






Chapter 1

Routine maintenance and servicing

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Degrees of difficulty

Easy , suitable for novice with little experience		Fairly easy , suitable for beginner with some experience		Fairly difficult , suitable for competent DIY mechanic		Difficult , suitable for experienced DIY mechanic		Very difficult , suitable for expert DIY or professional	
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Specifications

Engine

Direction of crankshaft rotation	Clockwise (seen from right-hand side of vehicle)
Oil filter:	
HCS and CVH engines	Champion C104
Zetec engine	Champion C148

Cooling system

Coolant protection at standard 40% antifreeze/water mixture ratio:	
Slush point	-25°C (-13°F)
Solidifying point	-30°C (-22°F)
Coolant specific gravity at standard 40% antifreeze/water mixture ratio and 15°C/59°F - with no other additives in coolant	1.061

Fuel system

Idle speed*:	
1.3 litre HCS (carburettor) engine	750 ± 50 rpm (cooling fan running)
1.4 litre CVH (carburettor) engine	800 ± 50 rpm (cooling fan running)
1.6 litre CVH (carburettor) engine	800 ± 50 rpm (cooling fan running)
1.6 litre CVH (fuel-injected) engine:	
Idle speed	900 ± 50 rpm
Base idle speed	750 ± 50 rpm

1.2 Servicing Specifications

Fuel system (continued)

Idle mixture CO content*:

1.3 litre HCS (carburettor) engine	1.0 ± 0.5%
1.4 litre CVH (carburettor) engine	1.0 ± 0.5%
1.6 litre CVH (carburettor) engine	1.5 ± 0.5%
1.6 litre CVH (fuel-injected) engine	0.8 ± 0.25%

***Note:** The idle speed and mixture CO content is only adjustable on the engines shown above. On all other engines, it is controlled by the engine management system, and cannot be checked or adjusted without specialised test equipment.

Air filter element:

1.3 litre HCS engine	Champion W225
1.4 litre CVH engine	Champion W226
1.6 litre CVH (carburettor) engine	Champion W226
1.6 litre CVH (fuel-injected) engine	Champion U612
1.6 and 1.8 litre Zetec engine	Champion U612

Fuel filter:

1.3 litre HCS (CFI fuel-injected) engine	Champion type not available
1.4 litre CVH (CFI fuel-injected) engine	Champion type not available
1.6 litre CVH (fuel-injected) engine	Champion L204
1.6 and 1.8 litre Zetec engine	Champion L218

Ignition system

Firing order:

HCS engine	1-2-4-3 (No 1 cylinder at timing chain end of engine)
All other engines	1-3-4-2 (No 1 cylinder at timing belt end of engine)

Spark plugs*:

1.3 litre HCS (carburettor) engine	Champion RS9YCC or RS9YC
1.4 litre CVH engine	Champion RC7YCC or RC7YC
1.6 litre CVH (carburettor) engine	Champion RC7YCC or RC7YC
1.6 litre CVH (EFI fuel-injected) engine	Champion RC6YCC or RC6YC
1.6 and 1.8 litre Zetec engine	Champion RE7YCC

Electrode gap*:

1.3 litre HCS engine	1.0 mm
1.4 litre CVH (carburettor) engine	0.8 mm
1.4 litre CVH (CFI fuel-injected) engine	1.0 mm
1.6 litre CVH engine	0.8 mm
1.6 and 1.8 litre Zetec engine	1.0 mm

Spark plug (HT) leads:

HCS engine	Champion LS-28
1.4 litre CVH engine	Champion LS-27
1.6 litre CVH (carburettor) engine	Champion LS-27
1.6 litre CVH (fuel-injected) engine	Champion LS-26
1.6 and 1.8 litre Zetec engine	Champion type not available

Maximum resistance per lead 30 000 ohms

* Information on spark plug types and electrode gaps is as recommended by Champion Spark Plug. Where alternative types are used, refer to their manufacturer's recommendations.

Braking system

Minimum front or rear brake pad lining thickness	1.5 mm
Minimum rear brake shoe lining thickness	1.0 mm

Tyre pressures (cold)

Saloon, Hatchback and Estate models:

Normally-laden*	2.0 bars (29 psi)	1.8 bars (26 psi)
Fully-laden*	2.3 bars (34 psi)	2.8 bars (40 psi)

Van models:

Normally-laden*	2.0 bars (29 psi)	1.8 bars (26 psi)
Fully-laden*		
With 165 R 13 tyres	2.3 bars (34 psi)	3.0 bars (44 psi)
With 165 R 13 reinforced tyres	2.3 bars (34 psi)	3.5 bars (51 psi)

Note: Normally-laden means up to 3 persons. For sustained high speeds above 100 mph (160 km/h), increased pressures are necessary. Consult the driver's handbook supplied with the vehicle.

Wiper blades

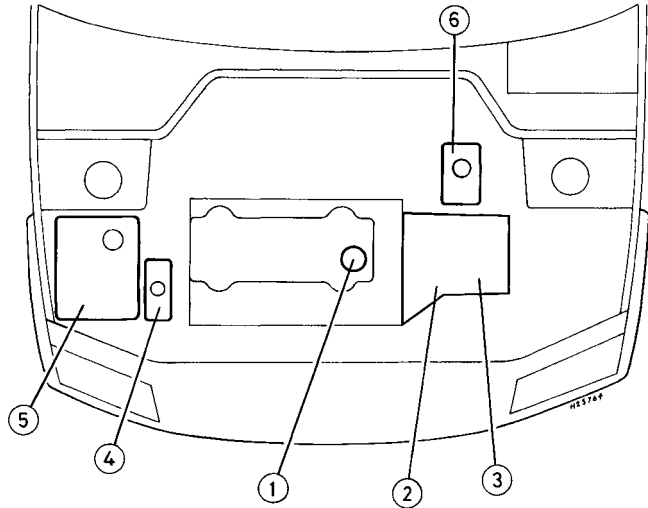
Windscreen	Champion X-5103
Tailgate/rear window	Champion X-5103

Torque wrench settings

	Nm	lbf ft
Auxiliary drivebelt cover fasteners	5 to 10	4 to 7
Auxiliary drivebelt adjustment:		
Adjusting bolt (sliding arm)	18 to 25	13 to 18
Central (locking) bolt	18 to 25	13 to 18
Pinion (adjuster) nut	10 to 15	7 to 11
Alternator mounting bolts	20 to 27	15 to 19
Engine oil drain plug	21 to 28	15 to 21
Manual transmission filler/level plug	23 to 30	17 to 22
Spark plugs:		
HCS engines	14 to 20	12 to 15
CVH engines	17 to 33	13 to 24
Zetec engines	14 to 20	12 to 15
Roadwheel nuts	70 to 100	52 to 74
Seat belt mounting bolts	29 to 45	22 to 33
Windscreen wiper arm nut	17 to 18	12.5 to 13

Lubricants and fluids

Component or system	Lubricant type/specification
1 Engine	Multigrade engine oil to specification API SG/CD or better, viscosity range 5W/50 to 10W/30
2 BC type manual transmission	SAE 80 high pressure gear oil to Ford specification SQM2C-9008-A
2 MTX-75 type manual transmission	Gear oil to Ford specification ESD-M2C-186-A
3 Automatic transmission	Transmission fluid to Ford specification ESP-M2C-166-H
4 Power steering	Transmission fluid to Ford specification ESP-M2C-166-H
5 Cooling system	Soft water, and antifreeze (ethylene glycol-based, suitable for use in mixed-metal cooling systems) to Ford specification ESD-M97B-49-A
6 Braking system	Hydraulic fluid to Ford specification ESD-M6C-57-A, Super DOT 4 or equivalent
Wheel hub bearing grease (front and rear)	Grease to Ford specification SAM-1C-9111A



Capacities

Engine oil

At oil and filter change:	
HCS engine	3.25 litres
CVH engine	3.50 litres
Zetec engine	4.25 litres
Difference between dipstick minimum and maximum level notches	0.5 to 1.0 litre

Cooling system

1.3 litre HCS engine	7.1 litres
1.4 litre CVH engine	7.6 litres
1.6 litre CVH engine	7.8 litres
1.6 and 1.8 Zetec engine	7.4 litres

Fuel tank	55.0 litres
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Manual transmission

BC type (four-speed)	2.8 litres
BC type (five-speed)	3.1 litres
MTX-75 type	2.4 litres

Automatic transmission

Without fluid cooler	3.5 litres
With fluid cooler	3.6 litres

Washer system reservoir

Excluding headlight washer system	4.0 litres
Including headlight washer system	8.0 litres

Ford Escort and Orion maintenance schedule

General

The manufacturer's recommended maintenance schedule for these vehicles is as described below - note that the schedule starts from the vehicle's date of registration. These are the minimum maintenance intervals recommended by the factory for Escorts and Orions driven daily, but subjected only to "normal" use. If you wish to keep your vehicle in peak condition at all times, you may wish to perform some of these procedures even more often. Because frequent maintenance enhances the efficiency, performance and resale value of your vehicle, we encourage you to do so. If your usage is not "normal", shorter intervals are also recommended - the most important examples of these are noted in the schedule. These shorter intervals apply particularly if you drive in dusty areas, tow a caravan or trailer, sit with the engine idling or drive at low speeds for extended periods (ie, in heavy traffic), or drive for short distances (less than four miles) in below-freezing temperatures.

When your vehicle is new, it should be serviced by a Ford dealer

Weekly, when refuelling, or before any long journey

- ☐ Check the engine oil level, and top-up if necessary (Section 3)
- ☐ Check the brake fluid level, and top-up if necessary (Section 3). If repeated topping-up is required, check the system for leaks or damage at the earliest possible opportunity (Sections 12 and 22)
- ☐ Check the windscreen/tailgate washer fluid level, and top-up if necessary (Section 3)
- ☐ Check the tyre pressures, including the spare (Section 4)
- ☐ Check the tyres for excessive tread wear, or damage (Section 4)
- ☐ Check the operation of all (exterior and interior) lights and the horn, wipers and windscreen/tailgate washer system (Sections 6 and 8). Renew any blown bulbs (Chapter 12), and clean the lenses of all exterior lights
- ☐ Check the coolant level, and top-up if necessary (Section 3)
- ☐ Check the battery electrolyte level, where applicable (Section 3)
- ☐ Check the power steering fluid level, and top-up if necessary (Section 5)
- ☐ Check all reservoirs, hoses and pipes for leakage (Section 12)
- ☐ Check the operation of the air conditioning system (Section 14)
- ☐ Check the operation of the handbrake (Section 26 and Section 33 for adjustment)
- ☐ Check the aim of the windscreen/tailgate/headlight washer jets, correcting them if required (Section 6)
- ☐ Check the condition of the wiper blades, renewing them if worn or no longer effective - note that the manufacturer recommends renewing the blades as a safety precaution, irrespective of their apparent condition, at least once a year (Section 6)
- ☐ Check the automatic transmission fluid level with the engine still hot (Section 7)

service department to protect the factory warranty. In many cases, the initial maintenance check is done at no cost to the owner. Note that this first free service (carried out by the selling dealer 1500 miles or 3 months after delivery), although an important check for a new vehicle, is not part of the regular maintenance schedule, and is therefore not mentioned here.

