



XK8

DATE 5/97

303-03

SERVICE

TECHNICAL BULLETIN

Exhaust Manifold – Retaining Bolts –
Removal Procedure

MODEL 1997 MY-ON
XK8 Range
VIN
001001-006675

Issue:

On some XK8 vehicles within the above VIN range, the exhaust manifold locking bolts may shear off flush with the cylinder head if an attempt is made to remove them using air-powered tools or breaker bars.

This bulletin outlines a procedure to follow after removing the engine and transmission assembly from the vehicle.

Action:

Before attempting to remove the exhaust manifold bolts on an XK8 vehicle within the above VIN range, check the material identification stamped on the head of at least one bolt on the rear of each cylinder bank.

Bolts marked 8.8 must only be removed as described in the procedure below.

Bolts marked 10.9 can be removed in the usual manner, with the engine remaining in the vehicle.

The following procedures are covered in this bulletin:

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PROCEDURE FOR BOLTS MARKED 8.8

1. Remove the engine & transmission assembly from the vehicle. (Refer to procedure beginning on page 3.)
2. With a center punch, mark the center of each exhaust manifold bolt.
3. Use a 3 mm (1/8 inch) drill bit to drill a pilot hole in the center of each bolt to a depth of 12 mm (1/2 inch). (Illustration 1.)

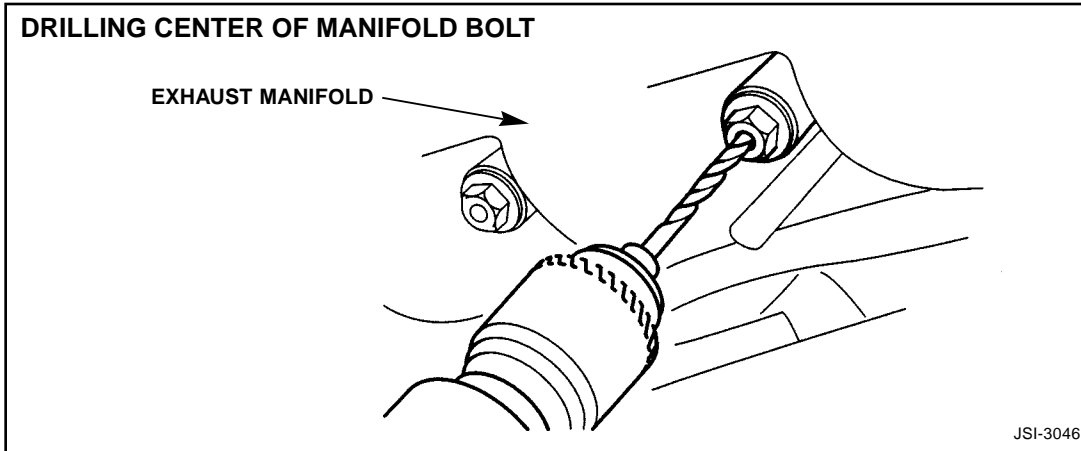


ILLUSTRATION 1

4. Use a 6 mm (1/4 inch) drill bit to drill the center of each bolt to a depth of 12 mm (1/2 inch). (Illustration 1).
5. Use a wrench to shear off the head of each bolt. (Illustration 2).

