16. Install the water pump assembly.
17. Install the air conditioning compressor in the reverse order of the removal procedure. Replace the refrigerant line seal washers and coat the new washers with 525 refrigerant oil prior to assembly.
18. Install the key to the crankshaft and, then install the torsional damper using J-38463, or an equivalent torsional damper installer. Check for proper key seating during installation.

NOTE: If a new balancer is installed, new balancer weights of the same size must be installed in the same hole locations as the original balancer.

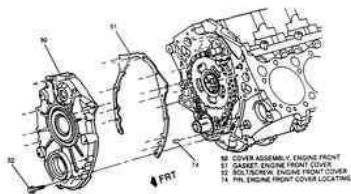
19. Remove the tool apply Loctite® 262 to the damper bolt threads. Install the washer and damper bolt, then tighten the bolt to 148 ft. lbs. (200 Nm).
20. Install the serpentine drive belt.
21. Install the steering gear.
22. Connect the negative battery cable, properly fill the engine cooling system and check for leaks.
23. If the engine oil was changed, and if equipped, reset the CHANGE OIL indicator, as outlined in Section 1 of this manual.
24. Take the vehicle to a reputable repair shop to have the A/C system properly evacuated and charged.

5.7L (VIN P and 5) Engines

1. Disconnect the negative battery cable.
2. Drain the engine oil and coolant into suitable containers.
3. Remove the throttle body air intake duct.
4. Remove the serpentine drive belt.
5. Remove the water pump assembly.
6. Remove the crankshaft balancer and hub.
 - A. If not done already, raise and support the vehicle safely, then remove the motor mount nuts.
 - B. Remove the power steering fluid cooler, then raise the engine sufficiently for tool access to the crankshaft balancer.

WARNING
When raising and supporting the engine, NEVER place a jack under the oil pan, crankshaft pulley or any sheetmetal. There is a minimal clearance between the oil pan and the pump screen. Jacking against the pan could cause sufficient deformation to damage the oil pickup unit.
 - C. Remove the balancer bolts, then remove the balancer from the hub.
 - D. Disconnect the power steering line from the steering gear.
 - E. Matchmark the crankshaft hub to the engine front cover, then remove the hub bolt and washer.
 - F. Remove the crankshaft hub using J-39046, or an equivalent hub removal/installation tool. To preserve the relationship between the hub and crankshaft, DO NOT crank the engine over once the hub has been removed. If the hub is not matchmarked and installed in the original position, an engine imbalance could result.
7. Remove the distributor assembly.
8. Remove the oil pan assembly.
9. Remove the engine front cover bolts.
10. Remove the engine front cover and gasket.

Fig. 3: Exploded view of the front cover and gasket — 5.7 (VIN P and 5) engines



To install:

11. Thoroughly clean the engine front cover and cylinder block gasket mating surfaces. Inspect the engine front cover and seals for damage, replace as necessary.
12. Using J-39087 or equivalent shaft gear front cover seal protector, on the water pump driveshaft, install the gasket and front cover into position over the shafts and guide pins.
13. Install the engine front cover bolts and tighten to 100 inch lbs. (11 Nm).
14. Install the oil pan and gasket.
15. Install the distributor assembly.
16. Install the and the torsional damper.
 - A. Align the matchmarks made earlier and install the crankshaft hub. If the engine was cranked and the matchmarks were lost, set the engine to No. 1 TDC, then install the crankshaft hub with the cast arrow in the 12 o'clock position.
 - B. Install the hub washer and bolt, but do not torque at this time.
 - C. Raise the engine, as necessary for access, then install the crankshaft balancer assembly. Tighten the crankshaft hub bolt to 75 ft. lbs. (102 Nm) and the balancer bolts to 60 ft. lbs. (81 Nm).

NOTE: If a new balancer is installed, new balancer weights of the same size must be installed in the same hole locations as the original balancer.
 - D. Install the power steering line to the gear, then lower the engine into position.
 - E. Install the power steering fluid cooler.
 - F. Install the motor mount nuts and tighten to 40 ft. lbs. (50 Nm).
17. Install the water pump assembly.
18. Install the serpentine drive belt and the throttle body air duct.
19. Properly fill the engine crankcase with oil.
20. Tighten the fuel filler cap and properly fill the engine cooling system.
21. Connect the negative battery cable, operate the engine and check for leaks.
22. Bleed the power steering hydraulic system, as necessary.
23. If equipped, reset the CHANGE OIL indicator, as outlined in Section 1 of this manual.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

