



COOLING SYSTEM
(COSWORTH 4x4 Variants only)

24B

Index

Page

Technical Data 2

General Description 4

Service and Repair Operations

Contained in
Operation

Page

24 222 0	Fan Motor - Remove and Install	..	..	..	..	..	-	..	..	6
24 254 0	Radiator - Remove and Install	..	..	..	..	..	-	..	..	8
24 404 0	Water Pump Assembly - Remove and Install	..	..	..	..	..	-	..	..	12
24 451 0	Thermostat - Test (Thermostat Removed)	..	..	..	..	..	-	..	..	14
24 454 0	Thermostat - Remove and Install	..	..	..	..	..	-	..	..	15



TECHNICAL DATA

COOLING SYSTEM
(COSWORTH 4x4)Coolant Capacity

Including heater circuit and degas tank 7,5 litres

Antifreeze

Type Ford Super Plus 4 Antifreeze

Specification No. ESD-M97B49-A

Concentration

Specific Gravity (providing no other additive is in coolant)	Approximate Percentage of antifreeze (by volume)	Remains fluid to		Solidifies at	
		°C	°F	°C	°F
1,069 at +15°C	45	-30	-22	-38	-36

A 45% concentration of Motorcraft Super Plus 4 antifreeze, which contains a powerful corrosion inhibitor, should remain in the cooling system for a maximum period of 4 years (regardless of climate) before being renewed. If only water is used as a coolant, severe corrosion could result.

Coolant top ups in service should be 50/50 mix for convenience.

Pressure Cap

Releasing pressure 0,85 to 1,10 bar

Thermostat

Nominal temperature rating 88°C

Opening temperature 76°C to 88°C

Drive Belt Tensions

Alternator - new 400 to 500 N

- used 300 to 400 N

Power assisted steering - new 450 to 550 N

- used 350 to 450 N



TECHNICAL DATA (cont'd)

COOLING SYSTEM
(COSWORTH 4x4)

<u>Tightening Torques</u>					<u>Nm</u>	<u>lbf,ft</u>
Radiator to front body panel	..	..	..	..	8,0 to 12,0	6,0 to 9,0
Water pump retaining bolts	..	..	..	..	9,0 to 13,0	7,0 to 9,5
Water pump pulley retaining bolts	..	..	..	..	20,5 to 25,5	15,0 to 19,0
Alternator adjusting strap to to water pump	..	..	..	..	18,0 to 25,0	13,0 to 19,0
Alternator adjusting strap to alternator	..	..	..	..	18,0 to 25,0	13,0 to 19,0
Alternator to bracket	..	..	..	..	18,0 to 25,0	13,0 to 19,0
Fan motor to shroud	..	..	..	..	8,0 to 10,0	6,0 to 7,5
Fan motor shroud to radiator	..	..	..	..	6,8 to 9,5	5,0 to 7,0



GENERAL DESCRIPTION

COOLING SYSTEM (COSWORTH 4x4)

The major cooling system components comprise an aluminium radiator core with plastic end tanks, water circulation pump, thermostat and electrically driven cooling fan. In addition, a plastic degas tank is used to ensure that the system is maintained at the correct volume of coolant.

The wax type thermostat ensures rapid engine warm up by restricting coolant flow at lower operating temperatures, it also assists in maintaining engine operating temperatures between pre-determined limits.

The radiator is of an aluminium construction with plastic end tanks.

The twin electric cooling fans are mounted within a shroud behind the radiator and are operated by a thermal switch. This actuates the fans when coolant temperatures reach a specific level.

ANTIFREEZE

Antifreeze content should be checked through the degas tank filler neck with a hydrometer. The specific gravity (sg) of correctly balanced coolant is 1,069 (sg) at 15°C, which indicates an antifreeze concentration of 45%. If the concentration falls below 45% there is insufficient low temperature protection and the corrosion resistance will be inadequate. In such cases, the concentration must be brought back to specification.

Changing coolant:

New Motorcraft Antifreeze Super Plus 4, in the correct proportions, will protect the cooling system against frost damage for an indefinite period, but its corrosion inhibitors lose their effectiveness after prolonged use. Therefore the cooling system should be drained, by removing the drain plug, and back-flushed every four years. The system should then be refilled using new Motorcraft Antifreeze Super Plus 4, Ford Specification No. ESD-M97B49-A, to the correct proportions (45% antifreeze).

NOTE: For normal top-up purposes, it is recommended that a mixture of 50% antifreeze/50% water is used.

