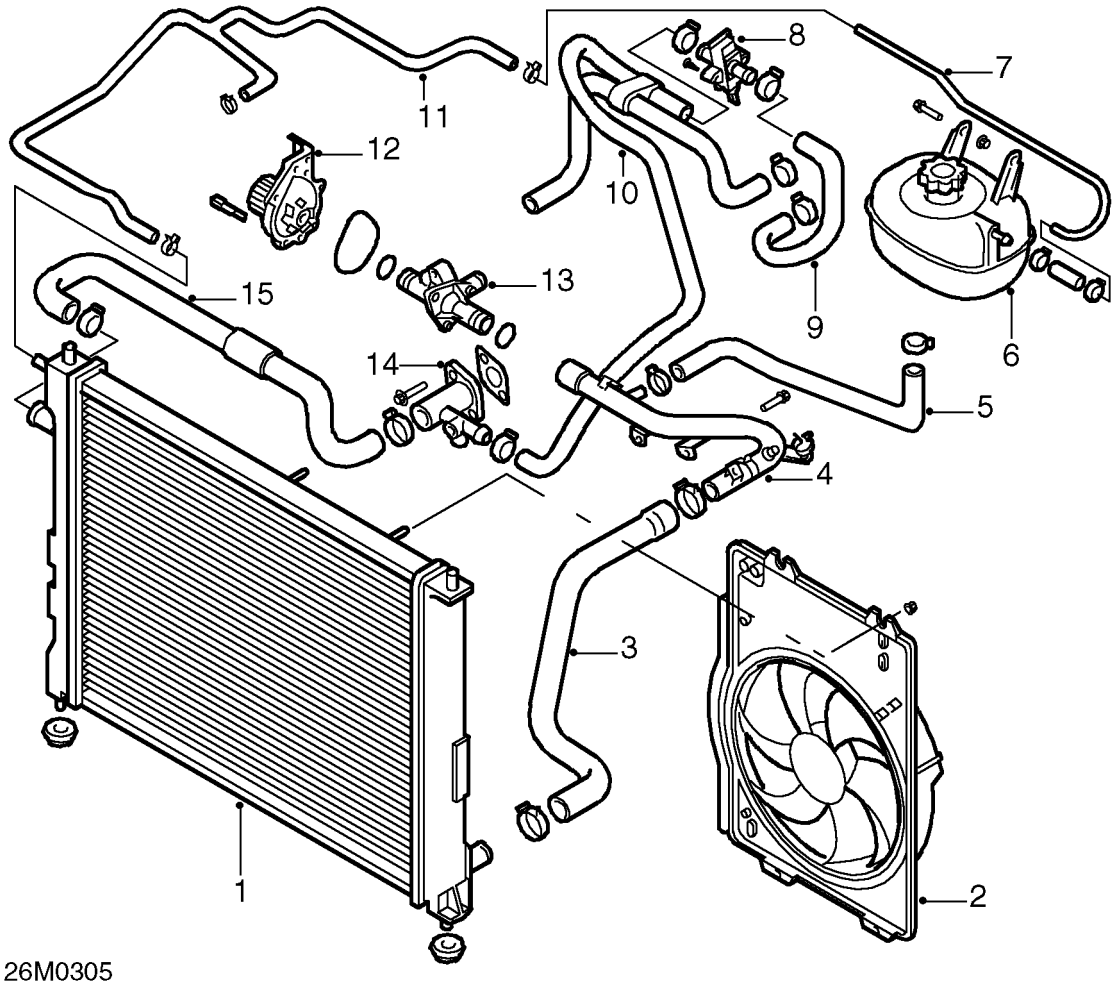
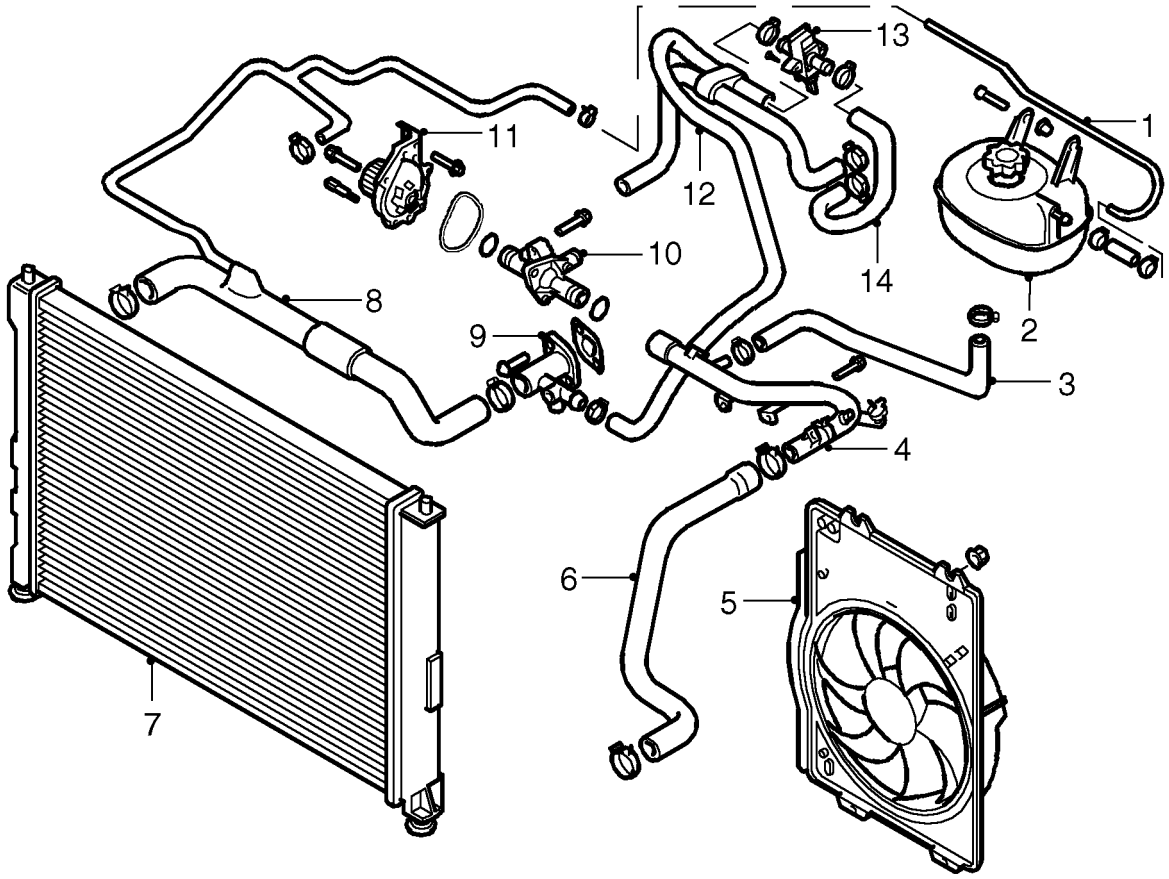
COOLING SYSTEM COMPONENTS - 'K8'



