

COOLING SYSTEM

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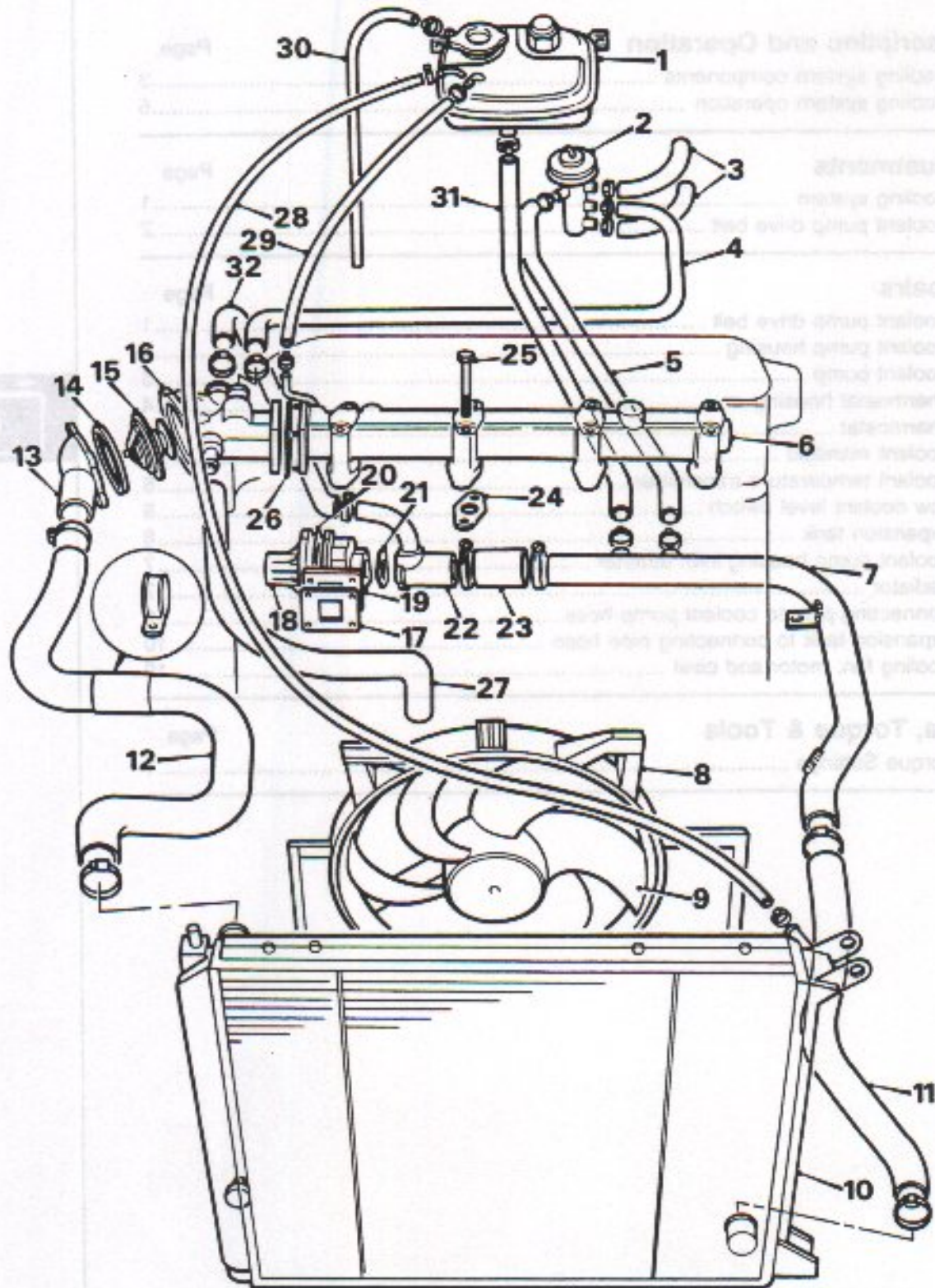
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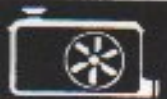
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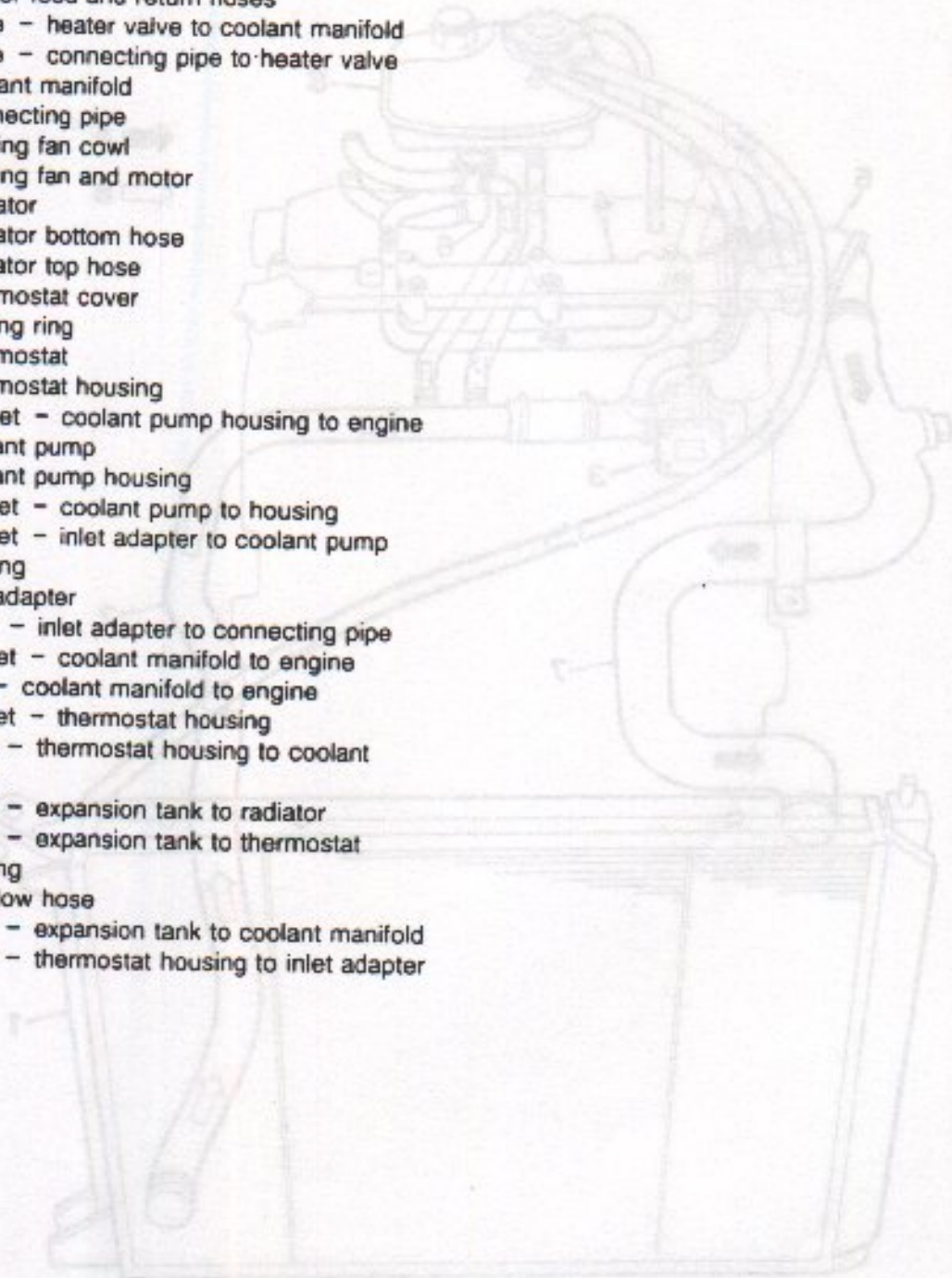