Antifreeze contains monoethylene glycol and other constituents which are toxic if taken internally and can be absorbed into the skin with prolonged contact.



GENERAL DESCRIPTION (cont'd)

COOLING SYSTEM
(COSWORTH 4x4)

The following precautions must be taken to promote the safe handling of antifreeze

1. Antifreeze must never be taken internally. If antifreeze is swallowed accidentally, medical advice must be sought immediately.
2. Precautions should be taken to avoid skin contact. In the event of accidental spillage onto the skin, antifreeze should be washed off as soon as practicable. If clothing is splashed with antifreeze, it should be removed and washed before being worn again, to avoid prolonged skin contact.
3. For regular and frequent handling of antifreeze, protective clothing (plastic or rubber gloves, boots and impervious overalls or aprons) must be used to minimise skin contact.

SPECIAL SERVICE TOOL RECOGNITION

TOOL	TOOL NAME
	NO SPECIAL SERVICE TOOLS REQUIRED

GENERAL EQUIPMENT

- Cooling system pressure tester

24 222 D FAN MOTOR - REMOVE AND INSTALL

SPECIAL TOOLS REQUIRED: NONE

To Remove

1. Disconnect battery earth cable.

2. Raise vehicle on a ramp.

3. Remove sump guard (eight securing bolts) and position clear of vehicle, refer to Fig.1.

4. Disconnect fan motor electrical connections, refer to Fig.2. Remove screws securing transfer tube to radiator, refer to Fig.3.

5. Remove fan shroud retaining screws from radiator and remove assembly from below vehicle.

6. Remove fan motor/s from shroud (3 bolts each).

7. Disconnect electrical connection between motor assemblies.

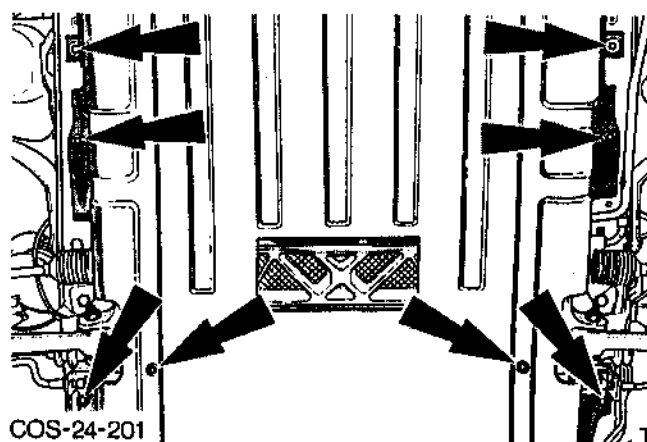


Fig.1. Sump guard securing bolts.

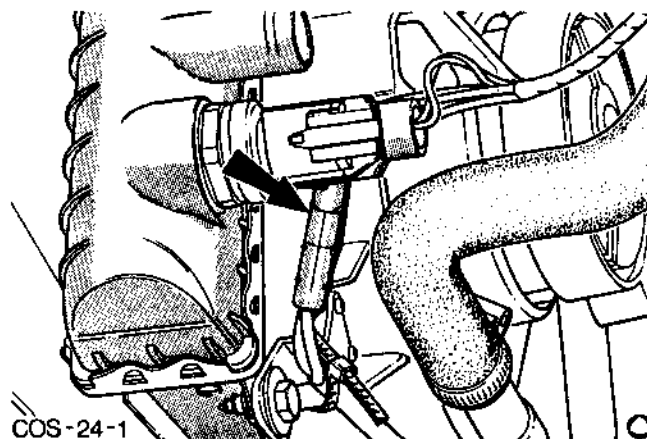


Fig.2. Fan motor electrical connection.

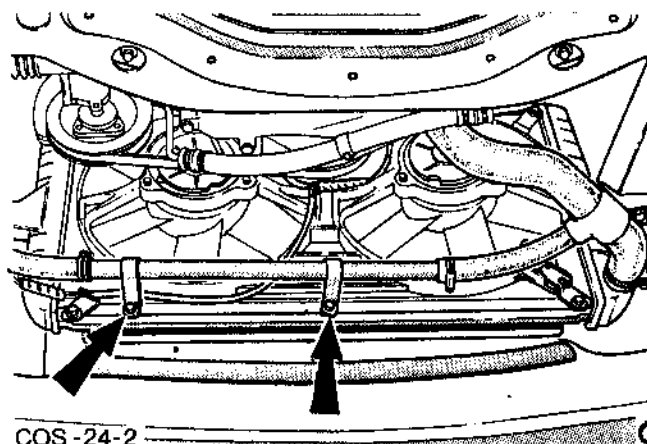


Fig.3. Transfer tube support bracket retaining screws.