It should be noted that for the 1992 model year, the service time/mileage intervals were extended by the manufacturer to the periods shown in this schedule. Although these intervals can be applied retrospectively, owners of earlier vehicles may notice a discrepancy between this schedule and the one shown in the Service Guide supplied with the vehicle.

Standard service - every 10 000 miles or 12 months, whichever occurs first

- ☐ Check the electrical system (Section 8)
- ☐ Check the battery (Section 9)
- ☐ Check the seat belts (Section 10)
- ☐ Check the auxiliary drivebelt (Section 11)
- ☐ Check under the bonnet for fluid leaks and hose condition (Section 12)
- ☐ Check the condition of all engine compartment wiring (Section 13)
- ☐ Check the condition of all air conditioning system components (Section 14)
- ☐ Check the valve clearance adjustment - HCS engines only (Section 15)
- ☐ Change the engine oil and filter (Section 16)
- ☐ Check the engine idle speed and mixture - HCS and CVH engines only, where possible (Section 17)
- ☐ Check the manual transmission oil level (Section 18)
- ☐ Check the steering, suspension and roadwheels (Section 19)
- ☐ Check the driveshaft rubber gaiters and CV joints (Section 20)
- ☐ Check the exhaust system (Section 21)
- ☐ Check the underbody, and all fuel/brake lines (Section 22)
- ☐ Check the brake system (Section 23)
- ☐ Check the doors and bonnet, and lubricate their hinges and locks (Section 24)
- ☐ Check the security of all roadwheel nuts (Section 25)
- ☐ Road test (Section 26).

Note: If the vehicle is used regularly for very short (less than 10 miles), stop/go journeys, the oil and filter should be renewed between services (ie, every 5000 miles/6 months). Seek the advice of a Ford dealer if in doubt on this point.

Every 20 000 miles

Carry out all operations listed above, plus the following:

- ☐ Renew the spark plugs - HCS and CVH engines only (Section 27)

Extended service - every 30 000 miles or 3 years, whichever occurs first

Carry out all operations listed above, plus the following:

- ☐ Renew the coolant (Section 28)
- ☐ Renew the air cleaner filter element (Section 29). Note that this task must be carried out at more frequent intervals if the vehicle is used in dusty or polluted conditions
- ☐ Check the Positive Crankcase Ventilation (PCV) system, and clean the filter (Section 30)
- ☐ Renew the spark plugs - Zetec engines only (Section 27)
- ☐ Check the oil filler cap - HCS engines only (Section 31)
- ☐ Renew the automatic transmission fluid (Section 32)
- ☐ Check the handbrake adjustment (Section 33)

Every 60 000 miles

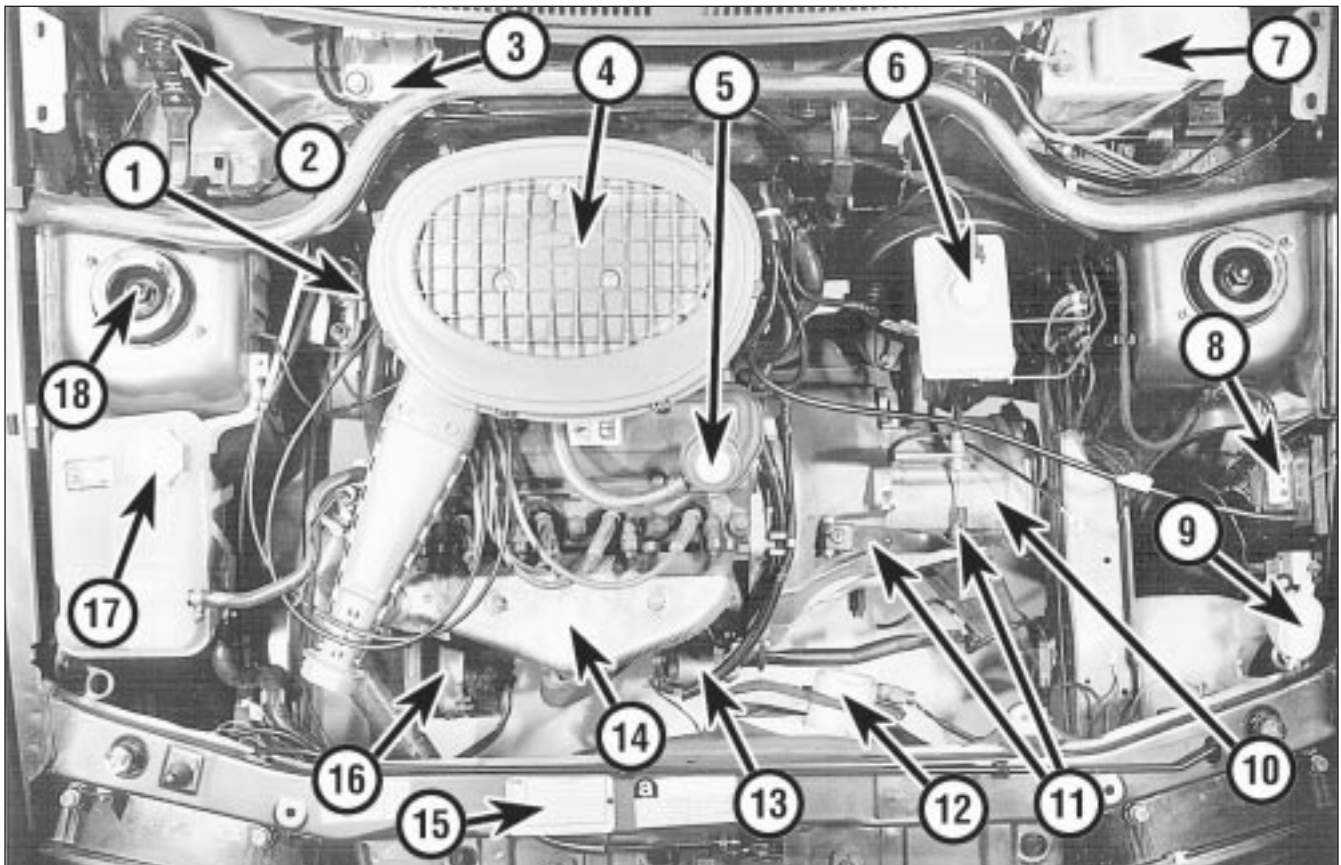
Carry out all operations listed above, plus the following:

- ☐ Renew the timing belt (Section 34)
- ☐ Renew the fuel filter (Section 35)

Every 3 years (regardless of mileage)

- ☐ Renew the brake fluid (Section 36)

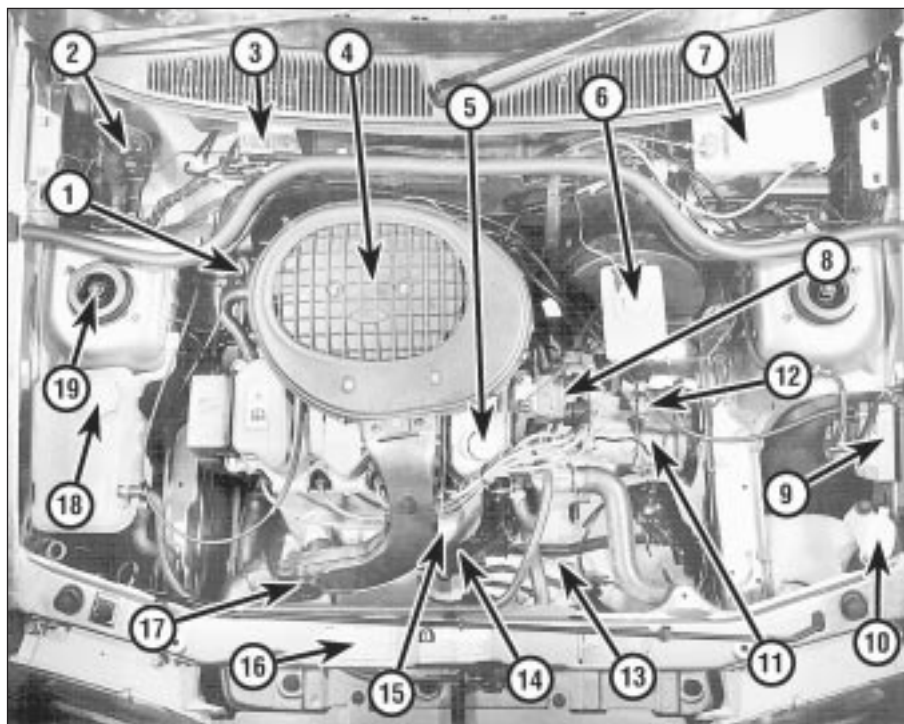
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Engine compartment component locations - 1.3 litre HCS carburettor engine

- | | | | |
|-------------------------------|-----------------------------------|--------------------------------------|---------------------------------------|
| 1 Oil level dipstick location | 6 Brake master cylinder reservoir | 11 Clutch operating lever and cable | 15 Vehicle identification plate (VIN) |
| 2 Anti-theft alarm horn | 7 Battery | 12 Cooling fan | 16 Alternator |
| 3 Windscreen wiper motor | 8 Ignition module | 13 Starter motor | 17 Coolant expansion tank |
| 4 Air cleaner | 9 Washer fluid reservoir | 14 Exhaust heat shield/air deflector | 18 Suspension upper mounting |
| 5 Engine oil filler cap | 10 Transmission | | |