XM1486

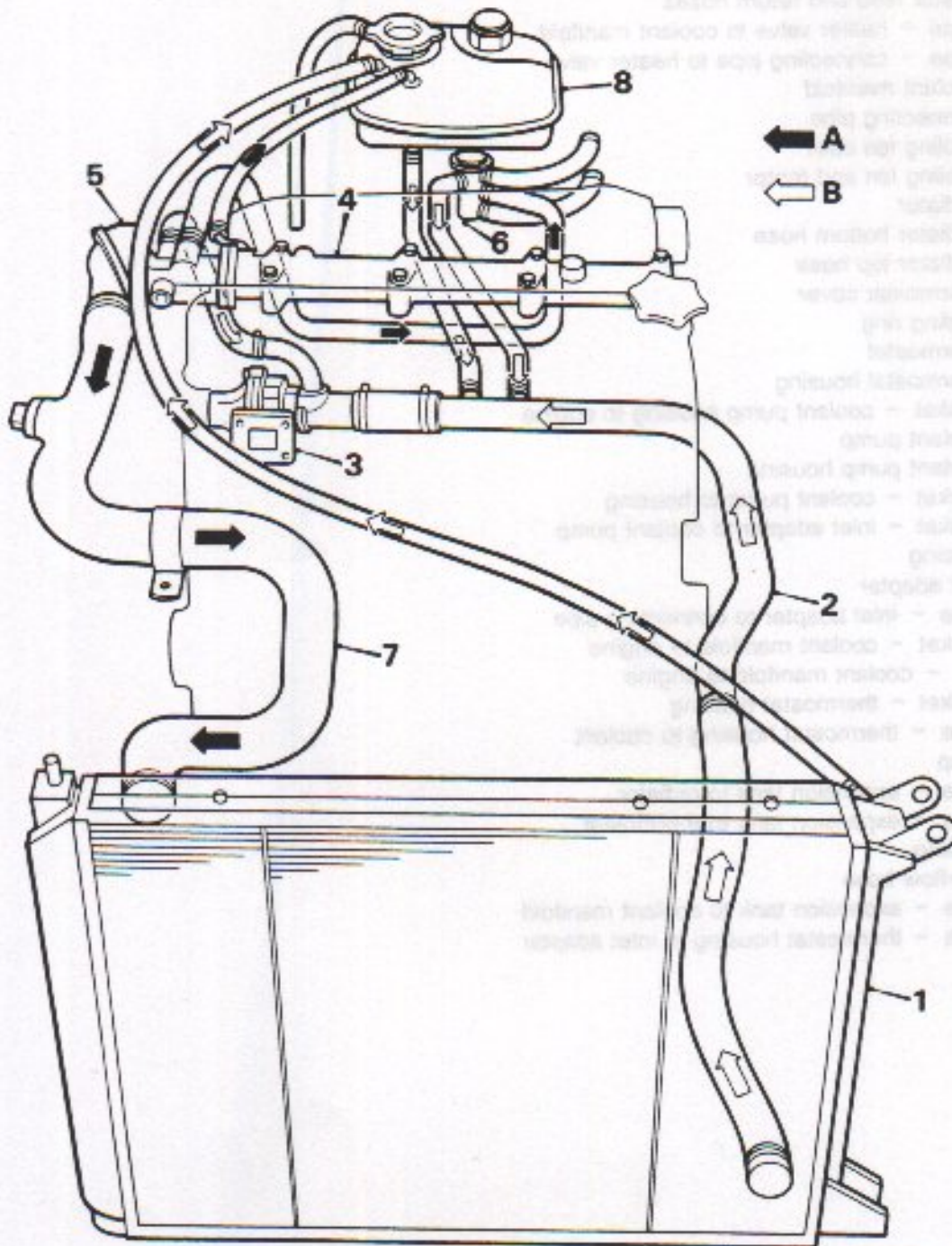


COOLING SYSTEM COMPONENTS

1. Expansion tank
2. Heater valve
3. Heater feed and return hoses
4. Hose - heater valve to coolant manifold
5. Hose - connecting pipe to heater valve
6. Coolant manifold
7. Connecting pipe
8. Cooling fan cowl
9. Cooling fan and motor
10. Radiator
11. Radiator bottom hose
12. Radiator top hose
13. Thermostat cover
14. Sealing ring
15. Thermostat
16. Thermostat housing
17. Gasket - coolant pump housing to engine
18. Coolant pump
19. Coolant pump housing
20. Gasket - coolant pump to housing
21. Gasket - inlet adapter to coolant pump housing
22. Inlet adapter
23. Hose - inlet adapter to connecting pipe
24. Gasket - coolant manifold to engine
25. Bolt - coolant manifold to engine
26. Gasket - thermostat housing
27. Hose - thermostat housing to coolant pump
28. Hose - expansion tank to radiator
29. Hose - expansion tank to thermostat housing
30. Overflow hose
31. Hose - expansion tank to coolant manifold
32. Hose - thermostat housing to inlet adapter



COOLING SYSTEM



← A
 ← B

26M 0070



COOLING SYSTEM OPERATION

A = HOT

B = COOL

Coolant is drawn from the radiator (1) via the bottom hose (2), is circulated through the coolant pump (3) to the cylinder block and rises through the cylinder head to the coolant manifold (4) and into the thermostat housing (5).

Until operating temperature is reached, coolant flow is restricted by the closed wax - type thermostat. Hot coolant is by - passed from the thermostat housing to heat the heater matrix via a valve (6) and is then returned to the system via the heater return hose. A separate by - pass takes coolant from the thermostat housing and returns it to the coolant pump.

When operating temperature is reached, the thermostat opens and the coolant now also flows through the top hose (7) to the radiator. In this condition the separate by pass is restricted.

Inside the radiator, coolant passes from the R.H. side of the radiator to the L.H. side of the radiator and is cooled by air passing through the matrix. The cooling fan operates when the coolant is above 90°C.

As coolant expands with temperature increase, the level in the expansion tank (8) rises and the pressure increases. The pressure relief cap is set at 1.0 bar, 15 lbf.in² to prevent boiling and increase thermal efficiency. On cooling, the coolant level and pressure in the expansion tank drops and a vacuum relief valve opens in the pressure relief cap.

The coolant used contains 50% anti - freeze mixture. The anti - freeze contains corrosion inhibitors, because of this under no circumstances must the system be used without anti - freeze.

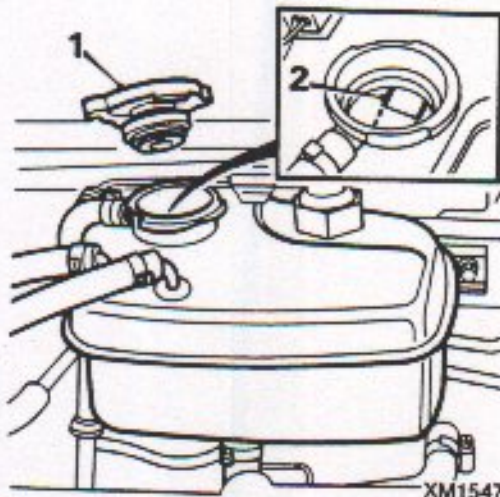


COOLING SYSTEM

WARNING: Since injury such as scalding can be caused by escaping steam or coolant, do not remove pressure relief cap from expansion tank while system is hot. Wait until system has cooled, use a cloth or glove to protect hands from escaping steam.

Check level and top - up

CAUTION: Coolant level should only be checked when coolant is cold; if level is appreciably low, suspect leakage or overheating.



XM1547

1. Remove pressure relief cap from expansion tank.
2. Check coolant level reaches indicator plate in expansion tank; top - up if necessary with 50% solution of Unipart SuperPlus Anti - freeze and Summer Coolant and water.

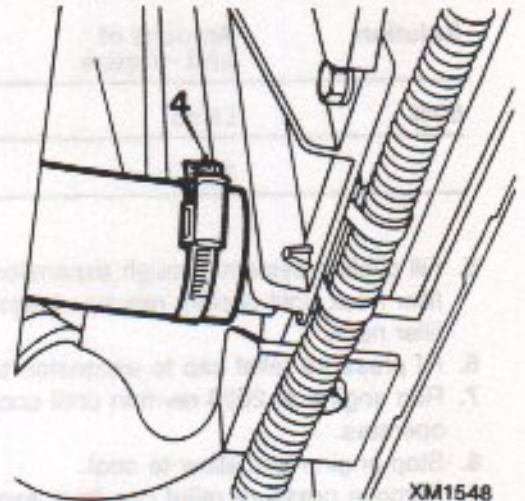
CAUTION: Coolant level must not be higher than indicator plate.

3. Check specific gravity of coolant. Overall anti - freeze concentration must not be less than 50% and must not exceed 60% by volume.
4. Refit pressure relief cap to expansion tank.