To Install

8. Fit fan motor/s to shroud (3 bolts each).

9. Connect electrical cable connection between fan motor assemblies.

10. Position fan shroud assembly on radiator from below vehicle and secure shroud to radiator (four securing screws).

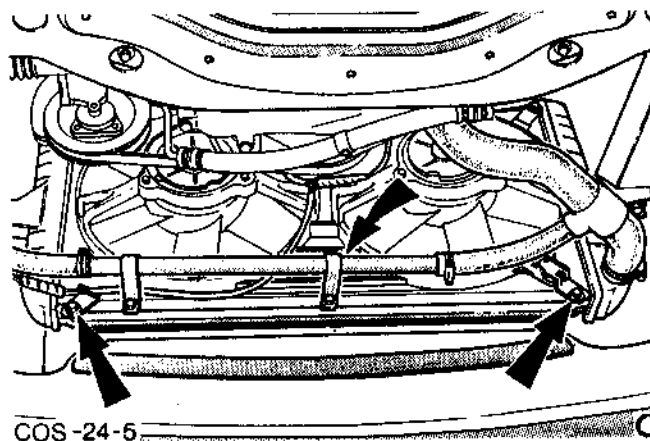
11. Reconnect fan motor cable to main loom.

12. Locate transfer tube to radiator and secure.

13. Refit sump guard and secure, refer to Fig.6.

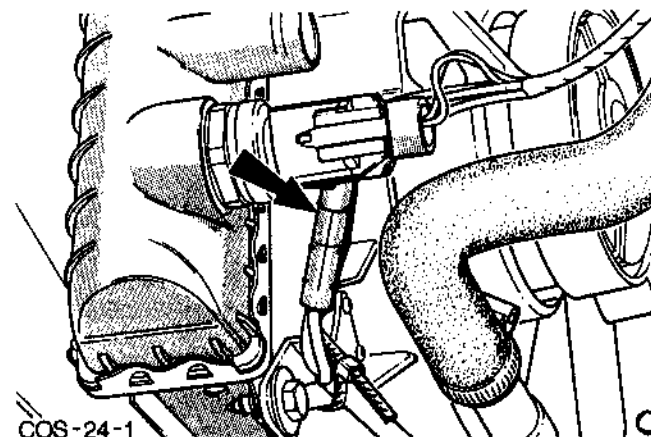
14. Lower vehicle to the ground.

15. Reconnect battery earth cable.



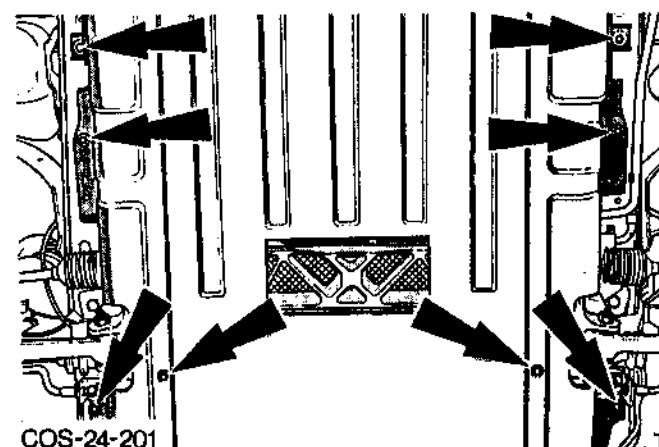
COS-24-6

Fig.4. Fit fan motor shroud to radiator.
(Viewed from below vehicle)



COS-24-1

Fig.5. Connect fan motor cable.



COS-24-201

Fig.6. Sump guard securing bolts.

24 254 0 RADIATOR - REMOVE AND INSTALL

SPECIAL TOOLS REQUIRED: NONE

To Remove

1. Disconnect battery earth cable.

WARNING: When releasing system pressure, cover cap with thick cloth to prevent coolant scalding.

2. Raise vehicle on a ramp.
3. Remove sump guard securing bolts and position clear of vehicle, refer to Fig.1.
4. Position drain tray below radiator bottom hose and relieve system pressure by slowly unscrewing degas tank cap.
5. Remove lower coolant hose from radiator and drain coolant into tray.
6. Disconnect top hose from radiator and water pump and remove.
7. Disconnect coolant and power steering pipes from radiator and chassis rail, Fig.2. (4 bolts).
8. Remove both nuts securing intercooler to radiator.