26M0305

1. Radiator
2. Cooling fan and cowl
3. Bottom hose
4. Pipe - bottom hose to thermostat
5. Hose - expansion tank return
6. Expansion tank
7. Pipe - expansion tank to expansion hose
8. Heater temperature control valve
9. Hose - heater matrix feed
10. Hose - heater matrix return
11. Hose - expansion pipe to radiator
12. Coolant pump
13. Thermostat housing
14. Coolant outlet elbow
15. Top hose

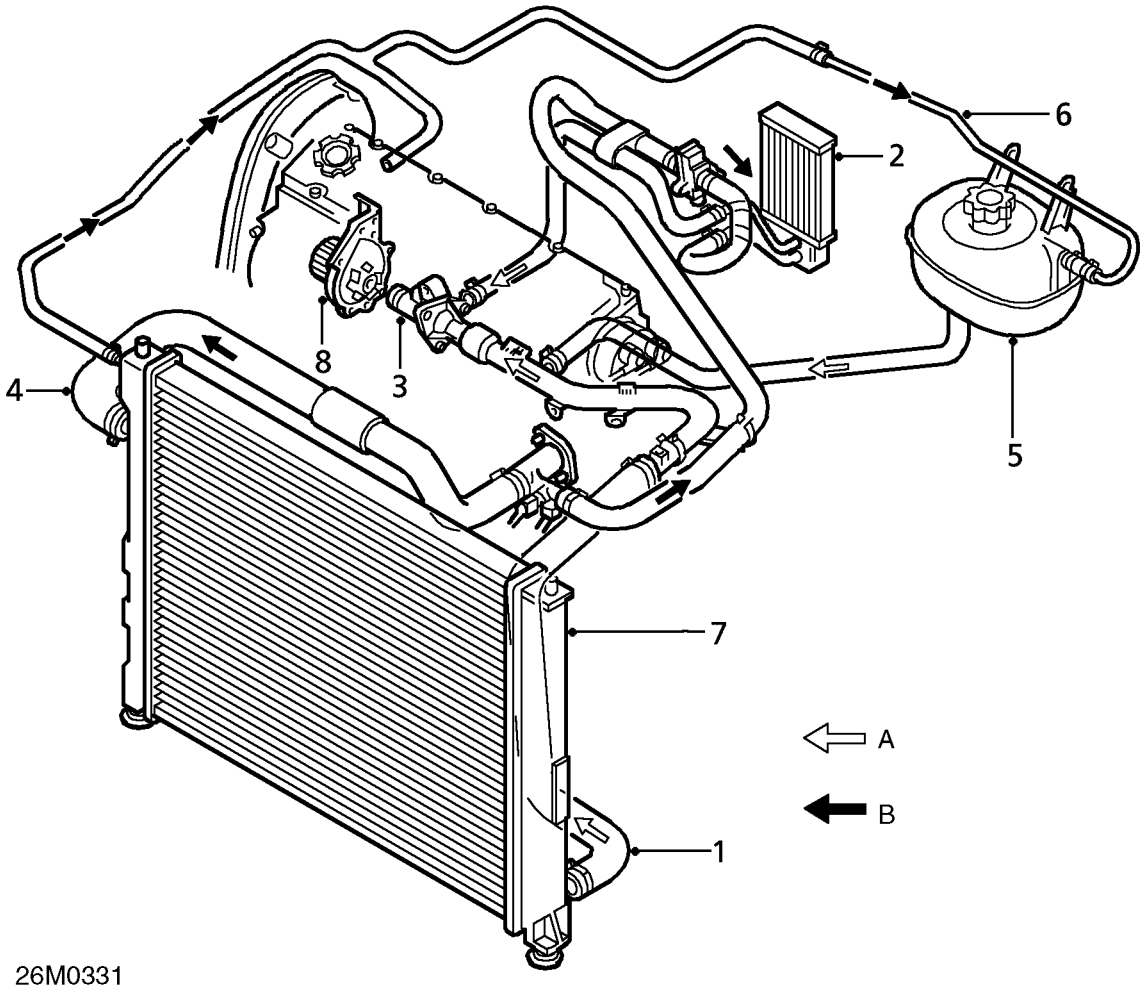
COOLING SYSTEM COMPONENTS - 'K16'



26M0330

1. Pipe - expansion tank to radiator
2. Expansion tank
3. Hose - expansion tank return
4. Pipe - bottom hose to thermostat
5. Cooling fan and cowl
6. Bottom hose
7. Radiator
8. Top hose
9. Coolant outlet elbow
10. Thermostat housing
11. Coolant pump
12. Hose - heater matrix return
13. Heater temperature control valve
14. Hose - heater matrix feed