1.6 Maintenance & Servicing

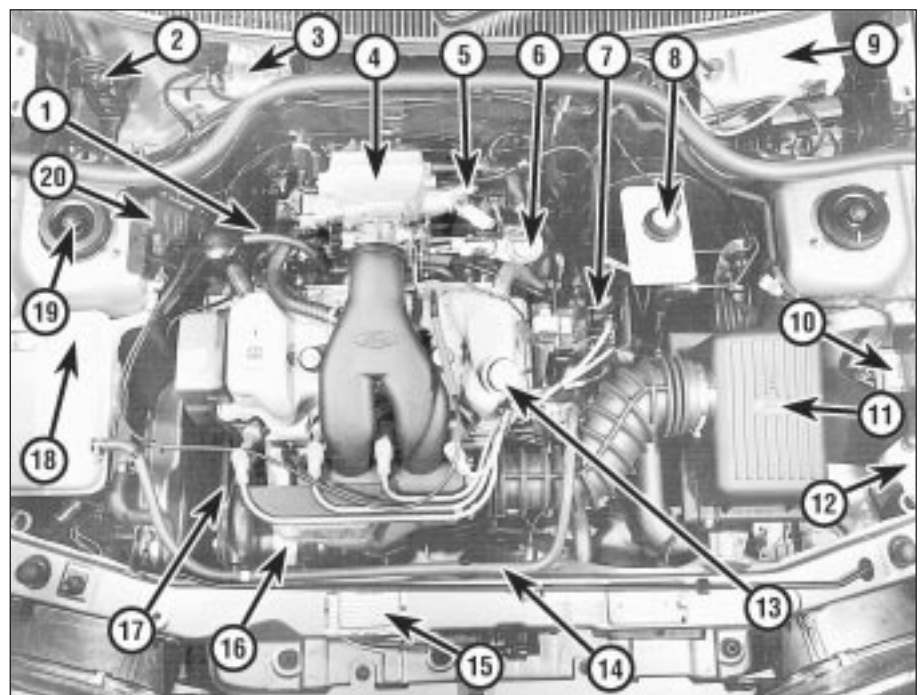


Engine compartment component locations
- 1.6 litre CVH carburettor engine

- 1 Oil level dipstick location
- 2 Anti-theft alarm horn
- 3 Windscreen wiper motor
- 4 Air cleaner
- 5 Engine oil filler cap
- 6 Brake master cylinder reservoir
- 7 Battery
- 8 DIS Ignition coil
- 9 Ignition module
- 10 Washer fluid reservoir
- 11 Transmission
- 12 Clutch cable
- 13 Cooling fan
- 14 Starter motor
- 15 Exhaust heat shield/air deflector
- 16 Vehicle identification plate (VIN)
- 17 Intake air temperature control valve
- 18 Coolant expansion tank
- 19 Suspension upper mounting

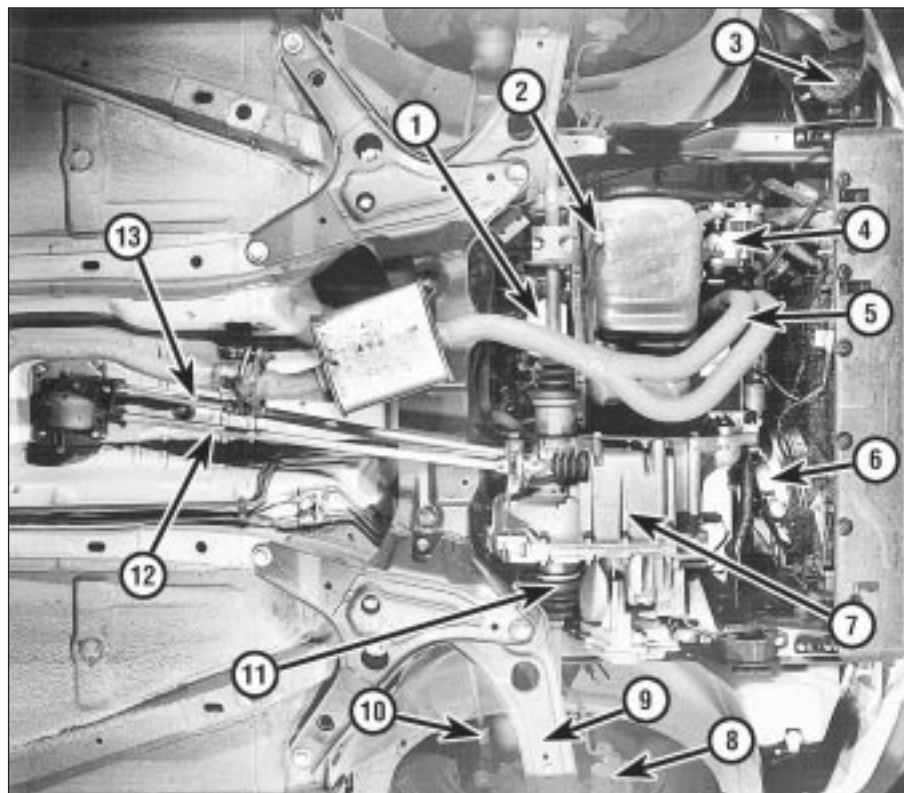
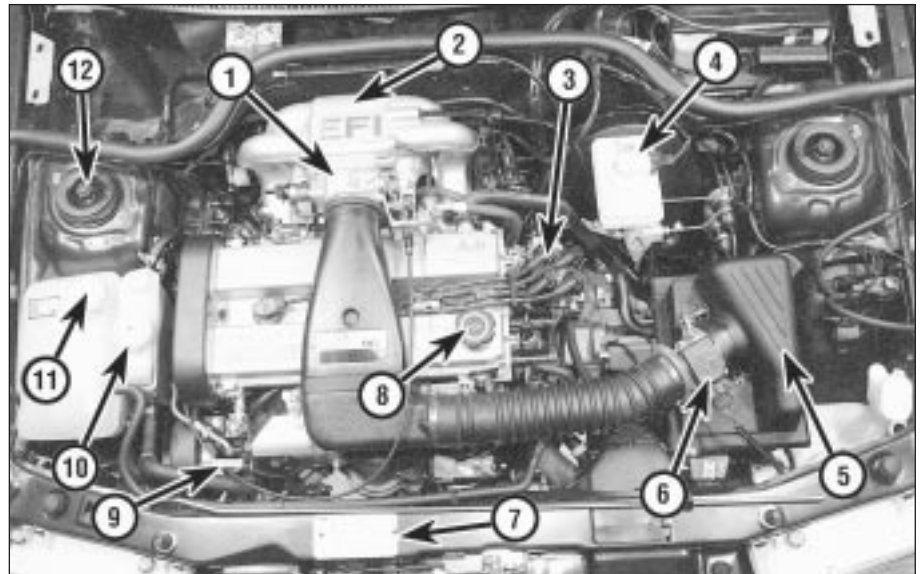
Engine compartment component locations
- 1.6 litre CVH EFI fuel injected engine

- 1 Oil level dipstick location
- 2 Anti-theft alarm horn
- 3 Windscreen wiper motor
- 4 Throttle housing
- 5 Intake air temperature sensor
- 6 Fuel pressure regulator
- 7 EDIS Ignition coil
- 8 Brake master cylinder reservoir
- 9 Battery
- 10 Ignition module
- 11 Air cleaner housing
- 12 Washer fluid reservoir
- 13 Engine oil filler cap
- 14 Cooling fan
- 15 Vehicle identification plate (VIN)
- 16 Starter motor
- 17 Auxiliary drivebelt
- 18 Coolant expansion tank
- 19 Suspension upper mounting
- 20 MAP sensor



Engine compartment component locations - 1.6 litre Zetec SEFi fuel injected engine

- 1 Throttle housing
- 2 Inlet manifold
- 3 EDIS ignition coil
- 4 Brake master cylinder reservoir
- 5 Air cleaner housing
- 6 Air mass meter
- 7 Vehicle identification plate (VIN)
- 8 Engine oil filler cap
- 9 Oil level dipstick location
- 10 Power steering fluid reservoir
- 11 Coolant expansion tank
- 12 Suspension upper mounting



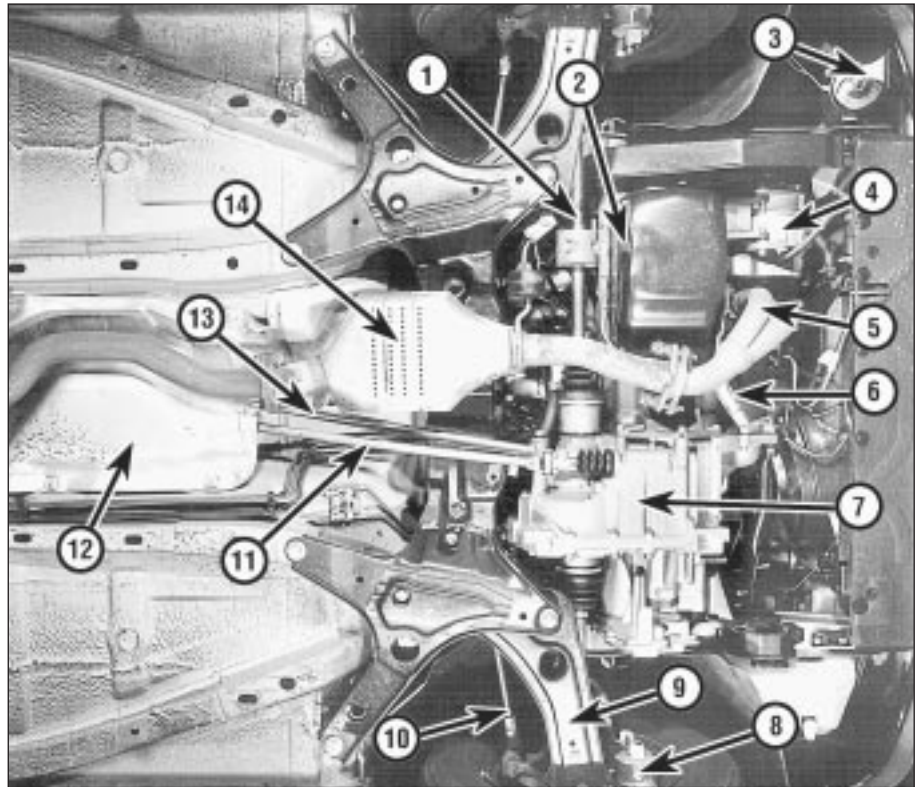
Underside view at front end showing component locations on the 1.3 litre HCS carburettor engine model

- 1 Engine oil filter
- 2 Engine oil drain plug
- 3 Horn
- 4 Alternator
- 5 Exhaust downpipe
- 6 Cooling fan
- 7 Transmission
- 8 Brake caliper
- 9 Lower suspension arm
- 10 Track rod end balljoint
- 11 Driveshaft
- 12 Gearshift rod
- 13 Stabiliser rod (transmission)