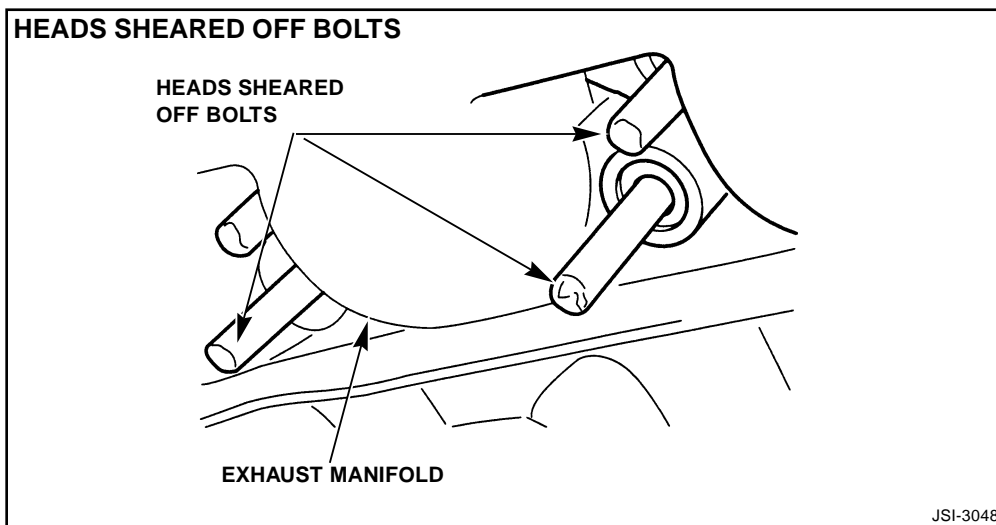


ILLUSTRATION 2

6. After removing the spacers from the bolt shanks, remove the exhaust manifold. Remove and discard the manifold gasket.
7. Grip the bolt with suitable locking pliers and use a torch regulated to a small flame to apply heat to the shank of the bolt, close to the cylinder head (Illustration 3).

CAUTION! Avoid directing heat directly on the cylinder head.

⚠ WARNING: FUEL LINES MAY CONTAIN RESIDUAL FUEL. OBSERVE ALL APPROPRIATE PRECAUTIONS FOR FIRE RISK.

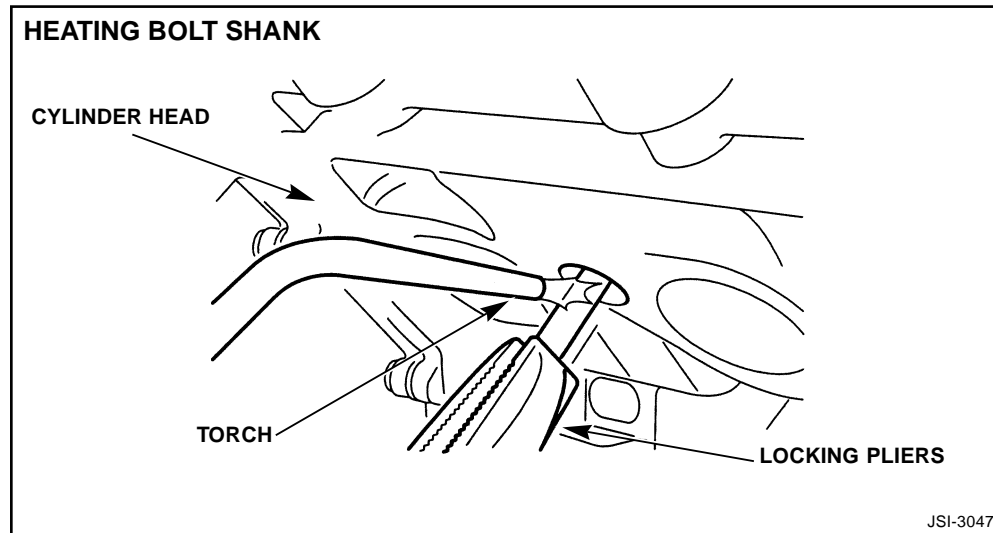


ILLUSTRATION 3

8. **Very gently** attempt to unscrew the bolt. As the locking compound on the bolt threads becomes hot, the bolt will loosen in the cylinder head, and can be unscrewed. It may be necessary to continue to apply heat as the bolt is unscrewed. Avoid the application of excessive heat which will char the locking compound making removal of the bolt difficult.
9. Repeat 7 & 8 above on **all** manifold bolts (**both** cylinder banks) so that removal of the engine will **not** be necessary in the future when the exhaust manifolds need to be removed.
10. Use a plug tap to loosen all debris from the threaded holes. Blow the debris clear using shop air.