5.7L (VIN 8) Engine

1984–88 VEHICLES

1. Take your vehicle to a reputable repair shop to have the A/C system discharged.
2. Disconnect the negative battery cable. Properly relieve the fuel system pressure.
3. Drain the engine cooling system into a suitable container.
4. Remove the serpentine drive belt, as outlined in Section 1 of this manual.
5. Remove the water pump pulley and the AIR pump pulley.
6. Remove the air management valve adapter.
7. Remove the AIR pump.
8. Disconnect the fuel inlet and return lines.
9. Remove the rear A/C compressor braces. Remove the lower A/C compressor mounting bolt. Remove the A/C compressor and idler pulley bracket nuts.
10. Detach the A/C compressor wiring.
11. Slide the mounting bracket forward and remove the rear A/C compressor bolt.
12. Remove the A/C compressor from the vehicle.
13. Remove the right and left AIR hoses at the check valve.
14. Remove the AIR pipe from the intake and power steering reservoir bracket.
15. Remove the power steering reservoir bracket, including the top alternator bolt.
16. Remove the lower AIR bracket from the water pump.
17. Disconnect the lower radiator and heater hoses from the water.
18. Unfasten the retainers, then remove the water pump. Remove and discard the gasket and thoroughly clean the gasket mating surfaces.

To install:

19. If installing a new water pump, transfer the heater hose fitting to the new pump.
20. Install the water pump to the block, with new gaskets, and secure with the attaching bolts. Tighten the bolts to 25–35 ft. lbs. (33–47 Nm).
21. The remainder of installation is the reverse of the removal procedure.
22. Fill the radiator with the proper type and amount of coolant.
23. Start the engine, and allow to run (with the radiator cap still removed), until the upper hose is hot (thermostat is open). With the engine idling, add coolant to the radiator until it reaches the bottom of the filler neck.
24. Install the filler cap. Inspect for leaks. Turn the engine **OFF**.

1989–91 VEHICLES

1. Disconnect the negative battery cable. Properly relieve the fuel system pressure.
2. Remove the air cleaner and air intake duct assembly.
3. Detach the MAF sensor electrical connector.
4. Remove the surge tank pressure cap, then drain the engine cooling system into a suitable container.
5. Relieve the serpentine belt tension with a $\frac{1}{2}$ in. breaker bar, then remove the belt.
6. Remove the water pump damper and pulley.
7. Unfasten the A/C compressor mounting bolts.
8. Remove the AIR pump mounting bolts.
9. Remove the cover from the AIR control valve.
10. Disconnect the upper hose from the AIR control valve, then detach the electrical connector from the valve.
11. Unfasten the nut retaining the AIR pipe and control valve, then reposition the assembly.
12. Disconnect the heater hose from the pump.
13. Unfasten the belt tensioner bolt.
14. Disconnect the fuel lines.
15. Remove the AIR pump bracket bolts. Unfasten the nut retaining the AIR pump brace.
16. Unfasten the lower radiator hose clamp, then disconnect the hose.
17. Remove the A/C compressor bracket mounting bolts.
18. Remove the bolts and stud nuts holding the water pump to the engine block.
19. Unfasten the retainers, then remove the water pump. Remove and discard the gasket and thoroughly clean the gasket mating surfaces.

To install:

20. If installing a new water pump, transfer the heater hose fitting to the new pump and tighten the fitting to 27 ft. lbs. (37 Nm).
21. Install the water pump to the block, with new gaskets, and secure with the attaching bolts. Tighten the bolts to 30 ft. lbs. (40 Nm).
22. Install the AIR pipe retaining bracket bolt and the A/C compressor bracket mounting bolts.
23. Connect the lower radiator hose and secure with the hose clamp.
24. Install the AIR pump bracket retaining bolts.
25. Connect the fuel lines.
26. Install the belt tensioner bolt.
27. Attach the heater hose to the pump and secure with the hose clamp.
28. Attach the control valve electrical connector. Attach the upper hose onto the AIR control valve. Install the AIR control valve cover.
29. Install the AIR pump bolts and the nut retaining the pump brace. Tighten the nut to 25 ft. lbs. (33 Nm).
30. Install the A/C compressor mounting bolts.
31. Install the water pump damper and pulley.
32. Install the serpentine drive belt.
33. Attach the MAF sensor electrical connector.

34. Fill the radiator with the proper type and amount of coolant. Connect the negative battery cable.
35. Start the engine, and allow to run (with the radiator cap still removed), until the upper hose is hot (thermostat is open). With the engine idling, add coolant to the radiator until it reaches the bottom of the filler neck.
36. Install the filler cap. Inspect for leaks. Turn the engine **OFF**.

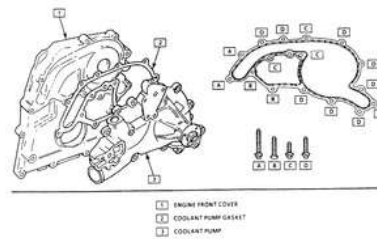
5.7L (VIN J) Engine

1. Disconnect the negative battery cable.
2. Drain the engine cooling system into a suitable container.
3. Remove the air cleaner and air intake duct assembly.
4. Unfasten the screws retaining the throttle body extension to the throttle body, then remove the extension and gasket.
5. Loosen the clamps, then disconnect the hoses from the coolant outlets, radiator inlet and inlet pipe.
6. Remove the hose and inlet pipe assembly from the vehicle.
7. Remove the serpentine drive belt.
8. Unfasten the bolt retaining the belt tensioner to the pump, then remove the tensioner from the vehicle.
9. Loosen the engine hose clamp, then remove the hose from the pump.
10. Unfasten the bolts securing the alternator lower mounting bracket, then remove the bracket from the vehicle.