1.8 Maintenance & Servicing

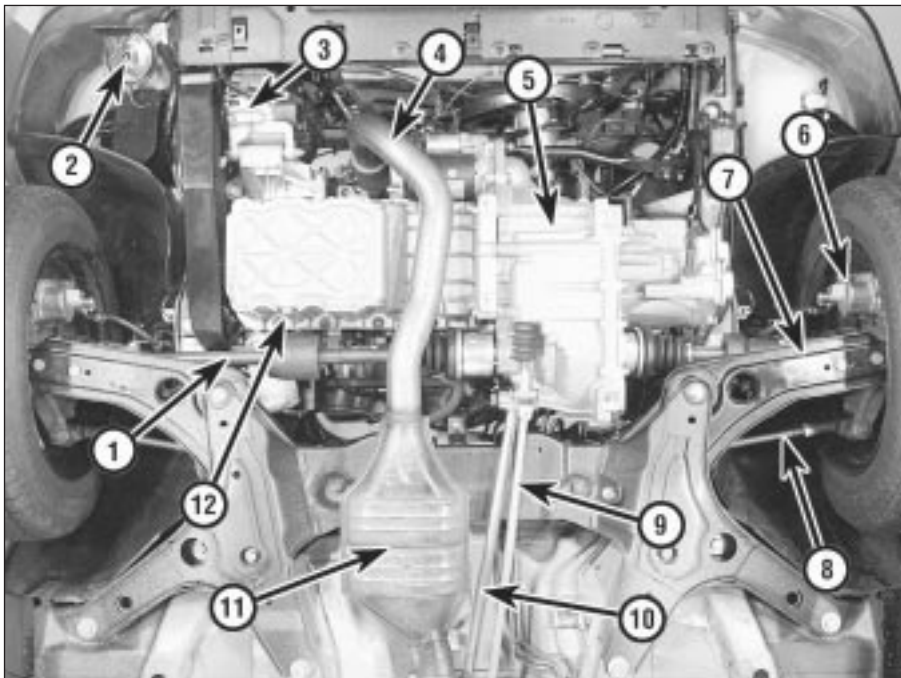
Underside view at front end showing component locations on the 1.6 litre CVH EFI engine model

- 1 Driveshaft
- 2 Engine oil drain plug
- 3 Horn
- 4 Alternator
- 5 Exhaust downpipe
- 6 Oxygen sensor
- 7 Transmission
- 8 Brake caliper
- 9 Lower suspension arm
- 10 Track rod
- 11 Gearshift rod
- 12 Heatshield
- 13 Stabiliser rod (transmission)
- 14 Catalytic converter



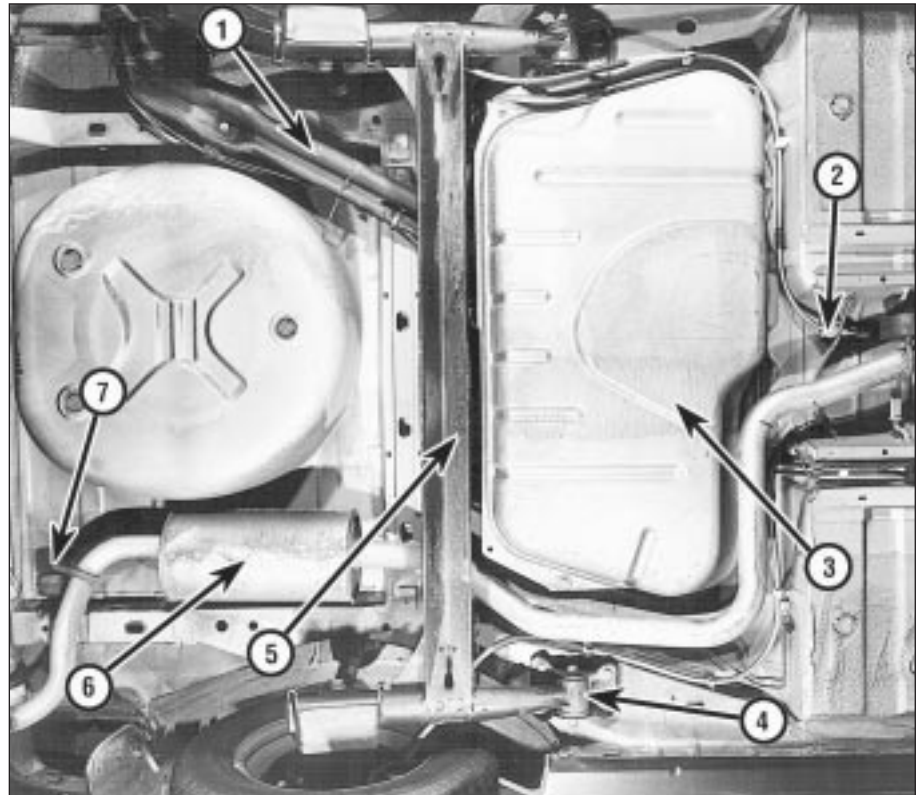
Underside view at front end showing component locations on the 1.6 litre Zetec SEFi engine model

- 1 Driveshaft
- 2 Horn
- 3 Alternator
- 4 Exhaust downpipe
- 5 Transmission
- 6 Brake caliper
- 7 Lower suspension arm
- 8 Track rod
- 9 Gearshift rod
- 10 Stabiliser rod (transmission)
- 11 Catalytic converter
- 12 Engine oil drain plug

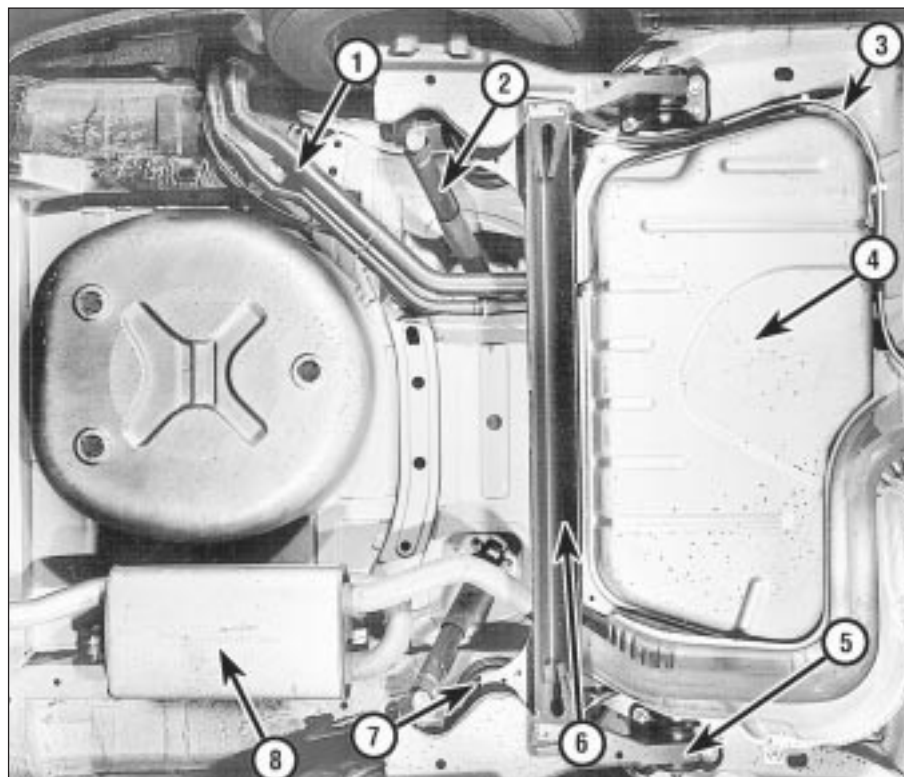


Underside view at rear end showing component locations on a 1.3 litre Hatchback model

- 1 Fuel filler pipe
- 2 Handbrake cable adjuster
- 3 Fuel tank
- 4 Suspension mounting
- 5 Rear axle beam
- 6 Exhaust rear silencer
- 7 Exhaust system support/insulator



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Underside view at rear end showing component locations on a 1.6 litre Estate model

- 1 Fuel filler pipe
- 2 Shock absorber
- 3 Handbrake cable
- 4 Fuel tank
- 5 Suspension mounting
- 6 Rear axle beam
- 7 Rear coil spring
- 8 Exhaust system rear silencer

1 Introduction

This Chapter is designed to help the home mechanic maintain the Ford Escort and Orion models for peak performance, economy, safety and long life.

On the following pages is a master maintenance schedule, followed by Sections dealing specifically with each item on the schedule. Visual checks, adjustments, component replacement and other helpful items are included. Refer to the accompanying illustrations of the engine compartment and the underside of the vehicle for the location of various components.

Servicing your Escort or Orion in accordance with the mileage/time maintenance schedule and the following

Sections will provide it with a planned maintenance programme, which should result in a long and reliable service life. This is a comprehensive plan, so maintaining some items but not others at the specified service intervals will not produce the same results.

As you service your car, you will discover that many of the procedures can - and should - be grouped together, because of the nature of the particular procedure you're performing, or because of the close proximity to one another of two otherwise-unrelated components.

For example, if the vehicle is raised for any reason, you should inspect the exhaust, suspension, steering and fuel systems while you're under the vehicle. When you're checking the tyres, it makes good sense to check the brakes and wheel bearings, especially if the roadwheels have already been removed.

Finally, let's suppose you have to borrow or hire a torque wrench. Even if you only need to tighten the spark plugs, you might as well check the torque of as many critical fasteners as time allows.

2 Routine maintenance

The first step of this maintenance programme is to prepare yourself before the actual work begins. Read through all the Sections which are relevant to the procedures you're planning to carry out, then make a list of, and gather together, all the parts and tools you will need to do the job. If it looks as if you might run into problems during a particular segment of some procedure, seek advice from your local parts man or dealer service department.

Weekly checks

3 Fluid level checks



General

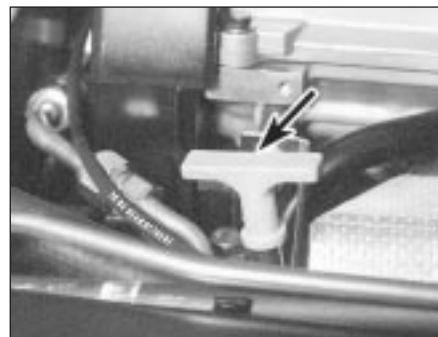
1 Fluids are an essential part of the lubrication, cooling, braking and other systems. Because these fluids gradually become depleted and/or contaminated during normal operation of the vehicle, they must be periodically replenished. See "Lubricants and fluids and capacities" at the beginning of this Chapter before adding fluid to any of the following components. **Note:** The vehicle must be on level ground before fluid levels are checked, to ensure accuracy.

Engine oil

2 The engine oil level is checked with a dipstick located at the front of the engine; it can be identified by its yellow/black plastic grip (see illustration). The dipstick extends through a metal tube, from which it protrudes down into the sump at the bottom of the engine.

3 The oil level should be checked before the vehicle is driven, or about 5 minutes after the engine has been switched off.

HAYNES HINT If the level is checked immediately after driving the vehicle, some of the oil will remain in the engine upper components, producing an inaccurate dipstick reading.