⚠ WARNING: Wear safety goggles when blowing out threaded holes.

11. Clean the mating faces of both cylinder heads and exhaust manifolds.
12. Reinstall each exhaust manifold, installing **new** manifold gaskets and **new** 10.9 grade bolts. When installing the exhaust manifolds, first finger-tighten **only** the center pair of bolts to hold the manifold and gasket in position. Insert and finger-tighten the remaining bolts and spacers. Then fully tighten the bolts to 18 Nm (13 lb ft) in **pairs**, upper and lower, starting with the **front** pair and working towards the rear.
13. Reinstall the engine & transmission assembly.

REMOVING & REINSTALLING XK8 ENGINE

1. Park the vehicle on a 4 post lift; select 'neutral'; lower both windows at least 25 mm (1 inch) before switching the ignition 'off'; release the hood latch. Depress the switch to release the trunk lid latch. Leave the handbrake 'off'. Chock one wheel using wedges to prevent unnecessary movement of the vehicle.

The engine hoist should be rated at 500 kg Safe Working Load **minimum**, and should be capable of fore and aft movement along the longitudinal axis of the vehicle. Depending on the working environment, side to side movement to allow the engine & transmission assembly to be traversed clear of the vehicle may also be appropriate.
2. Open the hood and install fender covers.
3. Disconnect the negative cable at the battery.
4. Apply masking tape to protect the front edge of the hood. With an assistant, support the hood while disconnecting the gas struts. After removing the 6 bolts that retain the hood, lift the hood clear.
5. Remove the LH and RH engine covers.
6. Discharge the refrigerant from the air conditioning system using recycling equipment. (As for 1995 MY On Sedan range).
7. Use Special Tool set JD-209 or similar proprietary equipment to depressurize the fuel system. Use Special Tool JD-182 to disconnect the fuel feed and return pipes from the fuel rail. Plug the feed and return pipes. Disconnect the fuel return hose from the fuel feed hose securing clip.
8. Drain the cooling system into a clean container. Save as much of the original coolant as possible, for reuse on reassembly.
9. Loosen the union nuts of the transmission fluid upper and lower cooling pipes from the radiator, position a drain tray and disconnect the pipes. Discard the drained-off transmission fluid. Plug the pipes and the radiator connections.
10. Drain the engine oil into a suitable container; discard the oil.
11. Lower the vehicle.
12. Disconnect the convoluted breather pipe from the stub on the 'A' bank cam cover. Retain the O-ring.
13. Disconnect the multiplug from the mass air flow (MAF) sensor; cut and discard the tie strap which secures the throttle body vacuum pipe to the induction elbow. Remove the two bolts and disconnect the intake tube from the throttle body, discarding the rubber seal. Release the 6 clips at the air cleaner, and remove the air intake tube/MAF sensor/air cleaner cover assembly.
14. Remove the cooling system expansion tank and disconnect the top hose from the engine. Disconnect the bottom hose at the thermostat housing .
15. Disconnect the high speed and low speed fan multiplugs, release their harnesses from the clips on the fan cowl and move the harnesses clear.
16. Remove the 5 bolts and remove the radiator top closing panel and radiator top mounting rubbers. Release and move the air conditioning refrigerant pipe from the clip on the fan cowl. Remove the bolt securing the hose from the receiver/drier to the air conditioning condenser, disconnect the hose from the receiver/drier. Plug the hose and the receiver/ drier. With an assistant, lift out the radiator assembly.