COOLING SYSTEM OPERATION



'K8' flow diagram

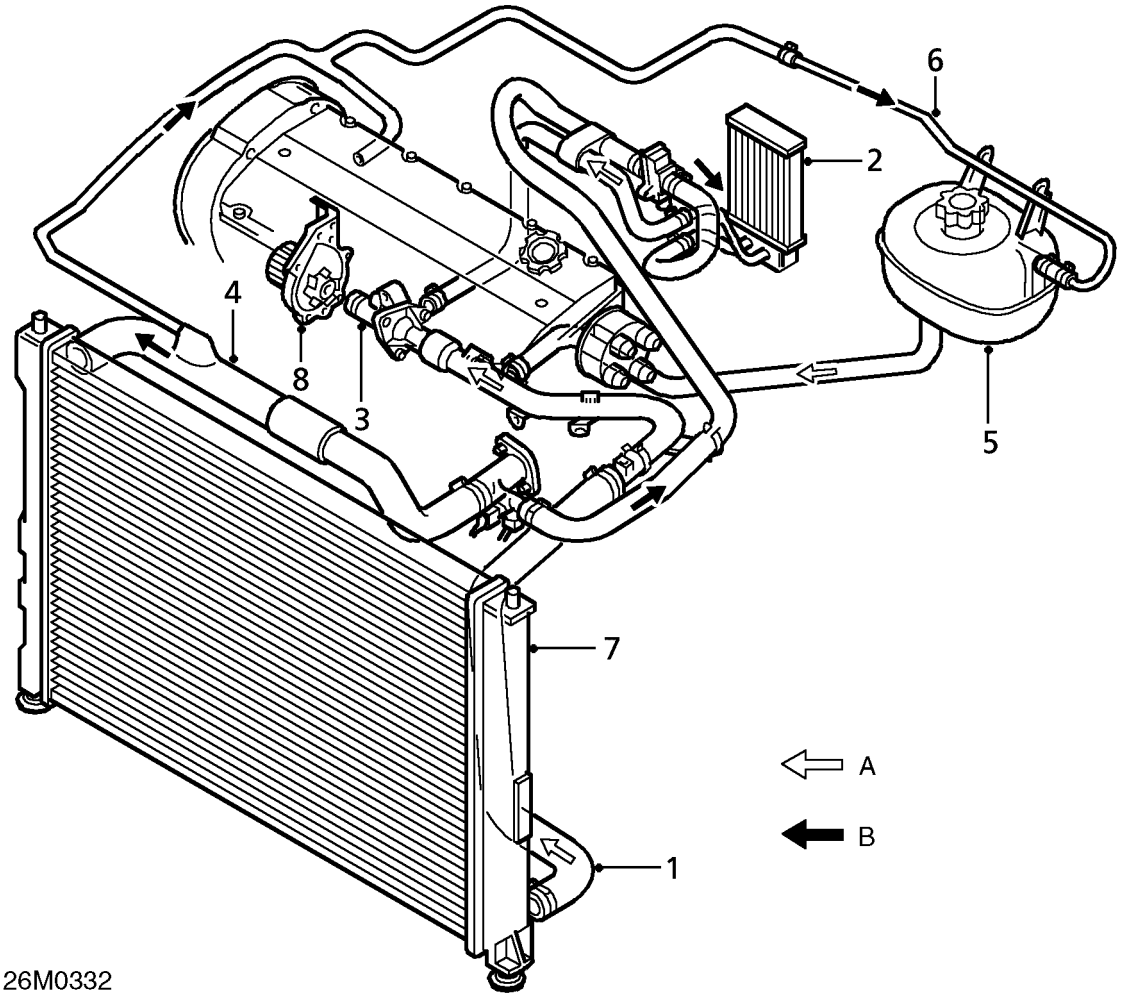
A = COLD **B =** HOT

The cooling system employed is the bypass type.

When the engine is cold the thermostat closes off the coolant feed from the radiator bottom hose (1). Coolant is drawn via the heater matrix (2) from the top of the cylinder block, this allows some heat transfer to the radiator via the top hose by convection while retaining the majority of the heat within the cylinder block.

The siting of the thermostat (3) in the inlet rather than the outlet side of the system provides a reduced warm up time by circulating a small amount of coolant around a shorter tract, this also prevents temperature build up within the cylinder head prior to the thermostat opening.

As temperature increases the thermostat gradually opens, bleeding cool fluid into the cylinder block and allowing hot coolant to flow to the radiator via the top hose (4), balancing the flow of hot and cold fluid to maintain temperature. As the thermostat opens further so the full flow of coolant is drawn through the radiator.



'K16' flow diagram

A = COLD **B =** HOT

Any excess coolant created by heat expansion is returned to the expansion tank (5) via hose (6).

The radiator (7) is a copper/brass cross-flow type with moulded plastic end tanks which incorporate sensor mountings and is mounted on rubber bushes directly into the front body member. The top of the radiator is supported by means of mounting brackets bolted to the radiator and bonnet locking platform.

For additional air flow, at times when the vehicle is stationary, an electric cooling fan is fitted. This is triggered by the Engine Control Module (ECM) on 'K' Series models or by a coolant temperature sensor at the rear of the cylinder block.