NOTE: The water pump is secured with 4 different types and sizes of bolts. Make sure to note the installed positions of the bolts before removing them.

11. Remove the water pump-to-front cover mounting bolts.
12. Unfasten the bolt securing the A/C compressor to the water pump, then remove the water pump from the vehicle.

Fig. 1: The water pumps on these vehicles are mounted with 4 different sizes of bolts



13. If you are installing a new water pump, transfer the water pump pulley to the new pump. Tighten the pulley mounting bolts to 89 inch lbs. (10 Nm).
14. Remove and discard the gasket, then thoroughly clean the mating surfaces.

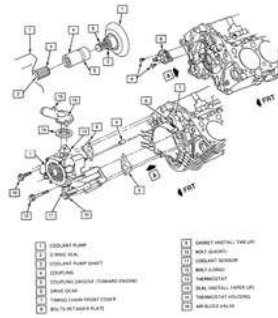
To install:

15. Position a new gasket, then install the water pump and retaining bolts. Make sure the bolts are in the same position as they were removed. Finger-tighten the mounting bolts.
16. Install the bolt securing the A/C compressor to the water pump and finger-tighten the bolts.
17. Tighten the water pump and A/C compressor bolts to 20 ft. lbs. (27 Nm).
18. Connect the engine hose and secure with the hose clamp.
19. Install the alternator mounting bolt and bracket bolts. Tighten the mounting bolts to 39 ft. lbs. (52 Nm) and the bracket bolts to 20 ft. lbs. (26 Nm).
20. Install the belt tensioner and secure with the mounting bolt. Tighten the tensioner-to-cylinder case bolt to 45 ft. lbs. (60 Nm).
21. Install the serpentine drive belt.
22. Install the hose and inlet pipe assembly and secure with the retaining clamps.
23. Install the throttle body extension gasket, extension and retaining screws. Tighten the screws to 53 inch lbs. (6 Nm).
24. Install the air cleaner and air intake duct assembly.
25. Fill the radiator with the proper type and amount of coolant. Connect the negative battery cable.
26. Start the engine, and allow to run (with the radiator cap still removed), until the upper hose is hot (thermostat is open). With the engine idling, add coolant to the radiator until it reaches the bottom of the filler neck.
27. Install the filler cap. Inspect for leaks. Turn the engine **OFF**.

5.7L (VIN P and 5) Engines

1. Disconnect the negative battery cable.
2. Detach the Intake Air Temperature (IAT) sensor electrical connector.
3. Remove the air cleaner assembly and air intake duct.
4. Drain the cooling system into a suitable container. If necessary, remove the knock sensors for complete draining.
5. Unfasten the clamps, then disconnect the inlet and outlet radiator hoses from the water pump.
6. Remove the throttle body hose from the T-fitting.
7. Disconnect the heater hose from the water pump.
8. Detach the Engine Coolant Temperature (ECT) sensor electrical connector. Remove the ECT sensor wiring harness retainer from the front of the water pump.
9. Remove the serpentine drive belt.
10. Unfasten the bolts holding the water pump to the engine block, then remove the water pump from the vehicle.
11. Remove and discard the gasket, then thoroughly clean the mating surfaces.
12. Inspect the O-ring seals on the water pump driveshaft and front cover for cracks and dryness. If any of the O-rings are damaged, they must be replaced.
13. If replacing the water pump, transfer the ECT sensor to the new pump. Tighten the sensor to 17 ft. lbs. (23 Nm).

Fig. 2: Exploded view of the water pump and related components — 5.7L (VIN P and 5) engines



To install:

NOTE: Before you assemble the coupling to the water pump, apply a light coat of grease to the seals and splines.

14. Install the coupling with the groove toward the engine.
15. Install new gaskets with the tabs up, the water pump with the drive coupling and the mounting bolts. Tighten the bolts to 30 ft. lbs. (41 Nm).
16. Install the serpentine drive belt.
17. Install the ECT sensor wire harness retainer on the front of the water pump, then attach the electrical connector.
18. Connect the heater hose to the water pump.
19. Attach the inlet and outlet radiator hoses and clamps to the water pump.
20. Install the throttle body hose at the T-fitting.
21. Install the air cleaner and intake duct.
22. Fill the radiator with the proper type and amount of coolant. Connect the negative battery cable.
23. Start the engine, and allow to run (with the radiator cap still removed), until the upper hose is hot (thermostat is open). With the engine idling, add coolant to the radiator until it reaches the bottom of the filler neck.
24. Install the filler cap. Inspect for leaks. Turn the engine **OFF**.