17. From the bracket at the rear, release the heated oxygen sensor connectors and disconnect the multiplugs.
18. Disconnect the 57-way connector of the Engine Management harness. Remove the multiplug from its bracket.
19. Disconnect the fuel injection harness multiplug from the Engine Management harness.
20. Disconnect the multiplugs of the EGR and Transmission Rotary Switch harnesses.
21. Rotate the throttle actuating cam and disconnect the throttle cable. Loosen the cable adjusting locknut and disconnect the outer cable from the bracket.
22. Disconnect the heater return hose. Release the connector lock lever and disconnect the heater feed hose.
23. Release and relocate the protective sleeve on the brake servo vacuum hose and disconnect the hose connector.
24. On each side of the cylinder block install an engine rear lifting eye - Special Tool JD 222. Tighten the captive securing bolts.
25. Remove the nuts which secure each downpipe catalytic converter to its exhaust manifold.
26. Release the filler cap of the PAS reservoir.
27. After raising the vehicle, position a drain tray, loosen the PAS pump high pressure hose union nut, disconnect the hose, drain off and discard the fluid. Insert suitable plugs in both the hose and the PAS pump outlet. Discard the O-ring seal.
28. Remove the engine oil dipstick tube. Plug the opening in the crankcase. Release the clip and disconnect the PAS pump feed hose; plug the hose and pump ports.
29. Loosen the nuts of the front muffler to downpipe catalytic converter clamps on both sides of the vehicle; move the front muffler rearward off the catalytic converter outlet stubs. Loosen the nuts of the clamps of the intermediate mufflers on both sides; move the intermediate mufflers to the rear, allowing the front muffler assembly to be disconnected and removed.
30. Loosen the handbrake cable adjuster nut; remove the 4 handbrake assembly retaining bolts, displace the handbrake assembly from the body, allowing it to hang down.
31. Remove the three nuts and bolts from each coupling flange of the drive shaft, turning the drive shaft as necessary to obtain access. Temporarily leave one bolt in place at the rear coupling to support the shaft.
32. Place a transmission jack under the rear mounting of the transmission and adjust it to take the weight of the rear of the engine/transmission assembly; remove the four bolts which retain the transmission mounting to the body.
33. Remove the last bolt from the rear coupling and move the shaft away, allowing the rear end of the shaft to be supported on the handbrake cable. Lower the transmission jack until the shaft can be disengaged from the transmission spigot and removed clear of the vehicle.
34. Remove the two bolts that secure each downpipe catalytic converter to its mounting bracket; remove the two converters, placing them in a safe location where they will not be damaged and where there will be no contaminants will enter the catalyst.
35. On the RH side of the engine compartment, disconnect the ground strap from the body.
36. Disconnect the multiplug of the generator suppression module. Displace the fuel injection harness below the suppression module; identify and disconnect the multiplug of the Engine Management harness to starter motor.

37. Disconnect the starter power cable from the power stud, pull it through the heatshield into the engine compartment.
38. Release the lock and disconnect the transmission harness from the rear of the transmission.
39. Remove the nut from the transmission selector cross shaft; remove the selector cable abutment bolts and disconnect the cable from the cross shaft.
40. From above, align an overhead engine hoist equipped with 4 chains and hooks off a common ring. Connect the longer chains and hooks to the engine rear lifting eyes, the shorter chains to the engine front lifting points. Adjust the chains until they all are taking equal weight, permitting the transmission jack to be lowered and removed without the transmission moving away from the body.

CAUTION! Do not allow the rear of the engine to drop. Damage will occur to components on the rear of the engine and on the bulkhead.