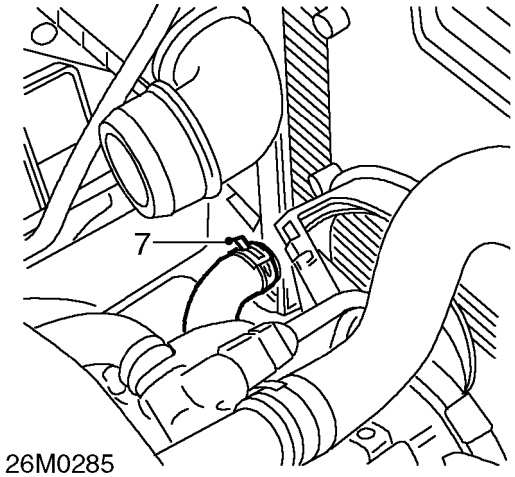
The coolant pump (8) is a rotor type pump which draws coolant directly from the thermostat. The pump is driven by a geared pulley from the camshaft timing belt.

DRAIN AND REFILL

Service repair no - 26.10.01

Drain

1. Visually check engine and cooling system for signs of coolant leaks.
2. Examine hoses for signs of cracking, distortion, and security of connections.
3. Remove air cleaner assembly. ***See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.***
4. Position heater temperature control to maximum heat position.
5. Remove expansion tank filler cap.
6. Position drain tin to collect coolant.



26M0285

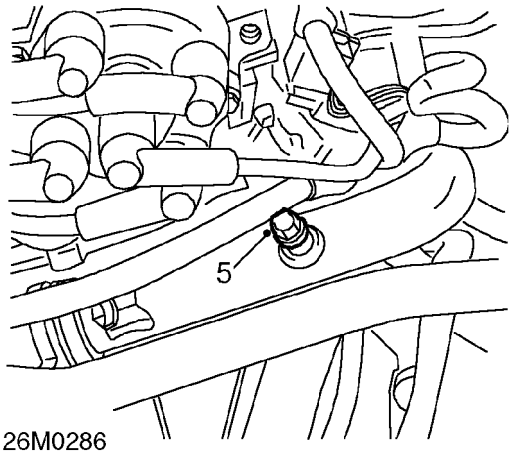
7. Loosen clip and disconnect bottom hose from radiator.
8. Allow cooling system to drain.

Refill

1. Flush system with water under low pressure.

CAUTION: High pressure water could damage the radiator.

2. Connect bottom hose to radiator and tighten clip.
3. Prepare coolant to required concentration. ***See INFORMATION, Capacities, fluids and lubricants.***
4. Remove bleed screw from coolant rail.



26M0286

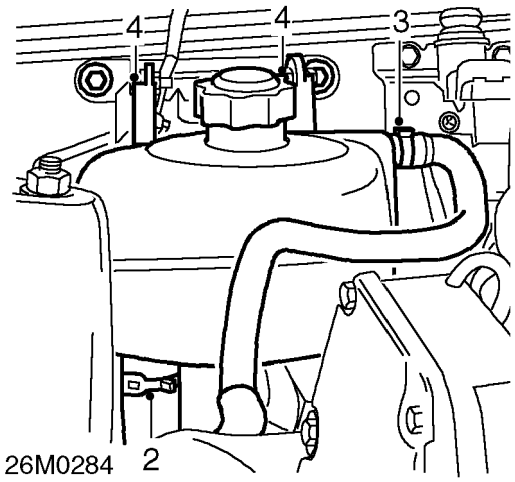
5. Fill system slowly until a steady flow of coolant is emitted from the bleed hole in coolant rail.
6. Fit bleed screw to coolant rail and tighten to 9 Nm.
7. Continue filling system until coolant level reaches 'MAX' mark on expansion tank.
8. Fit expansion tank filler cap.
9. Fit air cleaner. ***See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.***
10. Start and run engine until radiator cooling fan operates.
11. Switch off engine and allow to cool.
12. Check for leaks and top-up coolant to 'MAX' mark on expansion tank.

COOLANT EXPANSION TANK

Service repair no - 26.15.01

Remove

1. Position container to collect fluid loss from expansion tank.



2. Loosen clip and disconnect hose from expansion tank.
3. Release clip and disconnect coolant feed hose from expansion tank.
4. Remove 2 bolts securing expansion tank to body.
5. Release expansion tank from body and allow coolant to drain.
6. Remove coolant expansion tank.

Refit

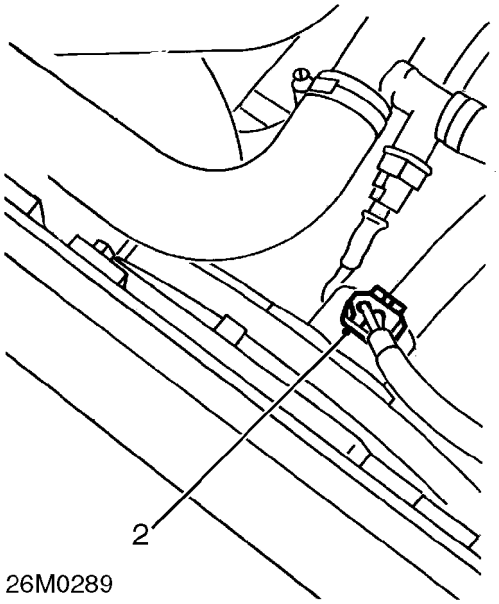
1. Position coolant expansion tank.
2. Fit 2 bolts securing expansion tank to body and tighten to 5 Nm.
3. Connect coolant feed hose to expansion tank and tighten clip.
4. Connect hose to expansion tank and tighten clip.
5. Top-up cooling system. ***See MAINTENANCE.***
6. Remove container positioned to catch fluid loss.