Drain

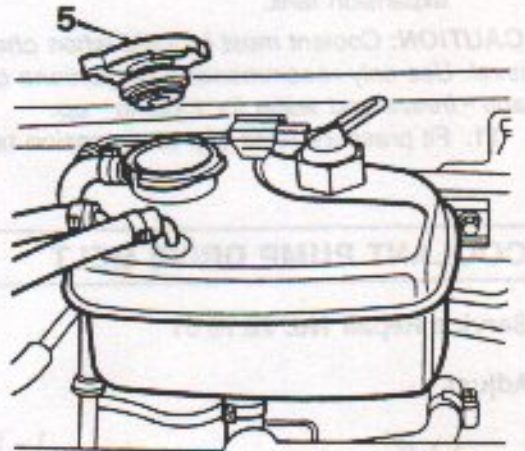
CAUTION: Coolant must be cold before draining system.

1. Move heater control to 'HOT' and ensure that air conditioning - if fitted is "OFF"
2. Remove underbelly panel, see **BODY - Repairs**.
3. Position a container to collect coolant.



XM1548

4. Slacken clip, disconnect bottom hose from radiator.



XM1549

5. Remove pressure relief cap from expansion tank; allow coolant to drain.

Refill

1. Connect bottom hose to radiator; tighten clip.
2. Fit underbelly panel, see **BODY - Repairs**.
3. Ensure heater control is at 'HOT' and air conditioning - if fitted is 'OFF'.
4. Prepare coolant to required concentration of 50% Unipart SuperPlus Anti - freeze and Summer Coolant and 50% water.

COOLING SYSTEM

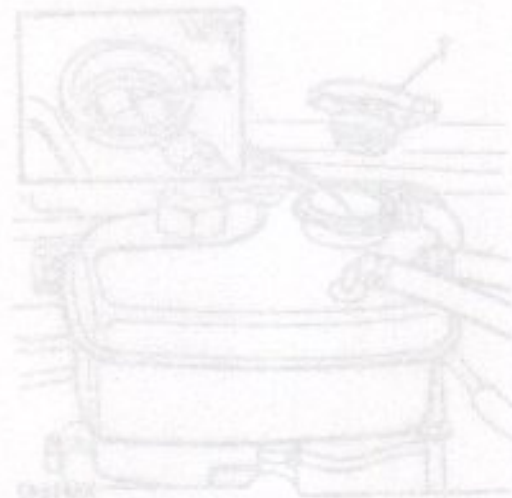
Solution	Amount of anti - freeze	Commences freezing		Frozen solid	
		°C	°F	°C	°F
50%	Litres	-36	-33	-48	-53

- Fill cooling system through expansion tank filler neck until coolant reaches bottom of filler neck.
- Fit pressure relief cap to expansion tank.
- Run engine at 2000 rev/min until cooling fan operates.
- Stop engine and allow to cool.
- Remove pressure relief cap from expansion tank.
- Check and top - up coolant if necessary until level reaches indicator plate in expansion tank.

CAUTION: Coolant must be cold when checking level. Use only recommended proportions of anti - freeze and water for topping - up.

- Fit pressure relief cap to expansion tank.

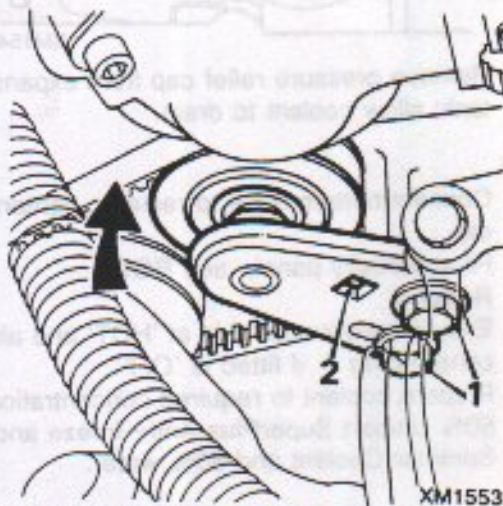
- Remove torque wrench; tighten jockey pulley arm top bolt.



COOLANT PUMP DRIVE BELT

Service Repair No. 26.10.01

Adjust



- Slacken 2 bolts, coolant pump drive belt jockey pulley arm to engine.

CAUTION: Slacken bolts sufficiently to ensure pulley arm is not in contact with heads of bolts.

- Using a dial gauge torque wrench and 3/8in square drive socket extension located in hole in jockey pulley arm, raise jockey pulley arm until gauge reads 5.5 Nm.
- Hold torque wrench in this position and tighten jockey pulley arm bottom bolt.



COOLANT PUMP DRIVE BELT

Service Repair No. 26.20.07

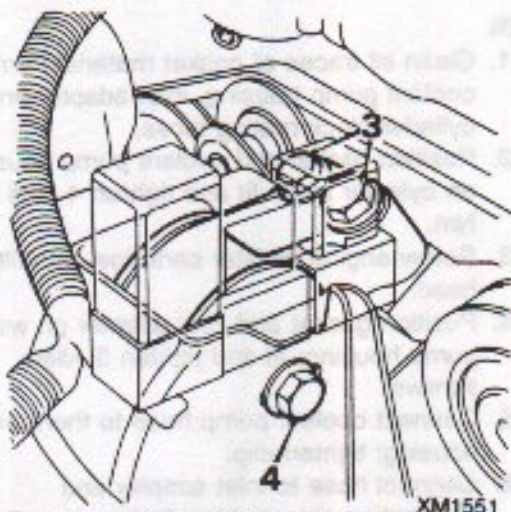
Remove

1. Remove auxiliary drive belt - see **ELECTRICAL - Adjustments.**



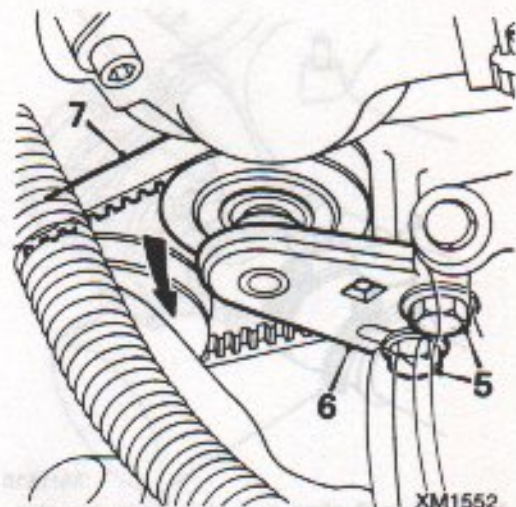
XM 1914

2. Fit 2 lifting eyes to P.A.S. pump bracket and support weight of engine.



XM1551

3. Remove 2 bolts, R.H. engine mounting to engine.
4. Slacken nut, R.H. engine mounting to bracket; move mounting away from engine.



XM1552

5. Slacken 2 bolts, coolant pump drive belt jockey pulley arm to engine.

CAUTION: Slacken bolts sufficiently to ensure pulley arm is not in contact with heads of bolts.

6. Move pulley to its lowest position.
7. Release coolant pump drive belt from pulleys.

Refit

1. Clean belt pulleys.
2. Position coolant pump drive belt on pulleys.
3. Adjust drive belt tension - see **Adjustments.**
4. Position R.H. engine mounting to engine; fit and tighten 2 bolts to 75 Nm.
5. Tighten R.H. engine mounting to bracket nut to 45 Nm.
6. Remove lifting eyes.
7. Refit auxiliary drive belt - see **ELECTRICAL - Adjustments.**

COOLANT PUMP HOUSING

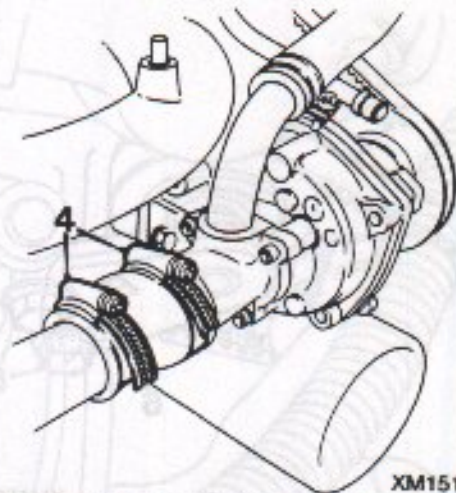
Service Repair No. 26.50.03

Remove

1. Raise front of vehicle.

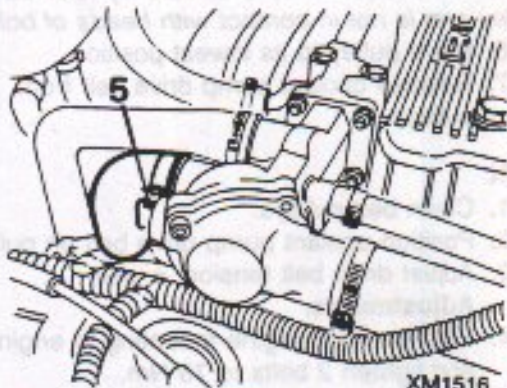
WARNING: Support on safety stands.