41. Remove the nuts from the engine mounts (Hydramounts.)
42. Remove the bolt through the rear mounting rubber and remove the rear mounting cross member.
43. With an assistant operating the engine hoist controls, very carefully lower the vehicle lift and engine hoist **SIMULTANEOUSLY** to a convenient working height.
44. Move the engine and transmission assembly forwards and upwards until the assembly can be lifted clear of the vehicle.
45. Move the engine hoist clear of the vehicle, until the engine and transmission assembly can be lowered to a convenient working height.
46. Disconnect the transmission oil cooler feed pipe, discarding the O-ring seal. Remove the securing bolt of the pipe bracket to the engine sump, release the air conditioning pipe from the bracket and remove the cooler pipes. Insert suitable blanking plugs in the transmission connection and in the pipes.
47. Remove the access cover, on the underside of the bell housing, to the torque converter. Turn the crankshaft, using a drive socket on the crankshaft damper securing bolt, to obtain access to the first bolt securing the torque converter to the drive plate and remove the bolt. (Rotate the engine clockwise only, viewed from the front). Suitably wedge the starter ring gear to prevent the crankshaft turning when loosening the bolt.
48. Rotate the engine 120° to remove the second bolt, and an additional 120° to remove the third bolt.
49. Adjust a transmission jack to support the transmission, installing or adjusting any additional brackets as required, and securing the transmission to the jack using the safety chain.
50. Remove the 10 bolts that secure the bell housing to the engine.
51. Carefully separate the engine from the transmission. Make sure that the torque converter does not stick to the drive plate, but stays completely in the transmission at all times. Once separated, secure the torque converter to the transmission so that it is not accidentally dislodged.
52. Lower the engine to the floor and position a piece of wood under the oil sump to support the unit. If the accessories need to be transferred to another engine, place the engine on an engine stand. Disconnect the lifting chains and hooks, and remove the engine rear lifting eyes.

53. Reassemble the transmission on the engine and reinstall the assembly in the vehicle in reverse order of the removal and dismantling procedure, noting:
- Clean all pipe and hose joint faces and fit new seals/O-rings as appropriate at all joints, as shown in the enclosed parts requirements.
 - Tighten all fasteners to the torque wrench settings as tabulated below.
 - Fill or top-up (as appropriate) the engine oil sump, ensuring that the oil level is at the 'FULL' mark on the dipstick before attempting to start the engine.

Engine oil specification: API SG/CD, or preferably: API SH where available.

Viscosity: 5W-30

- When filling the cooling system, refer to COOLANT SYSTEM REFILLING PROCEDURE, page 11.
- When refilling the PAS System, refer to the procedure in the XK8 Diagnostic and Test Manual, Section 211-02. Use DEXRON 3 Fluid.

IMPORTANT - THE FOLLOWING TWO OPERATIONS ARE CRITICAL

During reconnection of the throttle cable, it is **critical** that the cable adjustment is carried out as described in the XK8 On-Board Diagnostics Manual, Section 303-12, using that part of SRO 19-70-04 which refers to Throttle Cable Adjustment.

After reconnecting the battery and **before starting the engine**, carry out the continuation of the above SRO which refers to Kickdown Setting.

- Before starting the engine, remove the transmission filler/level plug. Top up to the level of the plug. Reinstall the plug. After running the engine, top up the transmission as necessary, as described in XK8 Diagnostic & Test Manual, Section 307-01. Use **only ESSO ATF LT 71141 fluid**.
- It may be found convenient, on initially starting the engine, that the Air Conditioning refrigeration system is not yet recharged with R134A refrigerant. Ensure that the controls are set such that the Air Conditioning compressor clutch does not become engaged until initial engine running is completed and the system has been charged with refrigerant and, where applicable, an appropriate quantity of the recommended refrigerant oil. For information, refer to XK8 Diagnostics and Test Manual, Section 412-03.
- Adjust the handbrake cable - refer to HANDBRAKE CABLE ADJUSTMENT page 11.
- Reset the clock, the radio code (where applicable) and carry out the windows set-up procedure, following reconnection of the battery,
- After completion of all items above and visual checks that no fluid leaks etc. are apparent, and all fluids have been correctly topped up, the vehicle may be driven to a storage area- The vehicle should be allowed to cool overnight,
- A Test Drive must then be undertaken, which will allow ECM adaptation to occur. This test drive **MUST** include:

Cold start Some idling Heavy acceleration

Steady state cruising up to achievement of normal engine temperature as described in XK8 On-Board Diagnostics Manual, Section 303-14, Pinpoint Test P0603, P1609, Item A3.