3.2 Engine oil dipstick location (arrowed) on Zetec engines

4 Pull the dipstick from the tube, and wipe all the oil from the end with a clean rag or paper towel; note the dipstick's maximum and minimum levels, indicated by notches (see illustration). Insert the clean dipstick all the way back into its metal tube, and pull it out again. Observe the oil on the end of the dipstick; its level should be between these two notches.

5 Do not allow the level to drop below the



3.4 Engine oil dipstick MAXimum and MINimum level markings



3.6A Topping-up the engine oil level (HCS engine)



3.6B Topping-up the engine oil level (CVH engine)



3.6C Topping-up the engine oil level (Zetec engine)

minimum level notch, or oil starvation may cause engine damage. Conversely, overfilling the engine (adding oil above the maximum level notch) may cause oil-fouled spark plugs, oil leaks or oil seal failures.

6 The oil filler cap is screwed into the left-hand front end of the cylinder head/rocker cover; unscrew it to add oil (see **illustrations**). When topping-up, use only the correct grade and type of oil, as given in "Lubricants, fluids and capacities" at the start of this Chapter; use a funnel if necessary to prevent spills. It takes approximately 0.5 to 1.0 litre of oil to raise the level from the dipstick's minimum level notch to its maximum level notch. After adding the oil, refit the filler cap hand-tight. Start the engine, and allow it to idle while the oil is redistributed around the engine - while you are waiting, look carefully for any oil leaks, particularly around the oil filter or drain plug. Stop the engine; check the oil level again, after the oil has had enough time to drain from the upper block and cylinder head galleries.

7 Checking the oil level is an important preventive maintenance step. A continually-dropping oil level indicates oil leakage through damaged seals and from loose connections, or oil consumption past worn piston rings or valve guides. If the oil looks milky in colour, or has water droplets in it, the cylinder head gasket may be blown - the engine's compression pressure should be checked immediately (see Chapter 2). The condition of the oil should also be checked. Each time you check the oil level, slide your thumb and index finger up the dipstick before wiping off the oil. If you see small dirt or metal particles clinging to the dipstick, the oil should be changed (Section 16).

Coolant



Warning: Do not allow antifreeze to come in contact with your skin or painted surfaces of the vehicle. Flush contaminated

areas immediately with plenty of water. Don't store new coolant, or leave old coolant lying around, where it's accessible to children or pets - they're attracted by its sweet smell. Ingestion of even a small amount of coolant can be fatal! Wipe up garage-floor and drip-pan spills immediately. Keep antifreeze containers covered, and repair cooling system leaks as soon as they're noticed.

8 All vehicles covered by this manual are equipped with a sealed, pressurised cooling system. A translucent plastic expansion tank, located on the right-hand side of the engine compartment, is connected by a hose to the thermostat housing. As the coolant heats up during engine operation, surplus coolant passes through the connecting hose into the expansion tank; a connection to the radiator bottom hose union allows coolant to circulate through the tank and back to the water pump, thus purging any air from the system. As the



3.10 Coolant reservoir MAXimum and MINimum level marks

engine cools, the coolant is automatically drawn back into the cooling system's main components, to maintain the correct level.

9 While the coolant level must be checked regularly, remember therefore that it will vary with the temperature of the engine. When the engine is cold, the coolant level should be between the "MAX" and "MIN" level lines on the tank, but once the engine has warmed up, the level may rise to above the "MAX" level line.

10 For an accurate check of the coolant level, the engine must be cold. The level must be between the "MAX" and "MIN" level lines on the tank (see **illustration**). If it is below the "MIN" level line, the coolant must be topped-up as follows.

11 First prepare a sufficient quantity of coolant mixture, using clean, soft water and antifreeze of the recommended type, in the specified mixture ratio. If you are using antifreeze to Ford's specification or equivalent (see "Antifreeze - notes on renewal" in Section 28), mix equal quantities of water and antifreeze to produce the 50/50 mixture ratio specified when topping-up; if using any other type of antifreeze, follow its manufacturer's instructions to achieve the correct ratio. If only a small amount of coolant is required to bring the system up to the proper level, plain water can be used, but repeatedly doing this will dilute the antifreeze/water solution in the system, reducing the protection it should provide against freezing and corrosion. To maintain the specified antifreeze/water ratio, it is essential to top-up the coolant level with the correct mixture, as described here. Use only ethylene/glycol type antifreeze, and do not use supplementary inhibitors or additives.



Warning: Never remove the expansion tank filler cap when the engine is running, or has just been switched off, as the cooling system will be hot, and the consequent escaping steam and scalding coolant could cause serious injury.

12 If topping-up is necessary, wait until the system has cooled completely (or at least 10 minutes after switching off the engine, if lack of time means it is absolutely necessary to top-up while the engine may still be warm). Wrap a thick cloth around the expansion tank



3.13 Topping-up the coolant level with specified antifreeze mixture

filler cap, and unscrew it one full turn. If any hissing is heard as steam escapes, wait until the hissing ceases, indicating that pressure is released, then slowly unscrew the filler cap until it can be removed. If more hissing sounds are heard, wait until they have stopped before unscrewing the filler cap completely. At all times, keep your face, hands and other exposed skin well away from the filler opening.

13 When the filler cap has been removed, add coolant to bring the level up to the "MAX" level line (see **illustration**). Refit the cap, tightening it securely.

14 With this type of cooling system, the addition of coolant should only be necessary at very infrequent intervals. If topping-up is regularly required, or if the coolant level drops within a short time after replenishment, there may be a leak in the system. Inspect the radiator, hoses, expansion tank filler cap, radiator drain plug and water pump. If no leak is evident, have the filler cap and the entire system pressure-tested by your dealer or suitably-equipped garage; this will usually show up a small leak not otherwise visible. If significant leakage is found at any time, use an antifreeze hydrometer to check the concentration of antifreeze remaining in the coolant.

15 Coolant hydrometers are available at most automotive accessory shops. If the specific gravity of a sample taken from the expansion tank (when the engine is switched off and fully cooled down) is less than that specified, the coolant mixture strength has fallen below the minimum. If this is found, either the coolant strength must be restored by adding neat antifreeze to Ford's specification (if that is what is in the system) or by draining and flushing the system, then refilling it with fresh coolant mixture of the correct ratio (if any other type of antifreeze is being used).

16 When checking the coolant level, always note its condition; it should be relatively clear. If it is brown or rust-coloured, the system should be drained, flushed and refilled. If antifreeze has been used which does not meet Ford's specification, its corrosion inhibitors will lose their effectiveness with time; such coolant must be renewed regularly,



3.17 Checking the level of fluid in the washer reservoir

even if it appears to be in good condition, usually at the intervals suggested in “Antifreeze - notes on renewal” in Section 28.

Windscreen/tailgate and headlight washer fluid

17 Fluid for the windscreen/tailgate washer system (and, where applicable, the headlight washer system) is stored in a plastic reservoir, which is located at the left-hand front corner of the engine compartment. In milder climates, plain water can be used to top-up the reservoir, but the reservoir should be kept no more than two-thirds full, to allow for expansion should the water freeze. In colder climates, the use of a specially-formulated windscreen washer fluid, available at your dealer or any car accessory shop, will help lower the freezing point of the fluid (see illustration). Do not use regular (cooling system) antifreeze - it will damage the vehicle's paintwork.

Battery electrolyte

18 On models not equipped with a sealed battery (see Section 9), check the electrolyte level of all six battery cells. The level must be approximately 10 mm above the plates; this may be shown by maximum and minimum level lines marked on the battery's casing. If the level is low, use a coin to release the filler/vent cap, and add distilled water. Install and securely retighten the cap.



Caution: Overfilling the cells may cause electrolyte to spill over during periods of heavy charging, causing corrosion or damage.

Refer also to the warning at the beginning of Section 9.

Brake fluid

19 The brake fluid reservoir is located on the top of the brake master cylinder, which is attached to the front of the vacuum servo unit. The “MAX” and “MIN” marks are indicated on the side of the translucent reservoir, and the fluid level should be maintained between these marks at all times (see illustration).

20 The brake fluid inside the reservoir is readily visible. With the vehicle on level



3.19 Brake master cylinder showing “MAX” and “MIN” marks

ground, the level should normally be on or just below the “MAX” mark.

21 Progressive wear of the brake pads and brake shoe linings causes the level of the brake fluid to gradually fall; however, when the brake pads are renewed, the original level of the fluid is restored. It is not therefore necessary to top-up the level to compensate for this minimal drop, but the level must never be allowed to fall below the minimum mark.

22 If topping-up is necessary, first wipe the area around the filler cap with a clean rag before removing the cap. When adding fluid, pour it carefully into the reservoir, to avoid spilling it on surrounding painted surfaces (see illustration). Be sure to use only the specified hydraulic fluid (see “Lubricants, fluids and capacities” at the start of this Chapter) since mixing different types of fluid can cause damage to the system.



Warning: Brake hydraulic fluid can harm your eyes and damage painted surfaces, so use extreme caution when handling and

pouring it. Wash off spills immediately with plenty of water. Do not use fluid that has been standing open for some time, as it absorbs moisture from the air. Excess moisture can cause corrosion and a dangerous loss of braking effectiveness.

23 When adding fluid, it is a good idea to inspect the reservoir for contamination. The system should be drained and refilled if deposits, dirt particles or contamination are seen in the fluid.



4.2 The TWI marks on the side of the tyre shows the position of the tread wear indicator bands



3.22 Topping-up the fluid level in the brake master cylinder reservoir

24 After filling the reservoir to the correct level, make sure that the cap is refitted securely, to avoid leaks and the entry of foreign matter.

25 If the reservoir requires repeated replenishing to maintain the correct level, this is an indication of an hydraulic leak somewhere in the system, which should be investigated immediately.

Power steering fluid

26 See Section 5 of this Chapter.

4 Tyre and tyre pressure checks



1 Periodic inspection of the tyres may spare you from the inconvenience of being stranded with a flat tyre. It can also provide you with vital information regarding possible problems in the steering and suspension systems before major damage occurs.

2 The original tyres on this vehicle are equipped with tread wear indicator (TWI) bands, which will appear when the tread depth reaches approximately 1.6 mm. Most tyres have a mark around the tyre at regular intervals to indicate the location of the tread wear indicators, the mark being TWI, an arrow, or the tyre manufacturer's symbol (see illustration).



Tread wear can be monitored with a simple inexpensive device known as a tread depth indicator gauge.