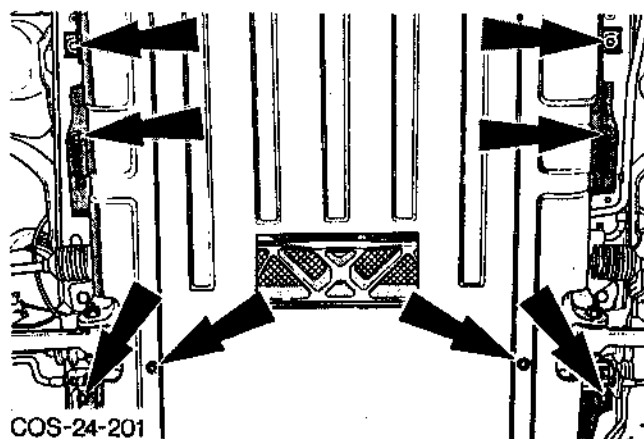


Fig.1. Sump guard securing bolts.

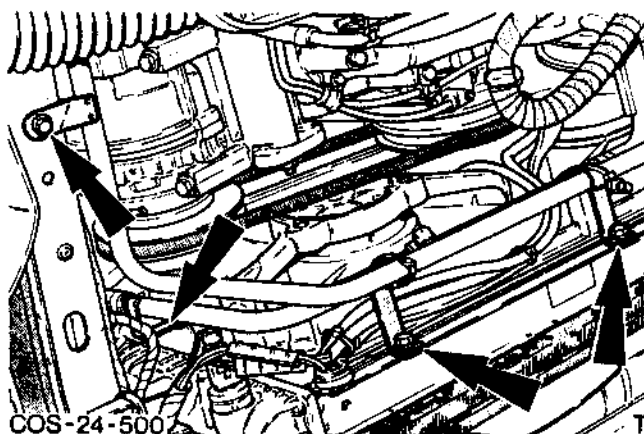


Fig.2. Remove coolant and power steering securing bolts.

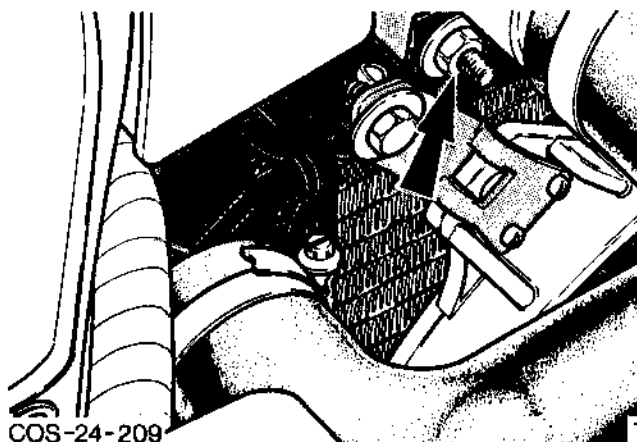


Fig.3. Detach radiator from intercooler (2 nuts). (One shown)

9. Disconnect both thermal sensor and fan motor multiplugs, refer to Fig.4.

10. Remove radiator mounting bolts, refer to Fig.5 and lower radiator, complete with shroud assembly, from underneath vehicle.

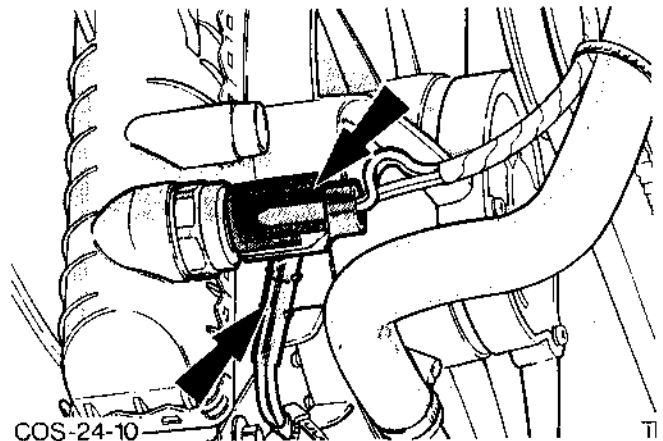


Fig.4. Disconnect electrical connections from radiator.