2. Remove exhaust down pipe - see **MANIFOLD AND EXHAUST - Repairs.**
3. Remove coolant pump.



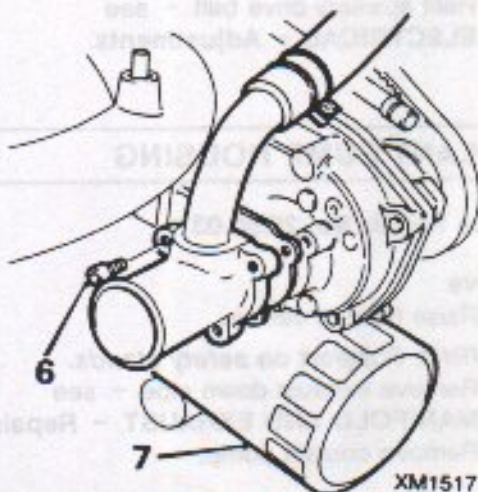
XM1515

- Slacken 2 clips securing hose to inlet adapter and connecting pipe; disconnect hose from inlet adapter.



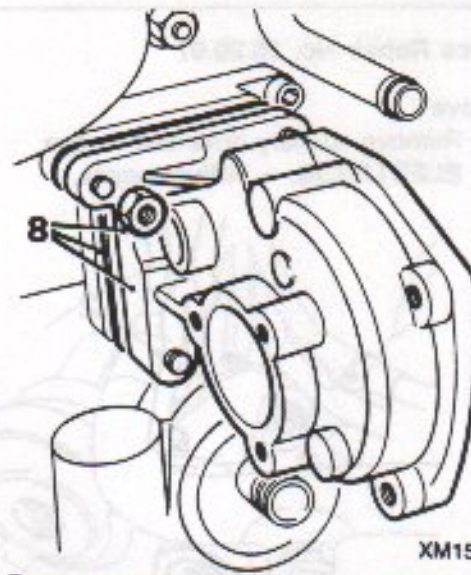
XM1516

- Slacken clip, disconnect coolant pump hose from thermostat housing.



XM1517

- Remove 3 Allen screws, release inlet adapter from coolant pump housing; remove and discard gasket.
- Unscrew engine oil filter cartridge.



XM1518

- Remove 4 nuts securing coolant pump housing, release housing from cylinder block; remove and discard gasket.

Refit

- Clean all traces of gasket material from coolant pump housing, inlet adapter and cylinder block mating faces.
- Position gasket and coolant pump housing on cylinder block fit and tighten 4 nuts to 25 Nm.
- Screw engine oil filter cartridge onto filter head.
- Position gasket and inlet adapter on water pump housing; fit and tighten 3 Allen screws.
- Connect coolant pump hose to thermostat housing; tighten clip.
- Connect hose to inlet adapter and connecting pipe; tighten 2 clips.
- Fit coolant pump.
- Fit exhaust down pipe - see **MANIFOLD AND EXHAUST - Repairs**.

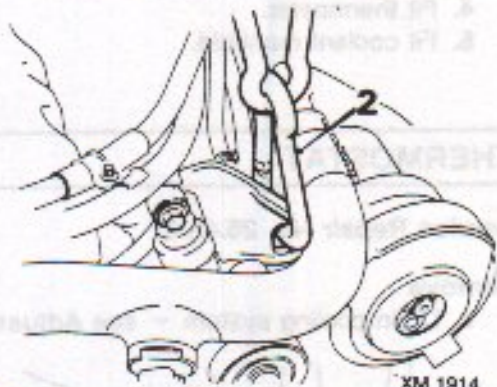


COOLANT PUMP

Service Repair No. 26.50.01

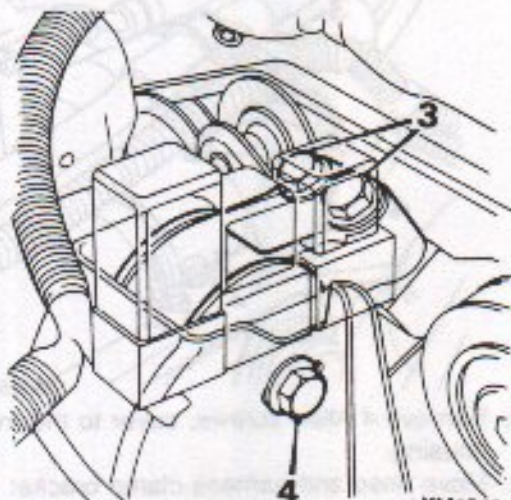
Remove

1. Drain cooling system - see **Adjustments**.



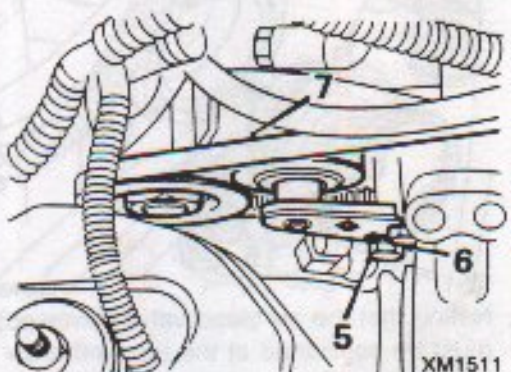
XM 1914

2. Fit 2 lifting eyes to P.A.S. pump bracket and support weight of engine.



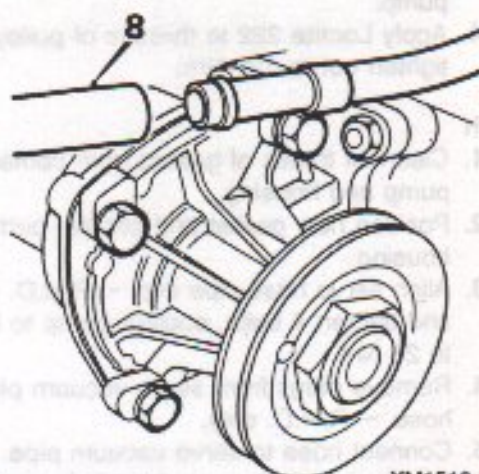
XM1546

3. Remove 2 bolts, R.H. engine mounting to engine.
4. Slacken bolt, R.H. engine mounting to bracket; move mounting away from engine.



XM1511

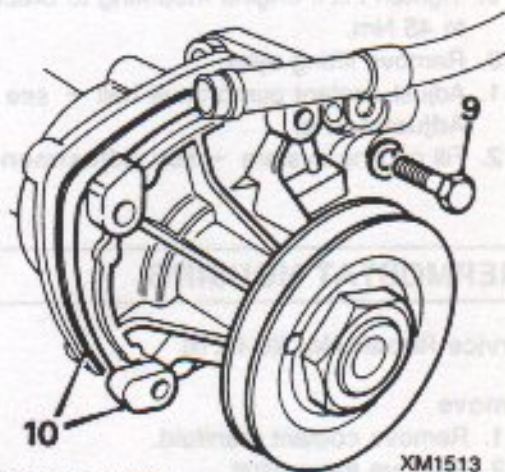
5. Remove bottom bolt, coolant pump drive belt jockey pulley arm to engine.
6. Slacken top bolt, coolant pump jockey pulley arm to engine; move jockey pulley aside.
7. Release drive belt from coolant pump pulley.