RADIATOR COOLING FAN

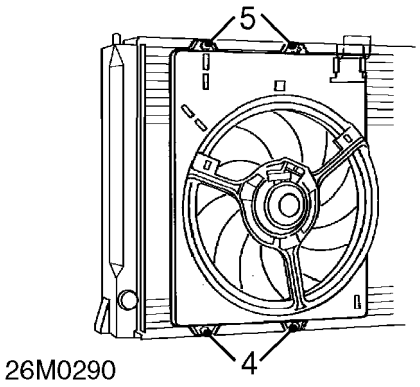
Service repair no - 26.25.22

Remove

1. Disconnect battery earth lead.



2. Disconnect multiplug from radiator cooling fan.
3. Release radiator top hose from clip on cooling fan housing.



26M0290

4. Remove 2 nuts securing bottom of cooling fan housing to radiator.
5. Remove 2 nuts securing top of cooling fan housing to radiator.
6. Release cooling fan housing from studs on radiator.
7. Manoeuvre cooling fan housing around radiator top hose and remove from vehicle.

Refit

1. Manoeuvre cooling fan housing around radiator top hose and into position on radiator studs.
2. Fit nuts securing cooling fan housing to radiator and tighten to 9 Nm.
3. Secure radiator top hose to clip on cooling fan housing.
4. Connect multiplug to radiator cooling fan.
5. Connect battery earth lead.

RADIATOR COOLING FAN - 'K16' WITH AIR CONDITIONING

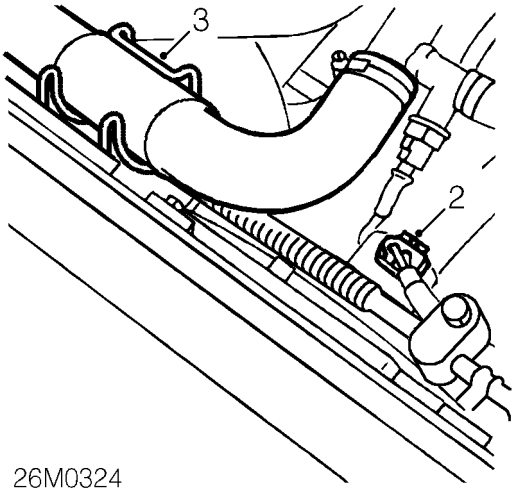
Service repair no - 26.25.22.20

Remove

1. Raise front of vehicle.

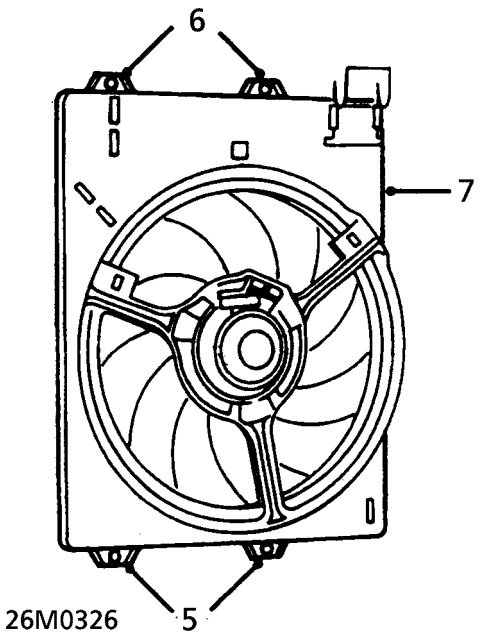
WARNING: Support on safety stands.

2. Remove front beam. ***See FRONT SUSPENSION, Repairs.***



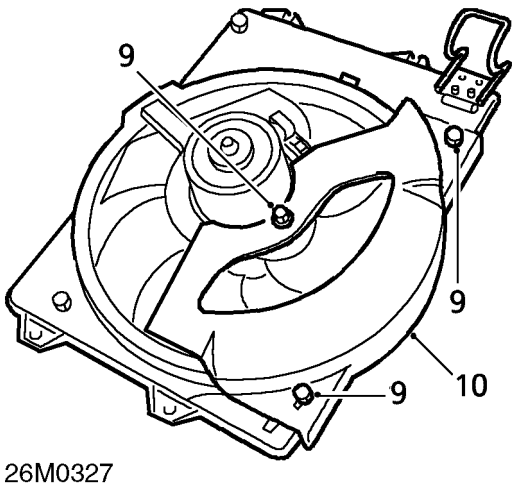
26M0324

3. Release radiator top hose from clip on cooling fan housing.
4. Disconnect multiplug from cooling fan.



5. Remove 2 nuts securing bottom of cooling fan housing to radiator.
6. Remove 2 nuts securing top of cooling fan housing to radiator.
7. Release cooling fan housing from studs on radiator.
8. Lower cooling fan housing from vehicle and remove.

Do not carry out further dismantling if component is removed for access only.



9. Remove 3 bolts securing heat shield to cooling fan housing.
10. Remove heat shield from cooling fan housing and fit to new.
11. Tighten bolts securing heat shield to 5 Nm.

Refit

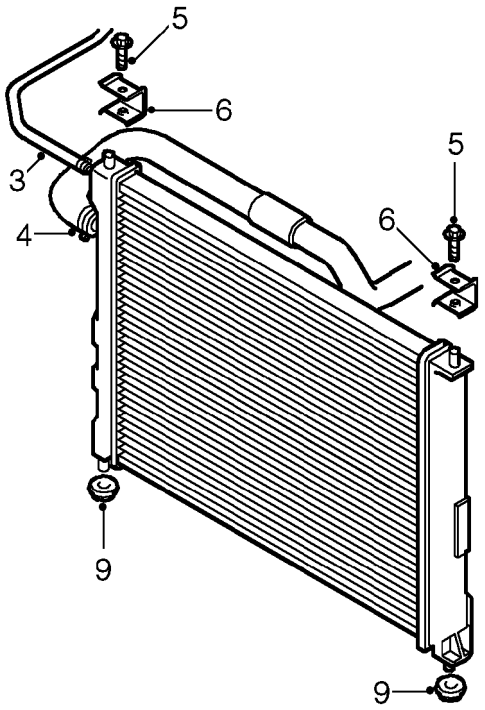
1. Position cooling fan housing on radiator studs.
2. Fit nuts securing cooling fan housing to radiator and tighten to 9 Nm.
3. Secure radiator top hose to clip on cooling fan housing.
4. Connect multiplug to radiator cooling fan.
5. Fit front beam. ***See FRONT SUSPENSION, Repairs.***
6. Remove stand(s) and lower vehicle.