11. Check radiator hoses for damage and renew if necessary.

12. Unscrew thermal sensor from radiator.

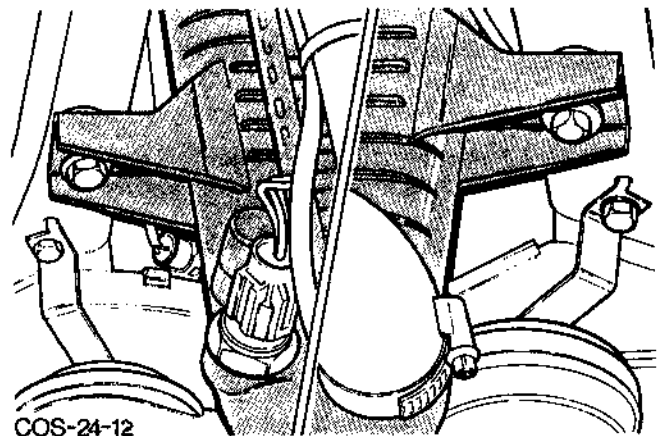


Fig.5. Radiator mounting bolts.

13. Unscrew shroud assembly complete with fan motors from radiator and remove securing clips from radiator body.

14. Remove radiator mounting bushes and sleeve, refer to Fig.6.

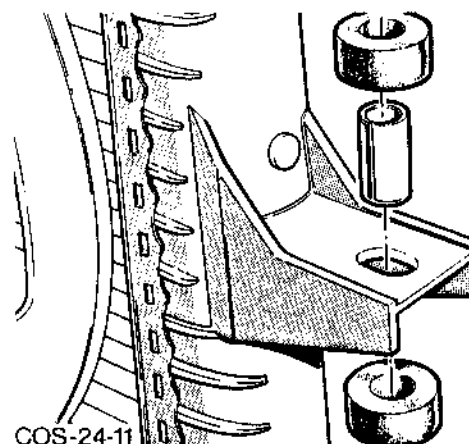


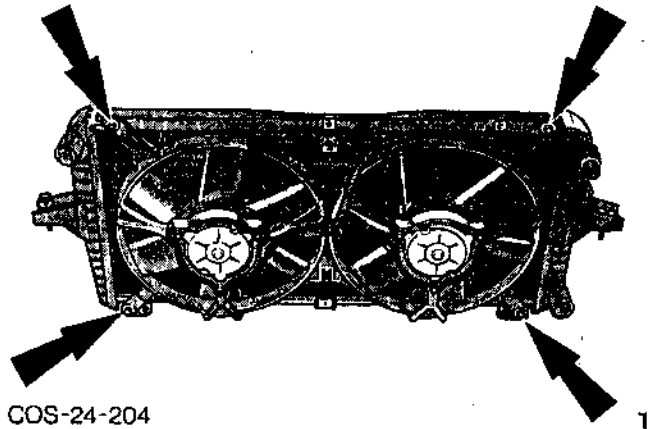
Fig.6. Remove radiator mounting bushes.

To Install

15. Refit radiator mounting bushes and fan shroud securing clips. Refit thermo-sensor and new gasket.

NOTE: Use new gasket when refitting thermo-sensor.

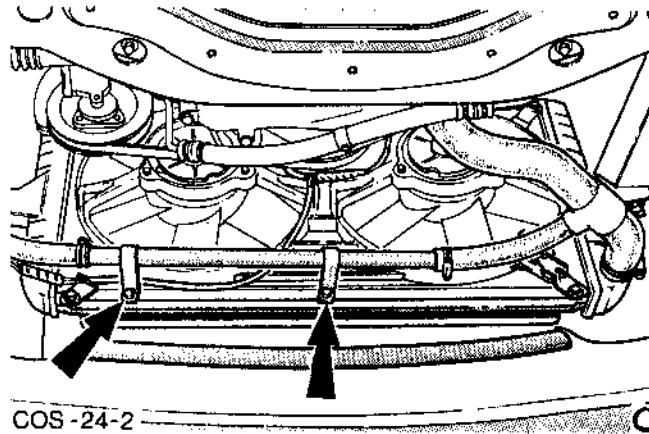
16. Refit shroud assembly complete with fan motors to radiator, refer to Fig.7.



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Fig.7. Shroud assembly securing screws.

17. Position radiator from below vehicle onto radiator support brackets and fit retaining bolts, refer to Fig.8. Torque bolts to specification, (see Technical Data).