TORQUE DATA

FASTENER	LOCATION	Nm	lb ft
Bolt,	Bell Housing to Engine	50	37
Bolt,	Torque Converter to Drive Plate	50	37
Nut,	Engine to Hydramount	50	37
Nut,	Catalytic Converter to Exhaust Manifold	16	12
Bolt,	Catalytic Converter to Bracket	45	33
Nut & Bolt,	Drive shaft Front Coupling	77	57
Nut & Bolt,	Drive shaft Rear Coupling	50	37
Nut,	Front Muffler Front Clamp to Catalytic Converter Stub	70	52
Nut,	Front Muffler Rear Clamp to Intermediate Muffler Entry	70	52
Bolt,	PAS Pump HP Outlet Union	25	18
Bolt,	Hinge to Hood Pick-up Point	26	19
Bolt,	Oil Cooler Pipe Bracket/Sump		
Bolt,	Handbrake assy to Body	25	18

TRANSFERRING ENGINE ACCESSORIES

1. Disconnect the 'A' bank V.V.T. solenoid harness multiplug. Move the clips of the mounting bracket of the fuel injection harness on the generator mounting bracket. Disconnect the engine oil pressure sensor multiplug and the generator harness multiplug. Reroute the fuel injection harness from behind the link lead connecting the generator to the starter motor and release the clips securing the fuel injection harness to the front cover and 'A' bank cam cover.
2. Disconnect the multiplugs of the coolant temperature sensor and the 'A' bank knock sensor and fuel injectors and withdraw the harness rearwards.
3. Remove the screws and remove the 'A' bank on-plug coil cover; disconnect the multiplugs from the on-plug ignition coils.
4. Disconnect the 'B' bank V.V.T. solenoid harness multiplug. Move the securing clips of the harness to the 'B' bank cam cover and PAS pump, disconnect the multiplugs to the Air Conditioning compressor clutch and lock sensor and disconnect the crankshaft angle sensor multiplug.
5. Disconnect the part-load breather hose from the 'B' bank cam cover, remove the screws and remove the on-plug coil cover; disconnect the multiplugs from the ignition coils.

6. Release the clips retaining the fuel injection harness to the rear of the 'B' bank cam over, and disconnect the multiplugs from:
 - throttle body motor/clutch
 - throttle position sensor
 - throttle pedal demand sensor
 - PAS pressure switch.thus allowing the fuel injection harness to be released and removed from the engine.
7. Remove the securing bolts, allowing the multiplug bracket for the Engine Management harness to be removed.
8. Disconnect the coolant feed hose and heater pipe from the throttle body. Remove the bolt from the fuel return pipe bracket.
9. Disconnect the EGR valve coolant feed hose from the throttle body, remove the 2 bolts from each end of the EGR pipe and disconnect it from the valve. Discard the EGR pipe and EGR valve body gaskets and clean the gasket faces of the valve.
10. Remove the retaining bolts, disconnect the coolant return hose and remove the EGR valve. Release the clip and remove the coolant return hose.
11. Remove the 10 bolts securing the intake manifold and 2 bolts securing the throttle body intake elbow. Release the camshaft position sensor multiplug and remove the intake manifold. Remove and discard the seals in each intake port.