XM1512

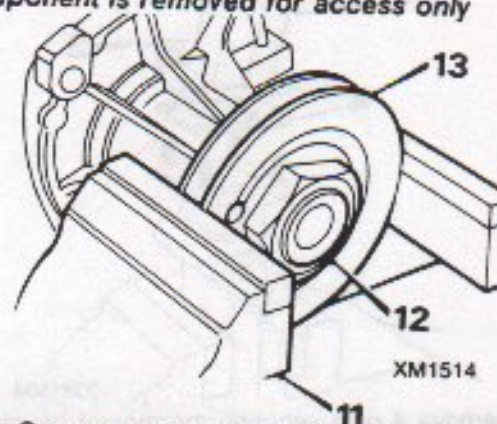
8. Disconnect hose from servo vacuum pipe; move hose aside - R.H.D. only.

CAUTION: Plug ends of hose and pipe to prevent ingress of dirt.



XM1513

9. Remove 4 bolts, coolant pump to housing; move servo hose pipe clip aside - R.H.D. only.
 10. Release coolant pump from housing; remove and discard gasket.
- Do not carry out further dismantling if component is removed for access only**



XM1514

11. Secure coolant pump pulley in soft jawed vice.
12. Remove pulley nut; remove pulley from coolant pump.

COOLING SYSTEM

- Transfer pulley to replacement coolant pump.
- Apply Loctite 222 to threads of pulley nut; tighten nut to 137 Nm.

Refit

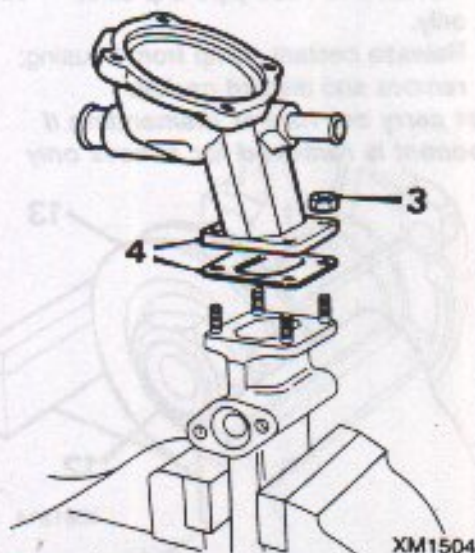
- Clean all traces of gasket from coolant pump and housing.
- Position new gasket and coolant pump on housing.
- Align servo hose pipe clip - R.H.D. only; fit and tighten 4 bolts, coolant pump to housing to 25 Nm.
- Remove plugs from servo vacuum pipe and hose - R.H.D. only.
- Connect hose to servo vacuum pipe.
- Position coolant pump drive belt on pulleys.
- Align coolant pump drive belt jockey pulley arm to engine; fit but do not tighten bottom bolt.
- Position R.H. engine mounting to engine; fit and tighten 2 bolts to 75 Nm.
- Tighten R.H. engine mounting to bracket nut to 45 Nm.
- Remove lifting eyes.
- Adjust coolant pump drive belt - see **Adjustments**.
- Fill cooling system - see **Adjustments**.

THERMOSTAT HOUSING

Service Repair No. 26.45.10

Remove

- Remove coolant manifold.
- Remove thermostat.



- Remove 4 nuts securing thermostat housing to coolant manifold.
- Release thermostat housing from coolant manifold; remove and discard gasket.

Refit

- Clean all traces of gasket from coolant manifold and thermostat housing.
- Position new gasket and thermostat housing on coolant manifold.
- Fit and tighten 4 nuts to 11 Nm.
- Fit thermostat.
- Fit coolant manifold.

THERMOSTAT

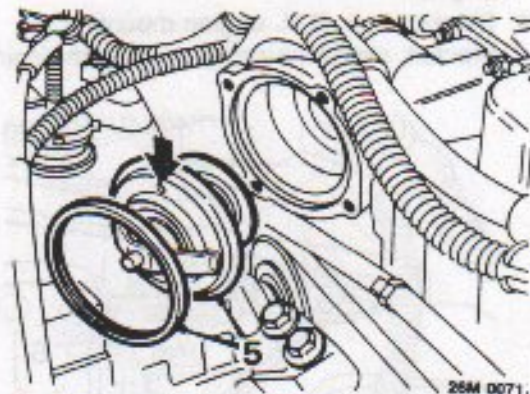
Service Repair No. 26.45.01

Remove

- Drain cooling system - see **Adjustments**.



- Remove 4 Allen screws, cover to thermostat housing.
- Move hose and harness clamp bracket aside.
- Release cover from thermostat housing.



- Noting that the air bleed valve (arrowed) must be positioned at the top, withdraw thermostat; remove and discard sealing ring.

Refit

- Clean thermostat housing and cover mating faces.
- Fit new sealing ring to thermostat.
- Fit thermostat, ensuring that air bleed valve is positioned at the top.



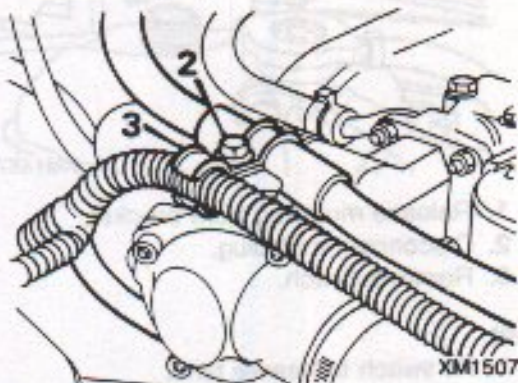
5. Fit and tighten 4 Allen screws to secure cover.
6. Fill cooling system - see Adjustments.

COOLANT MANIFOLD

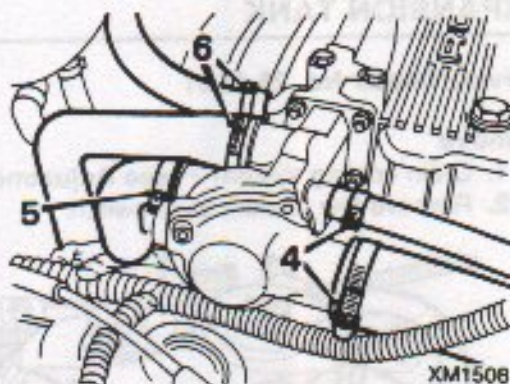
Service Repair No. 26.30.64

Remove

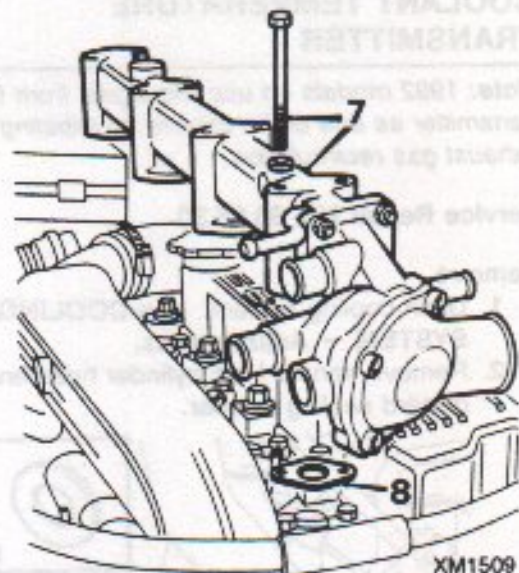
1. Drain cooling system - see Adjustments.



2. Remove 2 screws securing expansion tank hose and harness clamps.
3. Remove 2 clamps, move expansion tank hose and harness aside.

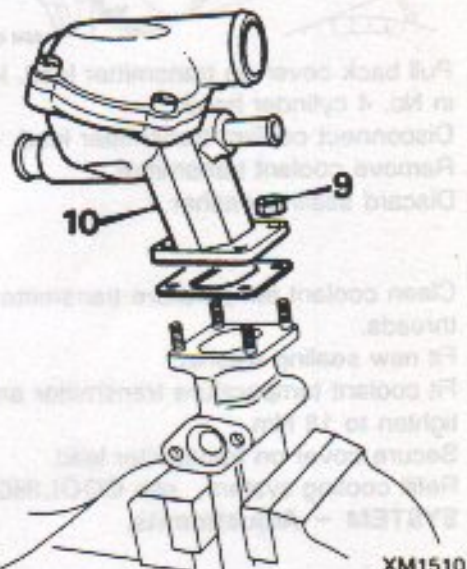


4. Slacken 2 clips, radiator top hose and heater valve hose to thermostat housing; disconnect hoses.
5. Slacken clip, disconnect coolant pump hose from thermostat housing.
6. Remove 2 clips, expansion tank and heater hoses to thermostat housing and coolant manifold; disconnect hoses.