4.3 Check the tyre pressures regularly using an accurate gauge

3 Ensure that tyre pressures are checked regularly and maintained correctly (see the Specifications at the beginning of this Chapter for pressures). Checking should be carried out with the tyres cold, and *not* immediately after the vehicle has been in use. If the pressures are checked with the tyres hot, an apparently-high reading will be obtained, owing to heat expansion. *Under no circumstances* should an attempt be made to reduce the pressures to the quoted cold reading in this instance, or effective under-inflation will result. Most garage forecourts have a pressure line which combines a gauge to check and adjust the tyre pressures, but they may vary in accuracy, due to general misuse and abuse. It therefore pays to carry a good-quality tyre pressure gauge in the vehicle, to make the regular checks required and ensure pressure accuracy (see illustration).

4 Note any abnormal tread wear (see illustration). Tread pattern irregularities such

as feathering, flat spots, and more wear on one side than the other, are indications of front wheel alignment and/or balance problems. If any of these conditions are noted, they should be rectified as soon as possible.

5 Under-inflation will cause overheating of the tyre, owing to excessive flexing of the casing, and the tread will not sit correctly on the road surface. This will cause a consequent loss of adhesion and excessive wear, not to mention the danger of sudden tyre failure due to heat build-up.

6 Over-inflation will cause rapid wear of the centre part of the tyre tread, coupled with reduced adhesion, harder ride, and the danger of damage occurring in the tyre casing.

7 Regularly check the tyres for damage in the form of cuts or bulges, especially in the sidewalls. Remove any nails or stones embedded in the tread, before they penetrate the tyre to cause deflation. If removal of a nail reveals that the tyre has been punctured, refit the nail, so that its point of penetration is marked. Then immediately change the wheel, and have the tyre repaired by a tyre dealer. Do not drive on a tyre in such a condition. If in any doubt as to the possible consequences of any damage found, consult your local tyre dealer for advice.

8 General tyre wear is influenced to a large degree by driving style - harsh braking and acceleration, or fast cornering, will all produce more rapid tyre wear. Interchanging of tyres may result in more even wear; however, it is worth bearing in mind that if this is completely

effective, the likelihood is that all four tyres would need replacing at once, which may prove too expensive for many owners.

9 Front tyres may wear unevenly as a result of wheel misalignment. The front wheels should always be correctly aligned according to the settings specified by the vehicle manufacturer.

10 Don't forget to check the spare tyre for condition and pressure.

11 Legal restrictions apply to many aspects of tyre fitting and usage, and in the UK this information is contained in the Motor Vehicle Construction and Use Regulations. It is suggested that a copy of these regulations is obtained from your local police, if in doubt as to current legal requirements with regard to tyre type and condition, minimum tread depth, etc.

5 Power steering fluid level check



1 The power steering fluid reservoir is located on the right-hand side of the engine compartment, next to the cooling system expansion tank.

2 For the fluid level check, the power steering system should be at its normal operating temperature, so it is best to carry out the check after a run.

3 Park the vehicle on level ground, with the front wheels pointing straight ahead, and switch off the engine.

Tyre tread wear patterns



Shoulder Wear

Underinflation (wear on both sides)

Under-inflation will cause overheating of the tyre, because the tyre will flex too much, and the tread will not sit correctly on the road surface. This will cause a loss of grip and excessive wear, not to mention the danger of sudden tyre failure due to heat build-up.

Check and adjust pressures

Incorrect wheel camber (wear on one side)

Repair or renew suspension parts

Hard cornering

Reduce speed!



Centre Wear

Overinflation

Over-inflation will cause rapid wear of the centre part of the tyre tread, coupled with reduced grip, harsher ride, and the danger of shock damage occurring in the tyre casing.

Check and adjust pressures

If you sometimes have to inflate your car's tyres to the higher pressures specified for maximum load or sustained high speed, don't forget to reduce the pressures to normal afterwards.



Uneven Wear

Front tyres may wear unevenly as a result of wheel misalignment. Most tyre dealers and garages can check and adjust the wheel alignment (or "tracking") for a modest charge.

Incorrect camber or castor

Repair or renew suspension parts

Malfunctioning suspension

Repair or renew suspension parts

Unbalanced wheel

Balance tyres

Incorrect toe setting

Adjust front wheel alignment

Note: The feathered edge of the tread which typifies toe wear is best checked by feel.

1•14 Weekly Checks



5.6 Topping-up the power steering fluid reservoir

4 Check that the fluid level is up to the "MAX" mark on the reservoir.

5 If topping-up is required, first use a clean rag to wipe the filler cap and the surrounding area, to prevent foreign matter from entering the system. Unscrew and remove the filler cap.

6 Top-up the level to the "MAX" mark, using the grade of fluid specified at the beginning of this Chapter (see illustration). Be careful not to introduce dirt into the system, and do not overfill. The need for frequent topping-up indicates a leak, which should be investigated.

7 Refit the filler cap.

6 Windscreen/tailgate washer system and wiper blade check

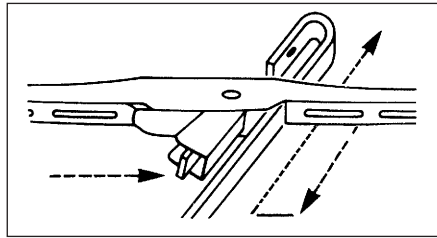


1 The windscreen wiper and blade assemblies should be inspected at the specified intervals for damage, loose components, and cracked or worn blade elements.

2 Road film can build up on the wiper blades and affect their efficiency, so they should be washed regularly with a mild detergent solution.

3 The action of the wiping mechanism can loosen bolts, nuts and fasteners, so they should be checked and tightened, as necessary, at the same time as the wiper blades are checked.

4 If the wiper blade elements are cracked, worn or warped, or no longer clean adequately, they should be replaced with new ones.



6.6 Windscreen wiper blade removal from the arm

5 Lift the wiper arm and blade away from the glass.

6 To remove the windscreen wiper blade, release the catch on the arm, then turn the blade through 90° and withdraw the blade from the end of the arm (see illustration).

7 To remove the tailgate wiper blade, push the wiper blade forward, and at the same time depress it against the spring pressure, then withdraw it from the end of the arm.

8 If the metal part of the wiper blade is in good condition, it may be possible to renew the rubber insert separately. Inserts can sometimes be obtained from car accessory shops and, according to type, may need to be cut to the correct length before sliding into the clips.

9 Refit the wiper blade assembly using a reversal of the removal procedure, making sure that it fully engages with the spring clip.

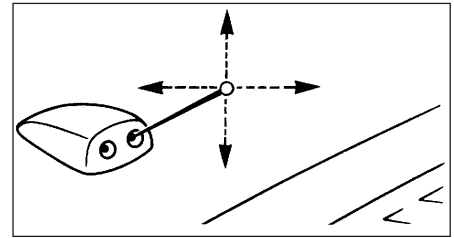
10 Check that the washer jets direct the fluid onto the upper part of the windscreen/tailgate/rear window/headlight, and if necessary adjust the small sphere on the jet with a pin (see illustration).

7 Automatic transmission fluid level check



1 The level of the automatic transmission fluid should be carefully maintained. Low fluid level can lead to slipping or loss of drive, while overfilling can cause foaming, loss of fluid and transmission damage.

2 The transmission fluid level should only be checked when the transmission is hot (at its normal operating temperature). If the vehicle has just been driven over 10 miles (15 miles in a cold climate), and the fluid temperature is 160 to 175°F, the transmission is hot.



6.10 Adjust the washer jets with a pin in the direction required



Caution: If the vehicle has just been driven for a long time at high speed or in city traffic in hot weather, or if it has been pulling a trailer, an accurate fluid level reading cannot be obtained. In these circumstances, allow the fluid to cool down for about 30 minutes.

3 Park the vehicle on level ground, apply the handbrake, and start the engine. While the engine is idling, depress the brake pedal and move the selector lever through all the gear positions three times, beginning and ending in "P".

4 Allow the engine to idle for one minute, then (with the engine still idling) remove the dipstick from its tube. Note the condition and colour of the fluid on the dipstick.

5 Wipe the fluid from the dipstick with a clean rag, and re-insert it into the filler tube until the cap seats.

6 Pull the dipstick out again, and note the fluid level. The level should be between the "MIN" and "MAX" marks. If the level is on the "MIN" mark, stop the engine, and add the specified automatic transmission fluid through the dipstick tube, using a clean funnel if necessary. It is important not to introduce dirt into the transmission when topping-up.

7 Add the fluid a little at a time, and keep checking the level as previously described until it is correct.

8 The need for regular topping-up of the transmission fluid indicates a leak, which should be found and rectified without delay.

9 The condition of the fluid should also be checked along with the level. If the fluid on the dipstick is black or a dark reddish-brown colour, or if it has a burned smell, the fluid should be changed. If you are in doubt about the condition of the fluid, purchase some new fluid, and compare the two for colour and smell.

Every 10 000 miles or 12 months

8 Electrical system check



1 Check the operation of all external lights and indicators (front and rear).

2 Check for satisfactory operation of the

instrument panel, its illumination and warning lights, the switches and their function lights.

3 Check the horn(s) for satisfactory operation.

4 Check all other electrical equipment for satisfactory operation.

5 Check all electrical wiring in the engine compartment for correct routing, and for any signs of physical or heat-damage or chafing.

9 Battery check, maintenance and charging



Warning: Certain precautions must be followed when checking and servicing the battery.

Hydrogen gas, which is highly flammable, is always present in the battery cells, so keep lighted tobacco and all other open flames and sparks away from the battery. The electrolyte inside the battery is actually dilute sulphuric acid, which will cause injury if splashed on your skin or in your eyes. It will also ruin clothes and painted surfaces. When disconnecting the battery, always detach the negative (earth) lead first and connect it last!

Note: Before disconnecting the battery, refer to Section 1 of Chapter 5.

General

1 A routine preventive maintenance programme for the battery in your vehicle is the only way to ensure quick and reliable starts. Before performing any battery maintenance, make sure that you have the proper equipment necessary to work safely around the battery. This includes safety goggles and rubber gloves to protect your eyes and hands from the caustic battery deposits, a solution of baking soda to dissolve these deposits, and petroleum jelly, which, applied to the cleaned battery terminals, will help prevent further corrosion occurring.

2 There are also several precautions that should be taken whenever battery maintenance is performed. Before servicing the battery, always turn the engine and all accessories off, and disconnect the lead from the negative terminal of the battery - see Chapter 5, Section 1.

3 The battery produces hydrogen gas, which is both flammable and explosive. Never create a spark, smoke, or light a match around the battery. Always charge the battery in a well-ventilated area.

4 The battery electrolyte fluid contains sulphuric acid, which is poisonous and corrosive. Do not allow it to get in your eyes, on your skin, or on your clothes. Never ingest it. Wear protective safety goggles when working near the battery. Keep children away from the battery.