Seal the intake port using adhesive tape to prevent the possible entry of foreign matter.
12. Disconnect both knock sensor multiplugs from their mounting bracket and use a 24 mm 'crowfoot' wrench to remove both knock sensors.
13. Remove the 4 bolts securing the coolant outlet pipe, 4 bolts securing the thermostat housing and remove the thermostat housing; discard the housing seal and the coolant outlet pipe seal. Release the clip and remove the heat feed hose.
14. From both banks, remove the on-plug coils; disconnect and remove the full load breather hose.
15. From both banks remove the securing bolts and spacers, supporting the manifold during their removal; remove the manifolds and gaskets.
16. Remove the 4 bolts from each engine mounting bracket and remove the brackets.
17. Remove the 2 bolts, release and remove the muffler pipe from the compressor, discarding the O-ring seal and inserting plugs in the pipe and port. Remove the 2 bolts, release and remove the air conditioning compressor discharge pipe; discard the O-ring seal; insert suitable blanking plugs in the pipe and in the compressor outlet port.
18. Apply a wrench to the drive belt tensioner pulley securing bolt, release the belt tension and disconnect the belt from the generator pulley before allowing the tensioner to relax.

Suitable wrench: Special Tool JD-230 or Snap-on Tools XDHM 1415

Release this drive belt from the remaining pulleys and remove the belt.
19. Prevent the water pump pulley from rotating, using a suitable strap-type oil filter wrench, while the three bolts are removed allowing the pulley to be withdrawn.

Suitable wrench: Snap-on Tools A91 B

20. Remove the 5 securing bolts and remove the water pump, discarding the gasket and O-ring seal.
21. Remove the rear lower securing bolt of the A/C compressor, and release the bracket of the crank sensor multiplug. Remove the 3 additional bolts and remove the compressor.
22. Remove the 3 bolts from the PAS pump pulley, holding the pulley with a strap-type oil filter wrench. Remove the pulley.
23. Remove the bolt and relocate the bracket of the oil level dipstick tube. Loosen the PAS pump upper securing bolt. Turn the drive belt tensioner pulley bolt against spring pressure to obtain clearance to allow removal of the bolt. Remove the 2 lower securing bolts and remove the pump.
24. Remove the 2 bolts and remove the compressor/pump/belt tensioner bracket assembly.
25. Release the clips, remove the securing bolt and remove the crankshaft sensor.
26. At the generator, move the protective boot and disconnect the link lead to the starter motor.
27. Remove the generator upper securing bolt. Support the generator, allowing the lower bolt to be removed along with the fuel injection harness mounting bracket, allowing removal of the generator.
28. After removing the 4 bolts, remove the generator bracket/idler pulley assembly.
29. After removing the 2 bolts, remove the starter motor. Remove the bolt and remove the engine grounding strap.
30. With a suitable container positioned to collect oil, remove the oil filter and clean up the spillage. Insert a plug in the oil filter boss.
31. From the banjo connector remove the bolt, allowing removal of the throttle body coolant pipe. Remove and discard the 'Dowty' washers.
32. After removing the 2 bolts securing each Variable Valve Timing actuating solenoid; remove the solenoids, discarding the O-ring seals. Insert suitable plugs in the openings in the timing cover.
33. Using a hoist with chain hooks attached to the engine lifting eyes, lift the engine from the workbench. In the case of replacement engines, lower the engine into its transit container before disconnecting the hoist. Remove the bolts together with the engine lifting eyes.
34. Install the lifting eyes and raise the replacement engine to a convenient workbench.
35. Reinstall all accessory components in the reverse order of the removal procedure, observing the following:

Clean all mating faces where gaskets or seals are fitted, before reinstalling components.
Use NEW gaskets or seals.
36. Observe Torque Data on following page.
37. When installing the engine oil filter, lubricate the rubber seal and tighten 3/4 turn only after initial contact of the seal with the mounting base.
38. When installing the exhaust manifolds, first finger-tighten only the central pair of bolts to retain the manifold and gasket in position. Insert and finger tighten the remaining bolts and spacers. Then fully tighten the bolts to the torque wrench setting in pairs, upper and lower, beginning with the FRONT pair.
39. When fitting the intake manifold, first finger-tighten the bolts. Tighten the bolts to the torque wrench setting in pairs, beginning from the center.