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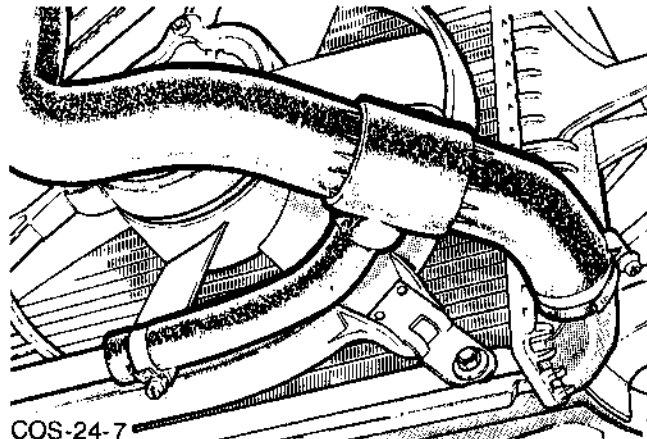
Fig.8. Radiator retaining bolts.

19. Reconnect lower coolant hose to radiator, Fig.9.

20. Reconnect both fan motor and thermo-sensor multiplugs.

21. Refit sump guard and secure.

22. Lower vehicle to the ground.



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Fig.9. Lower coolant hose connection.

23. Secure intercooler to top of radiator.

24. Refit radiator top hose.

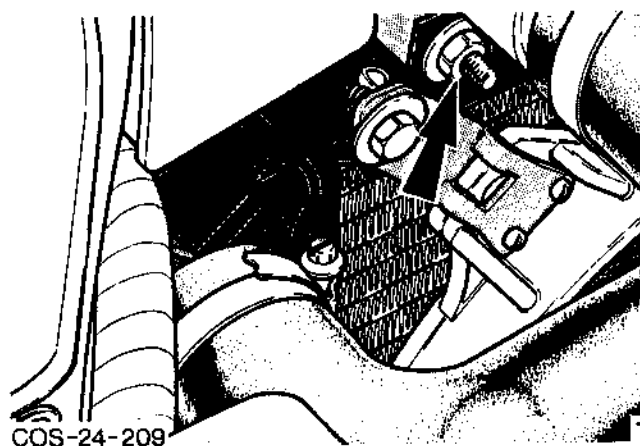


Fig.10. Radiator to intercooler securing nuts.
(One shown)

25. Top-up cooling system.

26. Connect battery earth cable.

27. Start engine and allow to warm up to operating temperature.

Check coolant level and top up if required.
Check hose connections for leaks.

24 404 0 WATER PUMP ASSEMBLY - REMOVE AND
INSTALL

SPECIAL TOOLS REQUIRED: NONE

To Remove

WARNING: When releasing system pressure, cover cap with thick cloth to prevent coolant scalding.

1. Disconnect battery earth cable. Relieve system pressure by slowly unscrewing degas tank cap.
2. Remove toothed drive belt cover retaining screws.
3. Position clean drain tray below radiator, detach bottom hose from radiator and drain coolant.
4. Remove bottom coolant hose from water pump.
5. Remove heater hose from water pump.
6. Remove bolts securing water pump pulley to drive flange.
7. Remove water pump drive belt by loosening alternator adjusting strap.
8. Remove water pump pulley.
9. Remove bolts securing water pump to cylinder block. Remove single bolt securing alternator adjuster strap to water pump body.

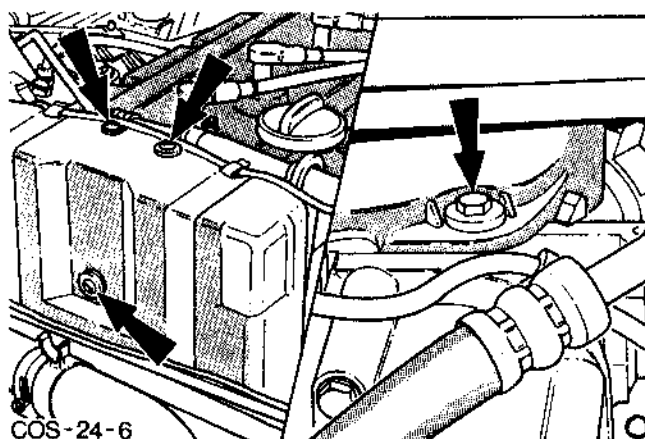


Fig.1. Toothed drive belt cover retaining screws.