RADIATOR - 'K8'

Service repair no - 26.40.01

Remove

1. Drain cooling system. ***See Adjustments.***
2. Remove radiator cooling fan. ***See this section.***



26M0311

3. Loosen clip and disconnect coolant expansion tank hose from radiator.
4. Loosen clip and disconnect top hose from radiator.
5. Remove 2 bolts securing radiator top mounting brackets to bonnet locking platform.
6. Remove 2 radiator top mounting brackets.
7. Release radiator from 2 lower mountings.
8. Remove radiator from vehicle.
   Do not carry out further dismantling if component is removed for access only.
9. Remove 2 lower mounting rubbers from radiator.
10. Fit lower mounting rubbers to new radiator.

Refit

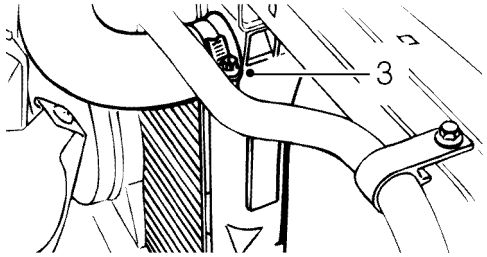
1. Manoeuvre radiator into position and locate on lower mountings.
2. Fit top mountings to radiator and align to body.
3. Fit bolts securing radiator top mountings to bonnet locking platform and tighten to 9 Nm.
4. Connect top hose to radiator and tighten clip.
5. Connect coolant expansion tank hose to radiator and tighten clip.
6. Refit radiator cooling fan. ***See this section.***
7. Refill cooling system. ***See Adjustments.***

RADIATOR - 'K16'

Service repair no - 26.40.01

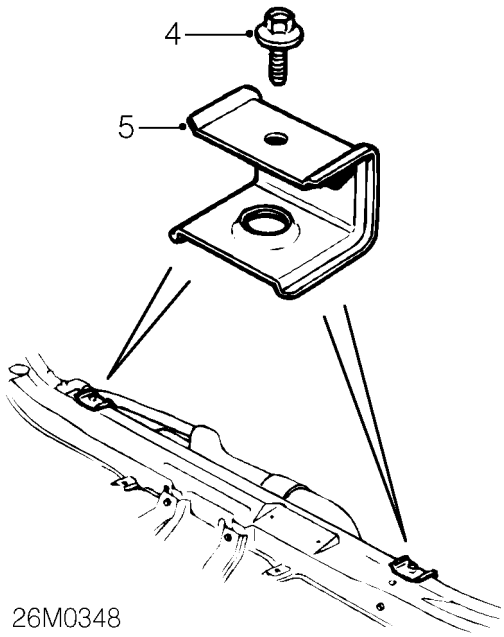
Remove

1. Drain cooling system. ***See Adjustments.***
2. Remove radiator cooling fan. ***See this section.***



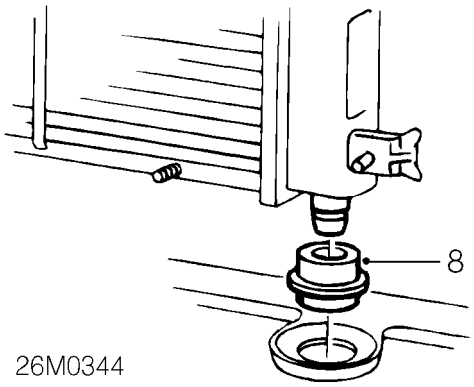
26M0347

3. Loosen clip and disconnect top hose from radiator.



26M0348

4. Remove 2 bolts securing radiator top mounting brackets to bonnet locking platform.
5. Remove 2 radiator top mounting brackets.



26M0344

6. Release radiator from 2 lower mountings.
7. Remove radiator from vehicle.
   Do not carry out further dismantling if component is removed for access only.
8. Remove 2 lower mounting rubbers from radiator.
9. Fit lower mounting rubbers to new radiator.

Refit

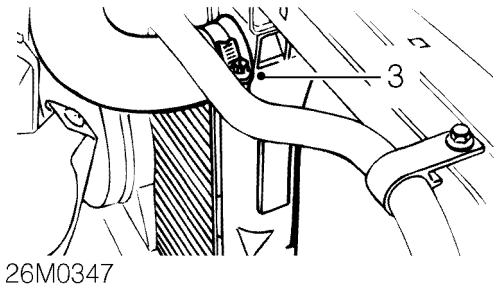
1. Manoeuvre radiator into position and locate on lower mountings.
2. Fit top mountings to radiator and align to body.
3. Fit bolts securing radiator top mountings to bonnet locking platform and tighten to 9 Nm.
4. Connect top hose to radiator and tighten clip.
5. Refit radiator cooling fan. ***See this section.***
6. Refill cooling system. ***See Adjustments.***