TORQUE DATA

FASTENER	LOCATION	Nm	lb ft
Bolt,	Starter Motor Securing	43	32
Bolt,	VVT Solenoid	12	9
Banjo Bolt,	Coolant Pipe for throttle body	25	19
Bolt,	Generator and Idler- Pulley Bracket		
Bolt,	Generator to Bracket- upper	23	17
	- lower	46	34
Bolt,	PAS Pump to Bracket	19	14
Bolt,	PAS Pump Drive Pulley securing	23	17
Bolt,	A/C Compressor to Bracket	23	17
Bolt,	Water Pump securing	13	10
Bolt,	Water Pump Pulley securing	12	9
Bolt,	Engine Mounting Brackets	25	19
Bolt,	Exhaust Manifold to Cylinder Head	18	13
Bolt,	Thermostat Housing	10	7
Knock Sensor	Units to Cylinder Block	36	27
Bolt,	Intake Manifold to Cylinder Head	21	16
Bolt,	EGR Valve securing	21	16

COOLANT SYSTEM REFILLING PROCEDURE

1. Remove the bleeder cap from the thermostat housing at the front of the engine.
2. Refill the cooling system, using the coolant preserved when draining the system, via the header tank.
3. Top up as necessary, using a 50% solution of Jaguar anti-freeze, coolant and corrosion inhibitor (conforming to specification ESD-M97B49-A) until the level stabilizes at top of the breather neck on the thermostat housing. Reinstall the bleeder cap. Continue to top up until coolant reaches the neck of the header tank.
4. Start and run the engine for a short time to circulate the coolant. Stop the engine and top-up as necessary. Reinstall the pressure cap to the header tank.
5. Start and run the engine, maintaining 1500 rpm with air conditioning 'OFF', until the cooling fans switch on. Turn the air conditioning controls to 'MAXIMUM HEAT' and check that hot air is being delivered from the heater outlets in the vehicle.
6. Stop the engine and allow the system to cool for at least 30 minutes.
7. Carefully remove the pressure cap from the Header Tank, top up the coolant to the bottom of the filler neck. Reinstall the pressure cap.

HANDBRAKE CABLE ADJUSTMENT

1. Tighten the cable adjuster under the lever assembly until all slack is eliminated from the cable.
2. Ensure that a good parking brake application occurs with the lever raised 3 - 4 clicks from fully released.

Parts Information:

<u>DESCRIPTION</u>	<u>PART NUMBER</u>	<u>QTY</u>
Crankshaft damper	NCA 1411AB	1
Front oil seal	EAZ 2060	1
Bolt	NCA 1451AA	1
Self locking exhaust manifold retaining bolt	JZB 100087	16
Exhaust manifold RH gasket (‘A’ bank)	NCA 2906AD	1
Exhaust manifold LH gasket (‘B’ bank)	NCA 2907AD	1
Transmission cooler pipes to radiator O-ring	EBC 4899	2
Air duct to throttle body seal	NJA 3554AA	1
Pipe to receiver/drier O-ring	KSG 111116	1
PAS pump to rack hose*	MJA 3985AF	1
Cooler feed pipe O-ring on transmission	EBC 4899	1
A/C compressor to outlet O-ring (qty 1)	KSG 110624	2
A/C compressor to muffler pipe O-ring (qty 1)		
Exhaust manifold to catalytic converter gasket	EAZ 2050	2
Vacuum pipe to intake elbow tie strap (qty1)	ADU 9028	3
Lower Oxygen Sensor Harness to Transmission		
Cooling Pipes tie strap (qty 2)		

*O-ring at PAS pump is not available separately from the hose.

Warranty Information:

<u>FAULT</u>	<u>R.O.</u>	<u>DESCRIPTION</u>	<u>TIME</u>
<u>CODE</u>	<u>NUMBER</u>		<u>ALLOWANCE</u>
AS DB **	30.91.04	Exhaust manifold bolt modification	9.50 hrs.
AS GB **			