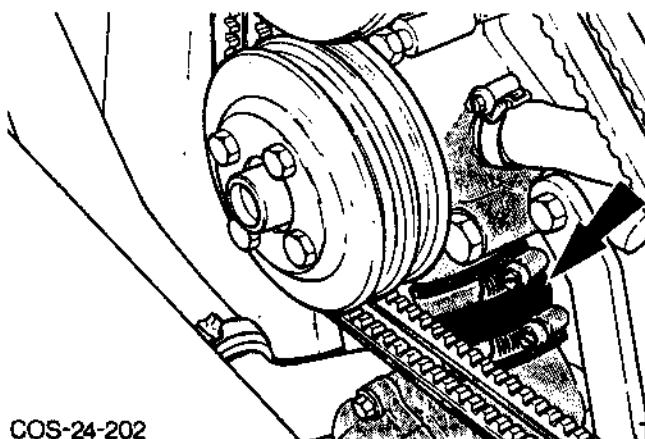


Fig.2. Heater hose - water pump.

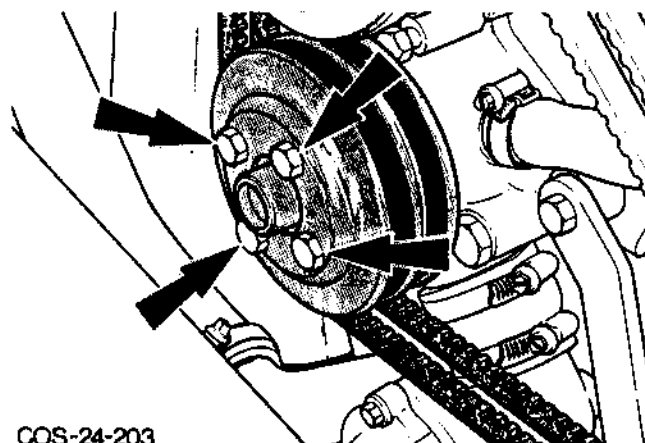


Fig.3. Remove water pump pulley retaining bolts.

To Install

10. Using new gasket, position and secure water pump assembly to cylinder block. Reconnect alternator adjusting strap to water pump body.

11. Fit drive belt pulley to water pump.

12. Refit and tension water pump drive belts.

Swing alternator downwards to apply the necessary tension to the drive belt (see Technical Data) and tighten alternator mounting bolts.

13. Tighten drive belt pulley bolts.

14. Refit heater hose to water pump.

15. Refit lower coolant hose to water pump and radiator.

16. Refit toothed belt cover.

17. Reconnect battery.

18. Fill cooling system. Start engine and allow to warm up to normal operating temperature. Check coolant level and check hose connections for leaks.

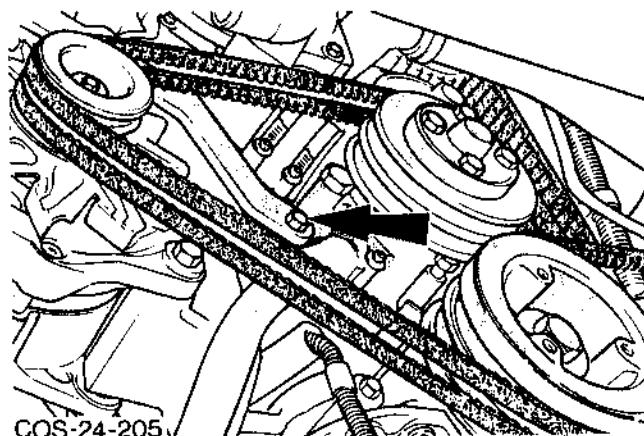


Fig.4. Alternator adjusting strap pivot bolt.

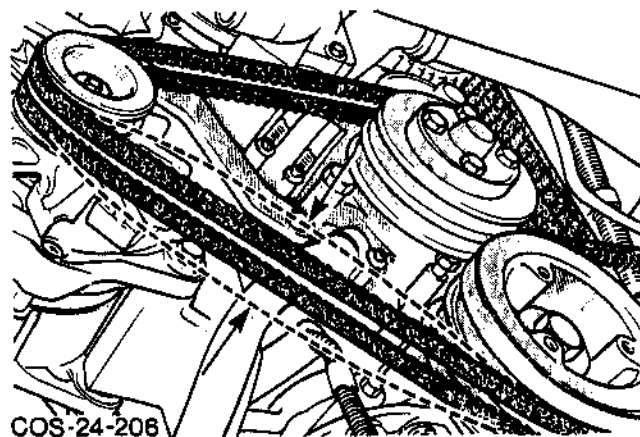


Fig.5. Adjust drive belt tension.

24 451 0 THERMOSTAT - TEST (THERMOSTAT REMOVED)

SPECIAL SERVICE TOOLS REQUIRED: NONE

To Test

1. Suspend thermostat in water in a suitable container. Ensure thermostat does not touch sides of container, refer to Fig.1.