7. Remove 8 bolts, coolant manifold to cylinder head; remove coolant manifold.
8. Discard 4 gaskets.

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



9. Remove 4 nuts thermostat housing to coolant manifold.
10. Remove thermostat housing.
11. Fit thermostat housing to new coolant manifold; use a new gasket.

Refit

1. Clean all traces of gasket from coolant manifold and cylinder head.
2. Position coolant manifold and 4 gaskets to cylinder head.
3. Fit 8 bolts; tighten bolts progressively, working from centre outwards to 11 Nm.
4. Connect hoses to thermostat housing; tighten clips.
5. Position harness and expansion tank hose, fit 2 clamps; fit and tighten 2 screws.
6. Fill cooling system - see Adjustments.

COOLING SYSTEM

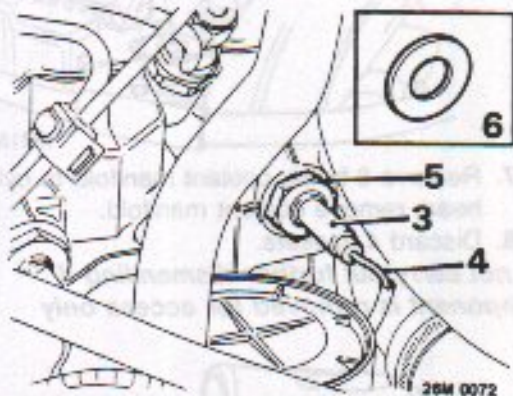
COOLANT TEMPERATURE TRANSMITTER

Note: 1992 models on use the signal from this transmitter as one of the criteria for initiating exhaust gas recirculation.

Service Repair No. 88.25.20

Remove

1. Drain cooling system, see **COOLING SYSTEM - Adjustments.**
2. Remove sensor from cylinder head and discard sealing washer.



3. Pull back cover on transmitter lead, located in No. 4 cylinder head.
4. Disconnect coolant transmitter lead.
5. Remove coolant transmitter.
6. Discard sealing washer.

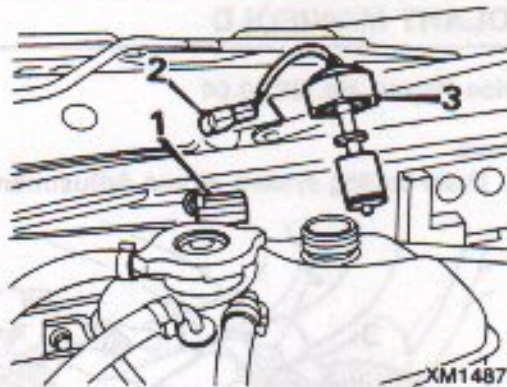
Refit

1. Clean coolant temperature transmitter threads.
2. Fit new sealing washer.
3. Fit coolant temperature transmitter and tighten to 18 Nm.
4. Secure cover on transmitter lead.
5. Refill cooling system, see **COOLING SYSTEM - Adjustments.**

LOW COOLANT LEVEL SWITCH

Service Repair No. 26.10.02

Remove



1. Release multiplug from bracket.
2. Disconnect multiplug.
3. Remove switch.

Refit

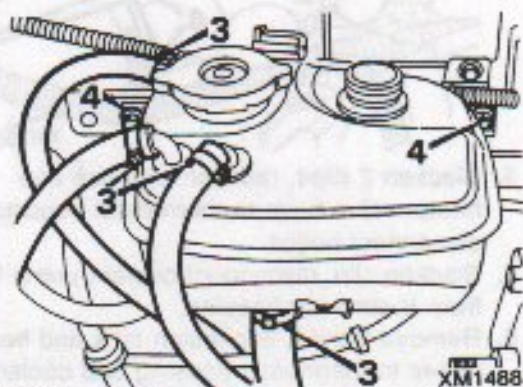
1. Fit switch to header tank.
2. Connect multiplug.
3. Secure multiplug to bracket.

EXPANSION TANK

Service Repair No. 26.15.01

Remove

1. Drain cooling system - see **Adjustments.**
2. Remove low coolant level switch.



3. Release 4 clips, hoses to expansion tank; disconnect hoses.
4. Remove 2 bolts securing expansion tank.

Refit

1. Position expansion tank, fit and tighten 2 bolts.
2. Fit clips to 4 hoses, connect hoses; tighten clips.

Note: Screw type clips may be used in place of original compression clips.

3. Fit low coolant level switch.



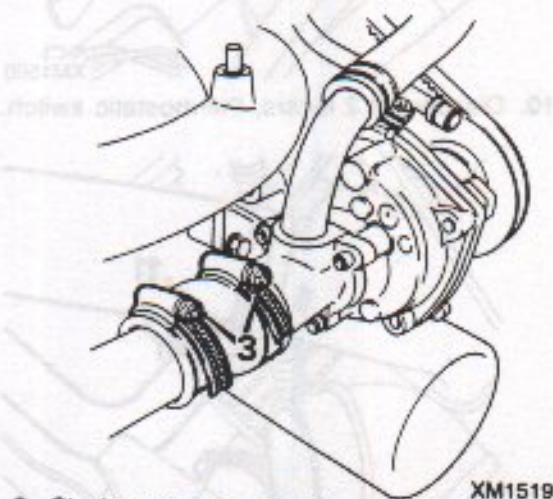
4. Fill cooling system - see **Adjustments**.

COOLANT PUMP HOUSING INLET ADAPTER

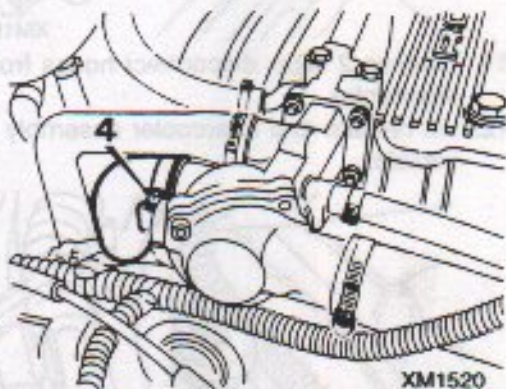
Service Repair No. 26.50.41

Remove

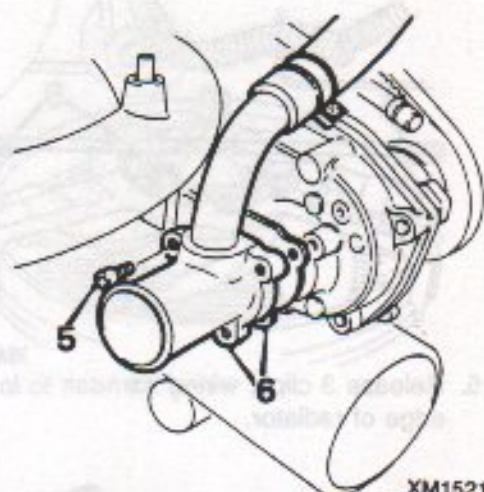
1. Remove exhaust down pipe, see **MANIFOLD & EXHAUST - Repairs**.
2. Drain cooling system - see **Adjustments**.



3. Slacken 2 clips, coolant pump housing inlet adapter to connecting pipe hose; disconnect hose from inlet adapter.



4. Slacken clip, coolant pump to thermostat housing hose; disconnect hose from inlet adapter.



5. Remove 3 Allen screws, inlet adapter to coolant pump.
6. Remove inlet adapter; remove and discard gasket.

Reft

1. Clean all traces of gasket from coolant pump housing and inlet adapter.
2. Fit gasket and inlet adapter to coolant pump housing, fit and tighten 3 Allen screws.
3. Connect hose to inlet adapter; tighten clip.
4. Connect hose to inlet adapter and connecting pipe; tighten 2 hose clips.
5. Fill cooling system - see **Adjustments**.
6. Fit exhaust down pipe, see **MANIFOLD & EXHAUST - Repairs**.