5 Note the external condition of the battery. If the positive terminal and lead clamp on your vehicle's battery is equipped with a plastic cover or rubber protector, make sure that it's not torn or damaged. It should completely cover the terminal. Look for any corroded or loose connections, cracks in the case or cover, or loose hold-down clamps. Also check the entire length of each lead for cracks and frayed conductors.

6 If corrosion, which looks like white, fluffy deposits is evident, particularly around the terminals, the battery should be removed for cleaning. Slacken the lead clamp nuts with a spanner, being careful to remove the negative (earth) lead first, and slide them off the terminals. Then unscrew the hold-down clamp nuts, remove the clamp, and lift the battery from the engine compartment.

7 Clean the lead clamps thoroughly, using a soft wire brush or a terminal cleaner, with a

solution of warm water and baking soda. Wash the terminals and the top of the battery case with the same solution, but make sure that the solution doesn't get into the battery. When cleaning the leads, terminals and battery top, wear safety goggles and rubber gloves, to prevent any solution from coming in contact with your eyes or hands. Wear old clothes too - even when diluted, sulphuric acid splashed onto clothes will burn holes in them. If the terminals have been extensively corroded, clean them up with a suitable tool. Thoroughly wash all cleaned areas with plain water.

8 Make sure that the battery tray is in good condition, and that the hold-down clamp nuts are tight. If the battery is removed from the tray, make sure that no parts remain in the bottom of the tray when the battery is refitted. When refitting the hold-down clamp nuts, do not overtighten them.

9 Information on removing and installing the battery can be found in Chapter 5. Information on jump starting can be found at the front of this manual. For more detailed battery checking procedures, refer to the Haynes "Automobile Electrical and Electronic Systems Manual".

Cleaning

10 Corrosion on the hold-down components, battery case and surrounding areas can be removed with a solution of water and baking soda. Thoroughly rinse all cleaned areas with plain water.

11 Any metal parts of the vehicle damaged by corrosion should be covered with a zinc-based primer, then painted.

Charging

Warning: When batteries are being charged, hydrogen gas, which is very explosive and flammable, is produced. Do not smoke, or allow open flames, near a charging or a recently-charged battery. Wear eye protection when near the battery during charging. Also, make sure that the charger is unplugged before connecting or disconnecting the battery from the charger.

12 Slow-rate charging is the best way to restore a battery that's discharged to the point where it will not start the engine. It's also a good way to maintain the battery charge in a vehicle that's only driven a few miles between starts. Maintaining the battery charge is particularly important in Winter, when the battery must work harder to start the engine, and electrical accessories that drain the battery are in greater use.

13 It's best to use a one- or two-amp battery charger (sometimes called a "trickle" charger). They are the safest, and put the least strain on the battery. They are also the least expensive. For a faster charge, you can use a higher-ampere charger, but don't use one rated more than 1/10th the amp/hour rating of the battery (ie no more than 5 amps, typically). Rapid boost charges that claim to restore the power of the battery in one to two hours are hardest on the battery, and can damage batteries not in good

condition. This type of charging should only be used in emergency situations.

14 The average time necessary to charge a battery should be listed in the instructions that come with the charger. As a general rule, a trickle charger will charge a battery in 12 to 16 hours.

10 Seat belt check



1 Check the seat belts for satisfactory operation and condition. Inspect the webbing for fraying and cuts. Check that they retract smoothly and without binding into their reels.

2 Check that the seat belt mounting bolts are tight, and if necessary tighten them to the specified torque wrench setting.

11 Auxiliary drivebelt check and renewal



General

1 The auxiliary drivebelt type depends on the engine fitted, and on whether the vehicle is equipped with power-assisted steering or air conditioning. The belt will be either a V-belt or a flat, multi-ribbed (or "polyvee") type. The drivebelt is located on the right-hand end of the engine, and drives the alternator, water pump (and, when fitted, the power steering pump and the air conditioning compressor) from the engine's crankshaft pulley.

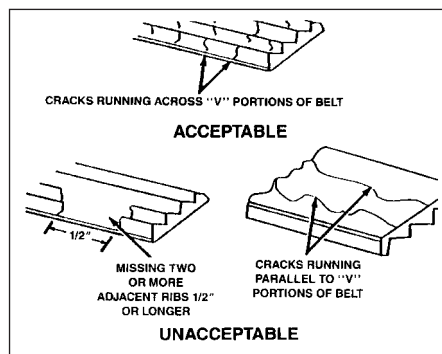
2 The good condition and proper tension of the auxiliary drivebelt is critical to the operation of the engine. Because of their composition and the high stresses to which they are subjected, drivebelts stretch and deteriorate as they get older. They must, therefore, be regularly inspected.

Check

3 With the engine switched off, open and support the bonnet, then locate the auxiliary drivebelt on the right-hand end of the engine (Be very careful, and wear protective gloves to minimise the risk of burning your hands on hot components, if the engine has recently been running). For improved access, jack up the



11.3 Removing the auxiliary drivebelt lower cover (arrowed) from inside the wheel arch



11.4 Check the auxiliary drivebelt for signs of wear like these. Very small cracks across the drivebelt ribs are acceptable. If the cracks are deep, or if the drivebelt looks worn or damaged in any other way, renew it. This is the "polyvee" type belt, but the checks on the V-belt type are the same

front right-hand side of the vehicle, support it securely on an axle stand, remove the roadwheel, then remove the auxiliary drivebelt lower cover from inside the wheel arch (see illustration).

4 Using an inspection light or a small electric torch, and rotating the engine when necessary with a spanner applied to the crankshaft pulley bolt, check the whole length of the drivebelt for cracks, separation of the rubber, and torn or worn ribs (see illustration). Also check for fraying and glazing, which gives the drivebelt a shiny appearance. Both sides of the drivebelt should be inspected, which means you will have to twist the drivebelt to check the underside. Use your fingers to feel the drivebelt where you can't see it. If you are in any doubt as to the condition of the drivebelt, renew it (go to paragraph 19). Turning the engine will be much easier if the spark plugs are removed first (Section 27).

Drivebelt tension

5 It's only necessary to adjust the tension if the drivebelt is of the V-belt type. The flat, "polyvee" type drivebelts are fitted with an automatic tensioner to maintain the correct belt adjustment.

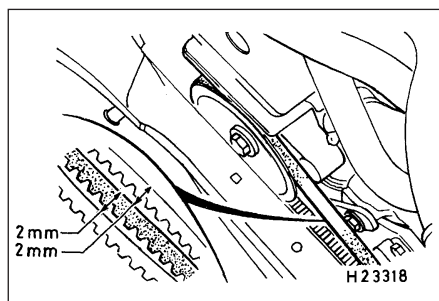
6 On the V-belt type, Ford technicians use a special tension gauge for checking drivebelt adjustment, but for DIY purposes, checking the belt tension using firm finger pressure gives a good indication of correct adjustment. This is done midway between the pulleys, on the longest run of the belt.

7 If adjustment is necessary, proceed as follows according to belt type.

V-belt with sliding arm type adjuster

8 Open the bonnet. Jack up the front right-hand side of the vehicle, and support it securely on an axle stand. Remove the roadwheel, then remove the auxiliary drivebelt lower cover from inside the wheel arch.

9 Apply firm finger pressure midway between



11.9A Checking drivebelt adjustment - V-belt types

Note that the 4 mm dimension is the total belt swing and is equal to 2 mm of deflection

the pulleys on the longest run of the belt, and look for a deflection of 2.0 mm (i.e. a total drivebelt "swing" of 4.0 mm). If adjustment is required, loosen off the alternator mounting and drivebelt adjustment bolts, pivot the alternator as required to provide the correct drivebelt tension, then retighten the bolts to secure (see illustrations).

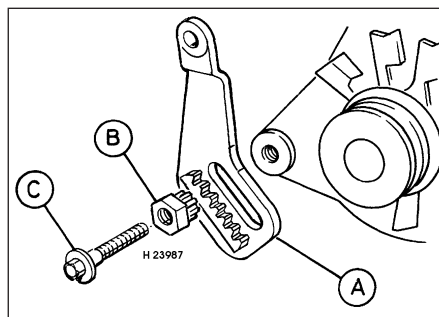
10 Refit the auxiliary drivebelt cover and roadwheel, then lower the vehicle to the ground.

11 Run the engine for about five minutes, then recheck the tension.

V-belt with rack-and-pinion type adjuster

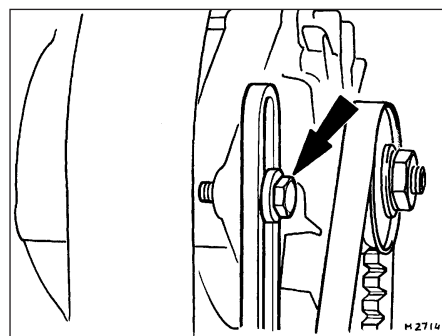
12 Open the bonnet. Jack up the front right-hand side of the vehicle, and support it securely on an axle stand. Remove the roadwheel, then remove the auxiliary drivebelt lower cover from inside the wheel arch.

13 Check the adjustment as described in paragraph 9. If adjustment is required, loosen off the alternator mounting bolts and the adjusting arm mounting bolt. Slacken the pinion central locking bolt, and turn the pinion nut as required to take up the tension of the drivebelt (see illustration). Hold it at the required setting, and tighten the central bolt securely to lock the adjuster arm and set the tension.



11.13 Rack-and-pinion type auxiliary drivebelt adjuster

- A Adjuster arm
- B Pinion (adjuster) nut
- C Central (locking) bolt



11.9B Alternator upper mounting/sliding arm adjuster bolt (arrowed) - V-belt with sliding arm type adjuster

14 Tighten the alternator mounting and adjusting arm bolts securely.

15 Refit the auxiliary drivebelt cover and roadwheel, then lower the vehicle to the ground.

16 Run the engine for about five minutes, then recheck the tension.

Flat "polyvee" type drivebelt

17 As mentioned above, this type of drivebelt is tensioned by an automatic tensioner; regular checks are not required, and manual "adjustment" is not possible.

18 If you suspect that the drivebelt is slipping and/or running slack, or that the tensioner is otherwise faulty, it must be renewed. To do this, remove the drivebelt as described below, then unbolt and remove the tensioner. On fitting the new tensioner, ensure that it is aligned correctly on its mountings, and tightened to the specified torque wrench setting.