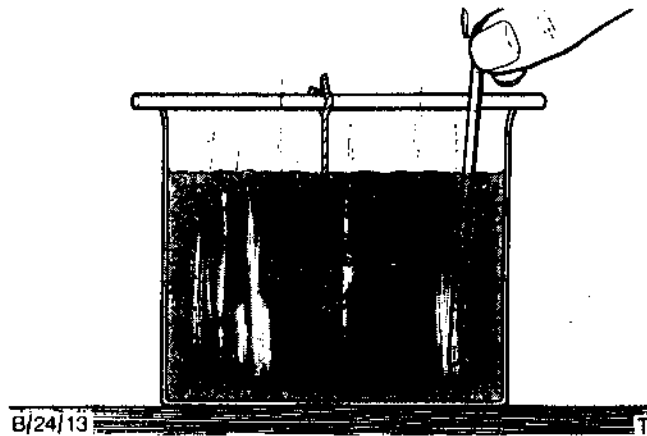


Fig.1. Testing thermostat.

2. Gradually heat water, frequently checking temperature with an accurate thermometer.
3. Observe thermostat opening temperature and check with specification on thermostat upper face.

NOTE: It is only possible to check the opening temperature and not the fully open condition, this is because the temperature required to fully open the thermostat is above the boiling point of water at normal atmospheric conditions.

4. If thermostat function is not to specification, a new thermostat should be fitted.

24 454 0 THERMOSTAT - REMOVE AND INSTALL

SPECIAL SERVICE TOOLS REQUIRED: NONE

To Remove

1. Disconnect battery earth cable.

2. Position drain tray underneath radiator bottom hose.

WARNING: When releasing system pressure, cover degas tank cap with thick cloth to prevent coolant scalding.

3. Release cooling system pressure by slowly unscrewing degas tank cap.

4. Remove radiator bottom hose and drain cooling system. To assist draining remove degas tank cap.

5. Remove coolant hose from thermostat cover.

6. Remove thermostat housing cover (3 bolts), refer to Fig.1.

7. Remove gasket and pull out retaining collar.

8. Remove thermostat and sealing ring.

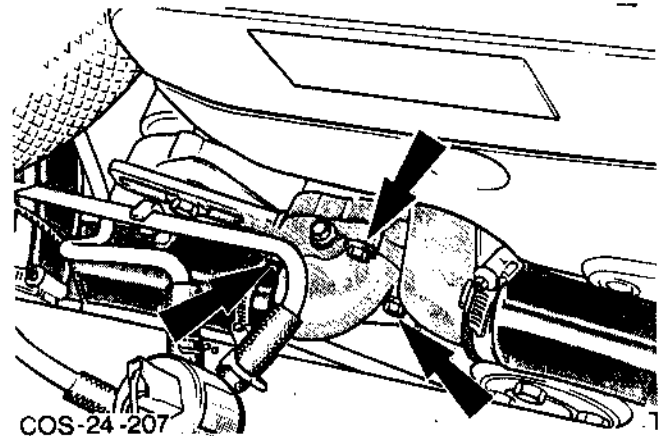


Fig.1. Thermostat housing securing bolts.

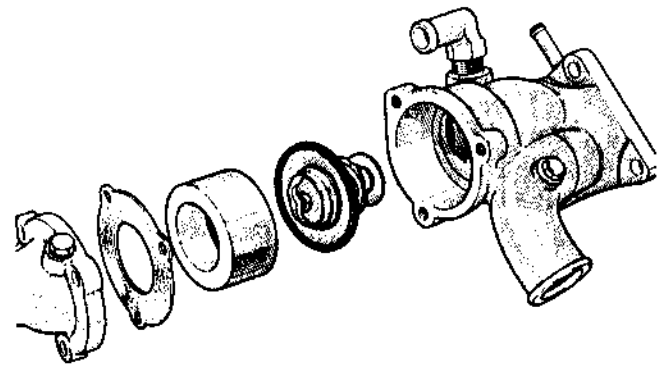


Fig.2. Exploded view of thermostat.
(Removed from vehicle for illustration clarity)



24 454 0

COOLING SYSTEM
(COSWORTH 4x4)

To Install

9. Clean thermostat housing mating faces.
10. Fit new thermostat sealing ring and refit thermostat assembly into the thermostat housing.
11. Refit retaining collar.
12. Position a new gasket and secure thermostat housing cover.
13. Refit coolant hose to thermostat cover.
14. Refit radiator bottom hose and refill cooling system.
15. Reconnect battery earth cable. Start engine and allow to warm to normal operating temperature. Check coolant level and check for leaks.