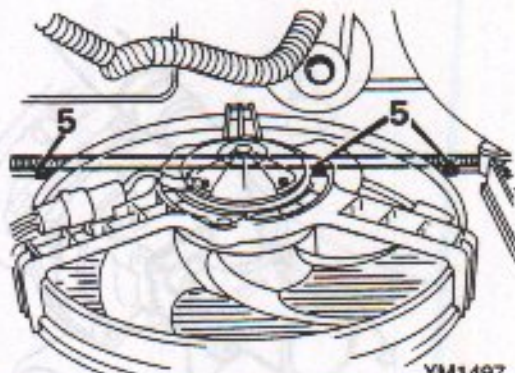
RADIATOR

Service Repair No. 26.40.04

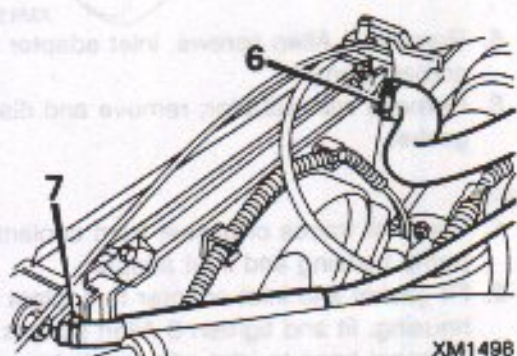
Remove

1. Remove underbelly panel and bonnet platform, see **BODY - Repairs**.
2. Remove front grille, see **BODY - REPAIR MANUAL - Repairs**.
3. Remove air cleaner assembly, see **FUEL SYSTEM - Repairs**.
4. Drain cooling system - see **Adjustments**.

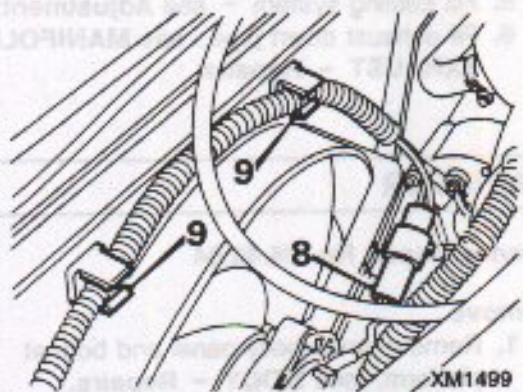
COOLING SYSTEM



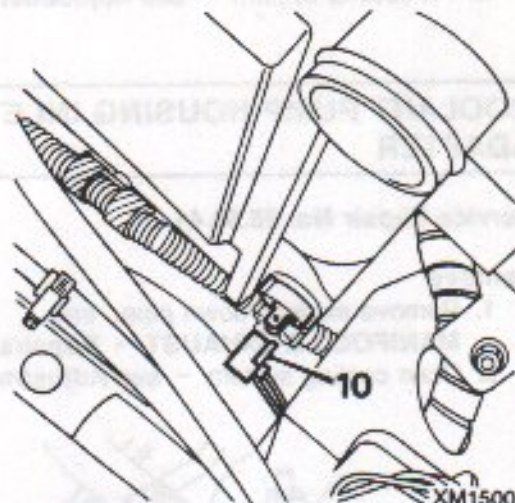
5. Release 3 clips, wiring harness to lower edge of radiator.



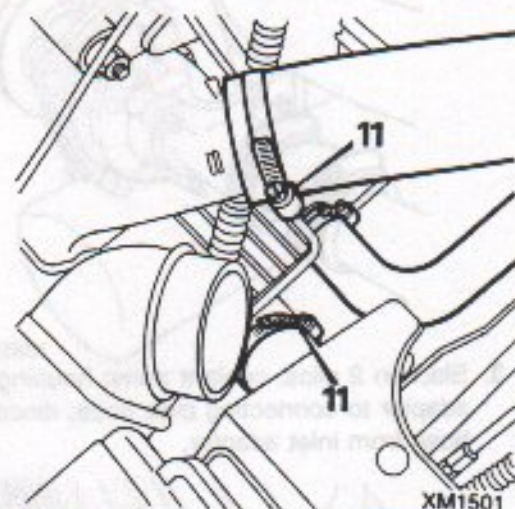
6. Slacken clip, disconnect radiator top hose.
7. Remove clip, disconnect bleed hose.



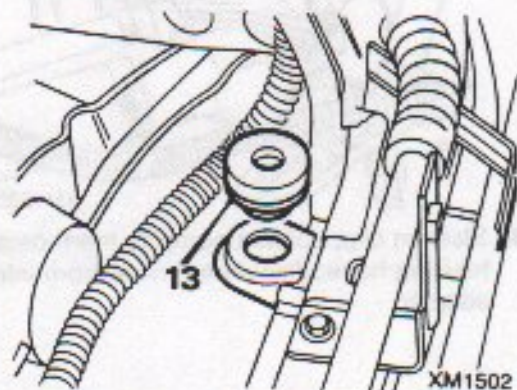
8. Disconnect cooling fan harness multiplug.
9. Release cooling fan harness from 2 clips on radiator cowl.



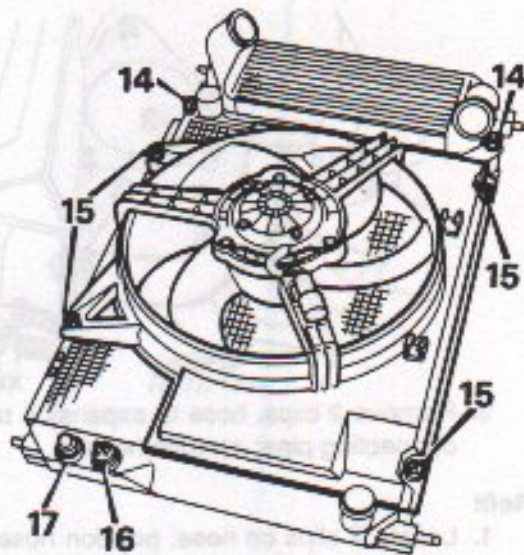
10. Disconnect 2 lucars, thermostatic switch.



11. Slacken 2 clips, disconnect hoses from intercooler.
12. Lift radiator and intercooler assembly out of vehicle.



13. Remove 2 radiator mounting rubbers.
Do not carry out further dismantling if component is removed for access only



XM1503

14. Remove 2 bolts, intercooler to radiator; remove intercooler.
15. Remove 4 screws, fan cowl to radiator; lift off fan cowl and cooling fan assembly.
16. Release thermostatic switch retainer, withdraw switch and seal; discard seal.
17. Remove blanking plug retainer, withdraw plug and seal; discard seal.
18. Transfer components removed to new radiator. Tighten intercooler securing bolts to 15 Nm.

CAUTION: Lubricate new seals with silicone grease.

Refit

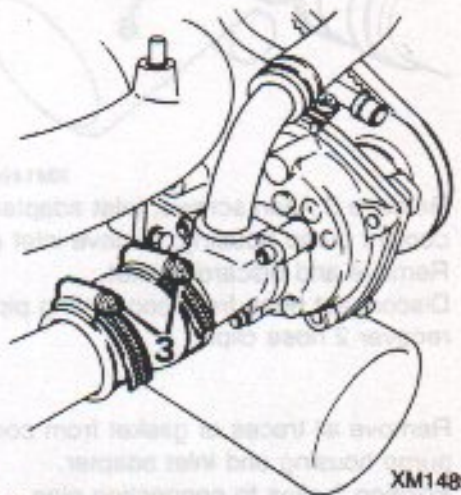
1. Fit 2 radiator mounting rubbers, position radiator in car.
2. Connect 2 intercooler hoses; tighten clips.
3. Connect 2 lucars to thermostatic switch, connect cooling fan multiplug.
4. Secure cooling fan harness to fan cowl using 2 clips.
5. Connect bleed hose, top and bottom radiator hoses; tighten clips.
6. Secure wiring harness to lower edge of radiator using 3 clips.
7. Fit underbelly panel and bonnet platform, see **BODY - Repairs**.
8. Fit air cleaner assembly, see **FUEL SYSTEM - Repairs**.
9. Fit radiator grille, see **BODY - REPAIR MANUAL - Repairs**.
10. Fill cooling system - see **Adjustments**.