RADIATOR - 'K16' WITH AIR CONDITIONING

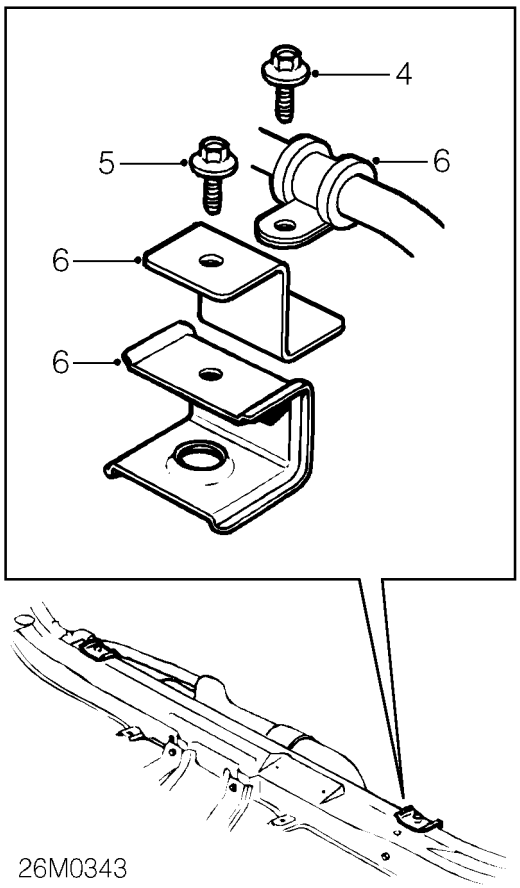
Service repair no - 26.40.01.20

Remove

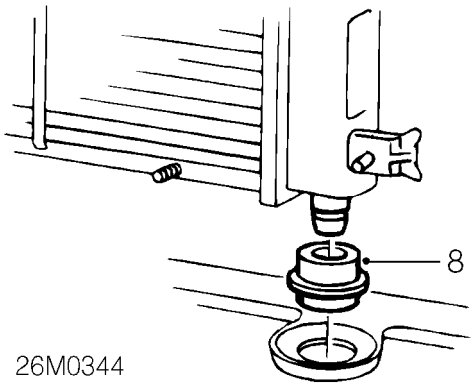
1. Drain cooling system. ***See Adjustments.***
2. Remove radiator cooling fan. ***See this section.***



3. Loosen clip and disconnect top hose from radiator.



4. Remove bolt securing air conditioning pipe to mounting bracket.
5. Remove 2 bolts securing radiator top mounting brackets to bonnet locking platform.
6. Remove 2 radiator top mounting brackets and air conditioning pipe bracket.
7. Remove radiator by lowering to floor. ***Do not carry out further dismantling if component is removed for access only.***



8. Remove 2 lower mounting rubbers from radiator.
9. Fit lower mounting rubbers to new radiator.

Refit

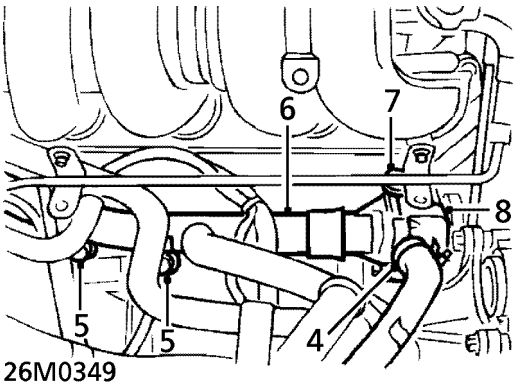
1. Position radiator and locate on lower mountings.
2. Fit top mounting brackets and air conditioning pipe bracket to radiator.
3. Fit bolts securing radiator top mounting bracket to bonnet locking platform and tighten to 9 Nm.
4. Connect top hose to radiator and tighten clip.
5. Fit bolt securing air conditioning pipe to mounting bracket and tighten to 6 Nm.
6. Fit radiator cooling fan. ***See this section.***
7. Refill cooling system. ***See Adjustments.***

THERMOSTAT

Service repair no - 26.45.09

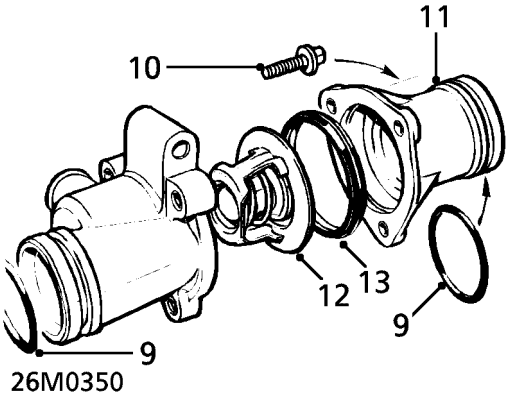
Remove

1. Disconnect battery earth lead.
2. Drain cooling system. ***See Adjustments.***
3. Remove air cleaner. ***See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.***



26M0349

4. Loosen clip and disconnect heater hose from thermostat housing.
5. Remove 2 bolts securing coolant rail to cylinder block.
6. Release coolant rail from thermostat housing.
7. Remove bolt securing thermostat housing to cylinder block.
8. Release thermostat housing from coolant pump and remove thermostat housing.

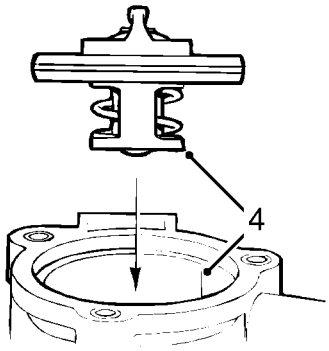


26M0350

9. Remove and discard 2 'O' rings from thermostat housing.
10. Remove 3 bolts securing cover to thermostat housing.
11. Remove thermostat housing cover.
12. Remove thermostat from housing.
13. Remove rubber seal from thermostat.

Refit

1. Examine thermostat rubber seal for signs of deterioration or damage, renew if necessary.
2. Fit rubber seal to thermostat.
3. Clean mating faces of thermostat and cover.



26M0251

4. Align thermostat to shoulder in thermostat housing.
5. Fit thermostat housing cover and tighten bolts to 9 Nm.
6. Clean 'O' ring grooves on thermostat housing outlets.
7. Lubricate new 'O' rings with rubber grease.
8. Fit 'O' rings to thermostat housing.

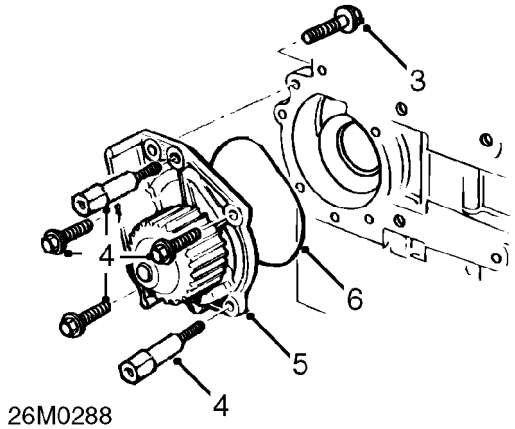
9. Position thermostat housing and engage fully to coolant pump.
10. Align dipstick tube bracket to thermostat housing.
11. Fit bolt securing thermostat housing to cylinder block and tighten to 10 Nm.
12. Connect coolant rail to thermostat housing.
13. Align coolant rail to cylinder block, fit bolts and tighten to 9 Nm.
14. Connect heater hose to thermostat housing and tighten clip.
15. Refill cooling system. ***See Adjustments.***
16. Fit air cleaner. ***See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.***
17. Connect battery earth lead.

COOLANT PUMP - 'K8'

Service repair no - 26.50.01

Remove

1. Drain cooling system. ***See Adjustments.***
2. Remove camshaft timing belt. ***See ENGINE - 'K8', Repairs.***



26M0288

3. Remove bolt securing rear cover to coolant pump.
4. Remove 3 bolts and 2 pillar bolts securing coolant pump to cylinder block.
5. Remove coolant pump from dowels and rear cover.
6. Remove and discard 'O' ring from coolant pump.

Refit

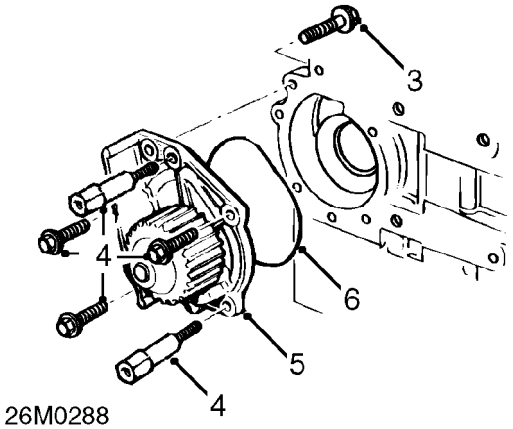
1. Clean pump and mating face, dowel and dowel hole.
2. Fit new 'O' ring to coolant pump.
3. Fit coolant pump to cylinder block, fit and tighten bolts to 10 Nm.
4. Fit and tighten pillar bolts to 10 Nm.
5. Fit and tighten bolt, rear cover to coolant pump, to 10 Nm.
6. Fit camshaft timing belt. ***See ENGINE - 'K8', Repairs.***
7. Refill cooling system. ***See Adjustments.***

COOLANT PUMP - 'K16'

Service repair no - 26.50.01

Remove

1. Drain cooling system. ***See Adjustments.***
2. Remove camshaft timing belt. ***See ENGINE - 'K16', Repairs.***



26M0288

3. Remove bolt securing rear cover to coolant pump.
4. Remove 3 bolts and 2 pillar bolts securing coolant pump to cylinder block.
5. Remove coolant pump from dowels and rear cover.
6. Remove and discard 'O' ring from coolant pump.

Refit

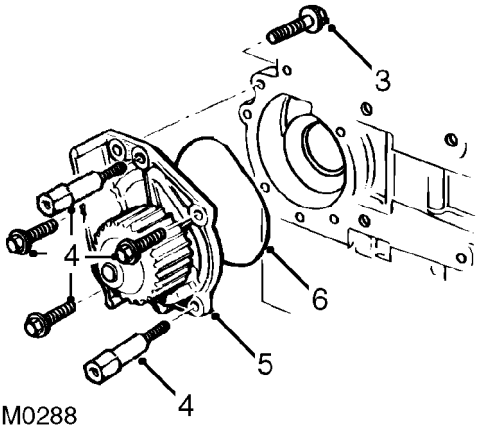
1. Clean pump and mating face, dowel and dowel hole.
2. Fit new 'O' ring to coolant pump.
3. Fit coolant pump to cylinder block, fit and tighten bolts to 10 Nm.
4. Fit and tighten pillar bolts to 10 Nm.
5. Fit and tighten bolt, rear cover to coolant pump, to 10 Nm.
6. Fit camshaft timing belt. ***See ENGINE - 'K16', Repairs.***
7. Refill cooling system. ***See Adjustments.***

COOLANT PUMP - 'K16 WITH VVC'

Service repair no - 26.50.01

Remove

1. Drain cooling system. ***See Adjustments.***
2. Remove camshaft timing belt. ***See ENGINE - 'K16 WITH VVC', Repairs.***



26M0288

3. Remove bolt securing rear cover to coolant pump.
4. Remove 3 bolts and 2 pillar bolts securing coolant pump to cylinder block.
5. Remove coolant pump from dowels and rear cover.
6. Remove and discard 'O' ring from coolant pump.

Refit

1. Clean pump and mating face, dowel and dowel hole.
2. Fit new 'O' ring to coolant pump.
3. Fit coolant pump to cylinder block, fit and tighten bolts to 10 Nm.
4. Fit and tighten pillar bolts to 10 Nm.
5. Fit and tighten bolt, rear cover to coolant pump, to 10 Nm.
6. Fit camshaft timing belt. ***See ENGINE - 'K16 WITH VVC', Repairs.***
7. Refill cooling system. ***See Adjustments.***