CONNECTING PIPE TO COOLANT PUMP HOSE

Service Repair No. 26.30.60

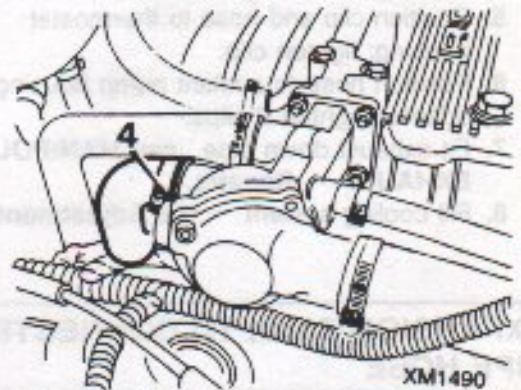
Remove

1. Drain cooling system - see **Adjustments**.
2. Remove exhaust down pipe, see **MANIFOLD & EXHAUST - Repairs**.



XM1489

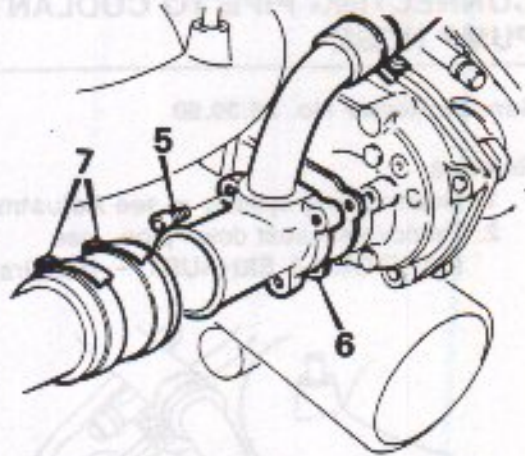
3. Slacken 2 clips, hose to coolant pump housing inlet adapter and connecting pipe; disconnect hose.



XM1490

4. Slacken clip, hose to thermostat housing; disconnect hose from thermostat housing.

COOLING SYSTEM



XM1491

5. Remove 3 Allen screws, inlet adapter to coolant pump housing; remove inlet adapter.
6. Remove and discard gasket.
7. Disconnect hose from connecting pipe; recover 2 hose clips.

Refit

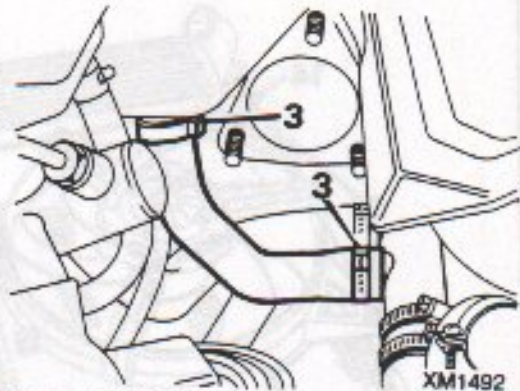
1. Remove all traces of gasket from coolant pump housing and inlet adapter.
2. Position 2 clips to connecting pipe.
3. Position hose to connecting pipe.
4. Fit inlet adapter and gasket to water pump housing; fit and tighten 3 Allen screws.
5. Position clip and hose to thermostat housing; tighten clip.
6. Position hose to coolant pump housing inlet adapter; tighten 2 clips.
7. Fit exhaust down pipe, see **MANIFOLD & EXHAUST - Repairs**.
8. Fill cooling system - see **Adjustments**.

EXPANSION TANK TO CONNECTING PIPE HOSE

Service Repair No. 26.30.39

Remove

1. Drain cooling system - see **Adjustments**.
2. Remove exhaust down pipe, see **MANIFOLD & EXHAUST - Repairs**.



XM1492

3. Remove 2 clips, hose to expansion tank and connecting pipe; remove hose.

Refit

1. Locate 2 clips on hose; position hose to expansion tank and connecting pipe; tighten 2 clips.
2. Fit exhaust down pipe, see **MANIFOLD & EXHAUST - Repairs**.
3. Fill cooling system - see **Adjustments**.

COOLING FAN, MOTOR AND COWL

Service Repair No. Fan, motor and cowl assembly - 26.25.23

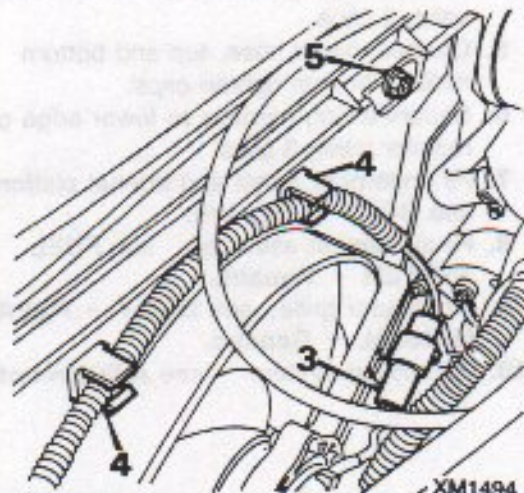
Service Repair No. Cooling fan - 26.25.06

Service Repair No. Fan motor - 26.25.22

Remove

Cooling fan, motor and cowl assembly

1. Remove underbelly panel and bonnet platform, see **BODY - Repairs**.
2. Remove front grille, see **BODY - REPAIR MANUAL - Repairs**.

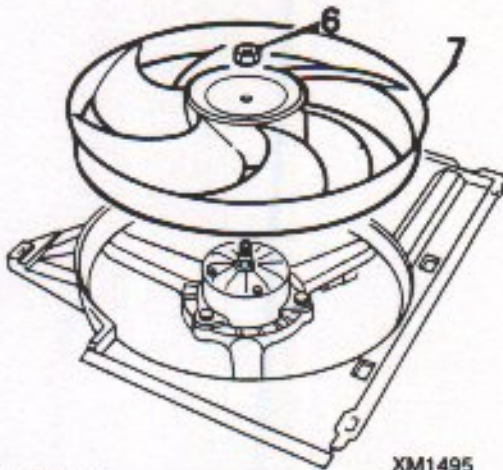


XM1494

3. Disconnect fan motor multiplug.
4. Release harness from 2 clips on cowl.
5. Remove 4 screws, cowl assembly to radiator, release assembly from radiator.



8. Fit underbelly panel and bonnet platform, see **BODY - Repairs**.
9. Fit front grille, see **BODY - REPAIR MANUAL - Repairs**.

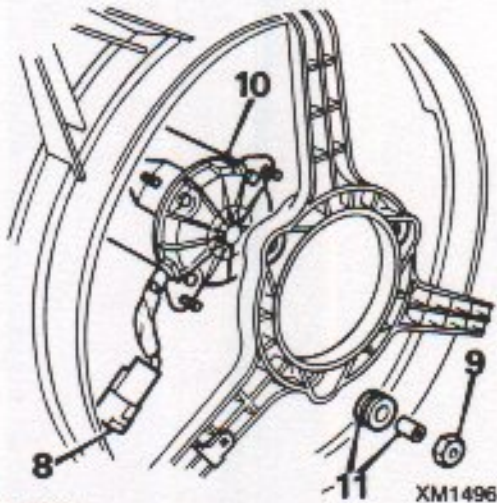


Cooling fan

6. Remove nut, cooling fan to motor spindle.

Note: Nut has a L.H. thread.

7. Pull cooling fan from spindle.



Fan motor

8. Release multiplug from bracket.
9. Remove 3 nuts, fan motor to cowl.
10. Lift motor from cowl.
11. Recover 3 spacers and 3 rubber bushes.

Refit

Fan motor

1. Position fan motor in cowl.
2. Fit 3 rubber bushes, 3 spacers and 3 nuts; fan motor to cowl. Tighten 3 nuts to 6 Nm.
3. Secure multiplug to bracket.

Cooling fan

4. Align machined flats on fan motor spindle and spindle hole in fan; fit fan to spindle.
5. Fit and tighten fan nut to 25 Nm.

Note: Nut has a L.H. thread.

Cooling fan, motor and cowl assembly

6. Position assembly to radiator, fit and tighten 4 screws.
7. Connect multiplug, secure harness in 2 clips.

**TORQUE SETTINGS**

Jockey pulley arm dial torque wrench 3.8in square drive	5.5 Nm
R.H. engine mounting bolts	75 Nm
R.H. engine mounting bracket nut	45 Nm
Thermostat housing nuts	11 Nm
Coolant pump housing nuts	25 Nm
Coolant pump pulley nut	137 Nm
Servo hose pipe clip	25 Nm
Coolant manifold bolts	11 Nm
Intercooler securing bolts	15 Nm
Fan motor to cowl nuts	6 Nm
Cooling fan nut	25 Nm
Coolant temperature transmitter	18 Nm