Renewal

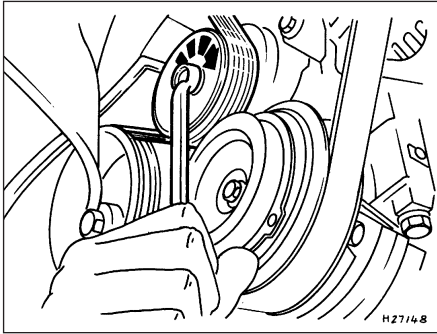
19 Open the bonnet. Jack up the front right-hand side of the vehicle, and support it securely on an axle stand. Remove the roadwheel, then remove the auxiliary drivebelt lower cover from inside the wheel arch.

20 The routing of the drivebelt around the pulleys is dependent on the drivebelt type, and on whether power steering and/or air conditioning is fitted. Before removing the drivebelt, it's a good idea to sketch the belt run around the pulleys; this will save a lot of frustration when it comes to refitting.

21 If the existing drivebelt is to be refitted, mark it, or note the maker's markings on its flat surface, so that it can be installed the same way round.

22 To renew the V-belt type of drivebelt, slacken the belt tension fully as described above, according to type. Slip the belt off the pulleys, then fit the new belt, ensuring that it is routed correctly. With the belt in position, adjust the tension as previously described.

23 To renew the flat, "polyvee" type



11.23 Automatic drivebelt tensioner - "polyvee" type drivebelt

Turn tensioner clockwise to release tension

drivebelt, reach up between the body and the engine (above the crankshaft pulley), and apply a spanner to the hexagon in the centre of the automatic tensioner's pulley. Rotate the tensioner pulley clockwise to release its pressure on the drivebelt, then slip the drivebelt off the crankshaft pulley, and release the tensioner again (see illustration). Note that on certain models, a self-cocking tensioner is fitted, and that this will remain in the released position. Working from the wheel arch or engine compartment as necessary, and noting its routing, slip the

drivebelt off the remaining pulleys and withdraw it.

24 Check all the pulleys, ensuring that their grooves are clean, and removing all traces of oil and grease. Check that the tensioner works properly, with strong spring pressure being felt when its pulley is rotated clockwise, and a smooth return to the limit of its travel when released.

25 If the original drivebelt is being refitted, use the marks or notes made on removal, to ensure that it is installed to run in the same direction as it was previously. To fit the drivebelt, arrange it on the grooved pulleys so that it is centred in their grooves, and not overlapping their raised sides, and is routed correctly (see illustrations). Start at the top, and work down to finish at the crankshaft pulley; rotate the tensioner pulley clockwise, slip the drivebelt onto the crankshaft pulley, then release the tensioner again.

26 Using a spanner applied to the crankshaft pulley bolt, rotate the crankshaft through at least two full turns clockwise to settle the drivebelt on the pulleys, then check that the drivebelt is properly installed.

27 Refit the auxiliary drivebelt cover and roadwheel, then lower the vehicle to the ground.

12 Underbonnet check for fluid leaks and hose condition

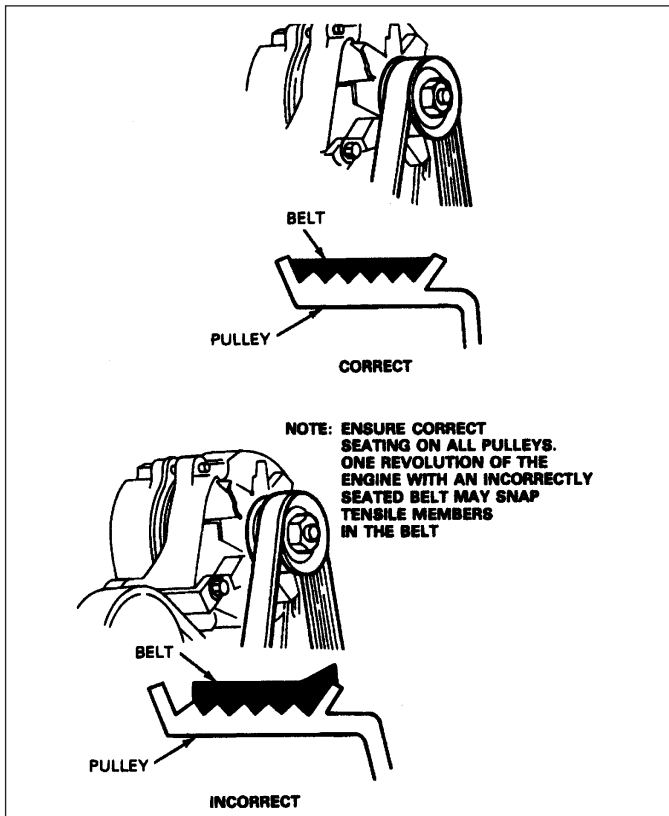


Caution: Renewal of air conditioning hoses must be left to a dealer service department or air conditioning specialist who has the equipment to depressurise the system safely. Never remove air conditioning components or hoses until the system has been depressurised.

General

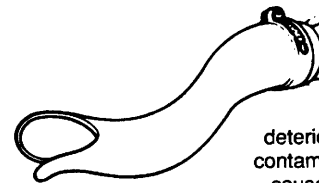
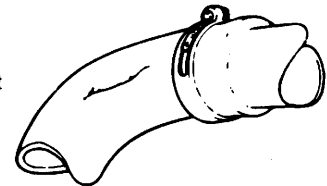
1 High temperatures in the engine compartment can cause the deterioration of the rubber and plastic hoses used for engine, accessory and emissions systems operation. Periodic inspection should be made for cracks, loose clamps, material hardening and leaks.

2 Carefully check the large top and bottom radiator hoses, along with the other smaller-diameter cooling system hoses and metal pipes; do not forget the heater hoses/pipes which run from the engine to the bulkhead. Inspect each hose along its entire length, replacing any that is cracked, swollen or shows signs of deterioration. Cracks may become more apparent if the hose is squeezed (see illustration). If you are using



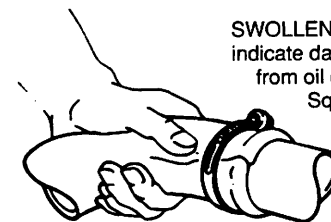
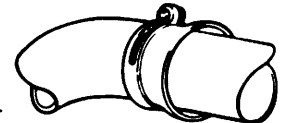
11.25 When installing the auxiliary drivebelt, make sure that it is centred - it must not overlap either edge of the grooved pulleys

ALWAYS CHECK hose for chafed or burned areas that may cause an untimely and costly failure.



SOFT hose indicates inside deterioration. This deterioration can contaminate the cooling system and cause particles to clog the radiator.

HARDENED hose can fail at any time. Tightening hose clamps will not seal the connection or stop leaks.



SWOLLEN hose or oil soaked ends indicate danger and possible failure from oil or grease contamination. Squeeze the hose to locate cracks and breaks that cause leaks.

12.2 Hoses, like drivebelts, have a habit of failing at the worst possible time - to prevent the inconvenience of a blown radiator or heater hose, inspect them carefully as shown here

non-Ford specification antifreeze, and so have to renew the coolant every two years or so, it's a good idea to renew the hoses at that time, regardless of their apparent condition.

3 Make sure that all hose connections are tight. A leak in the cooling system will usually show up as white- or rust-coloured deposits on the areas adjoining the leak; if the spring clamps that are used to secure the hoses in this system appear to be slackening, they should be renewed to prevent the possibility of leaks.

4 Some other hoses are secured to their fittings with clamps. Where clamps are used, check to be sure they haven't lost their tension, allowing the hose to leak. If clamps aren't used, make sure the hose has not expanded and/or hardened where it slips over the fitting, allowing it to leak.

5 Check all fluid reservoirs, filler caps, drain plugs and fittings etc, looking for any signs of leakage of oil, transmission and/or brake hydraulic fluid, coolant and power steering fluid. If the vehicle is regularly parked in the same place, close inspection of the ground underneath it will soon show any leaks; ignore the puddle of water which will be left if the air conditioning system is in use. As soon as a leak is detected, its source must be traced and rectified. Where oil has been leaking for some time, it is usually necessary to use a steam cleaner, pressure washer or similar, to clean away the accumulated dirt, so that (when the engine is run again) the exact source of the leak can be identified.

Vacuum hoses

6 It's quite common for vacuum hoses, especially those in the emissions system, to be colour-coded, or to be identified by coloured stripes moulded into them. Various systems require hoses with different wall thicknesses, collapse resistance and temperature resistance. When renewing hoses, be sure the new ones are made of the same material.

7 Often the only effective way to check a hose is to remove it completely from the vehicle. If more than one hose is removed, be sure to label the hoses and fittings to ensure correct installation.

8 When checking vacuum hoses, be sure to include any plastic T-fittings in the check. Inspect the fittings for cracks, and check the hose where it fits over the fitting for distortion, which could cause leakage.

9 A small piece of vacuum hose (quarter-inch inside diameter) can be used as a stethoscope to detect vacuum leaks. Hold one end of the hose to your ear, and probe around vacuum hoses and fittings, listening for the "hissing" sound characteristic of a vacuum leak.



Warning: When probing with the vacuum-hose stethoscope, be very careful not to come into contact with moving engine

components such as the auxiliary drivebelt, radiator electric cooling fan, etc.

Fuel hoses



Warning: There are certain precautions which must be taken when inspecting or servicing fuel system components. Work in a well-ventilated area, and do not allow open flames (cigarettes, appliance pilot lights, etc.) or bare light bulbs near the work area. Mop up any spills immediately, and do not store fuel-soaked rags where they could ignite.

10 Check all fuel hoses for deterioration and chafing. Check especially for cracks in areas where the hose bends, and also just before fittings, such as where a hose attaches to the fuel filter.

11 High-quality fuel line, usually identified by the word "Fluoroelastomer" printed on the hose, should be used for fuel line renewal. Never, under any circumstances, use unreinforced vacuum line, clear plastic tubing or water hose for fuel lines.

12 Spring-type clamps are commonly used on fuel lines. These clamps often lose their tension over a period of time, and can be "sprung" during removal. Replace all spring-type clamps with screw clamps whenever a hose is replaced.

Metal lines

13 Sections of metal piping are often used for fuel line between the fuel filter and the engine. Check carefully to be sure the piping has not been bent or crimped, and that cracks have not started in the line.

14 If a section of metal fuel line must be renewed, only seamless steel piping should be used, since copper and aluminium piping don't have the strength necessary to withstand normal engine vibration.

15 Check the metal brake lines where they enter the master cylinder and ABS hydraulic unit (if used) for cracks in the lines or loose fittings. Any sign of brake fluid leakage calls for an immediate and thorough inspection of the brake system.

13 Engine compartment wiring check



1 With the vehicle parked on level ground, apply the handbrake firmly and open the bonnet. Using an inspection light or a small electric torch, check all visible wiring within and beneath the engine compartment.

2 What you are looking for is wiring that is obviously damaged by chafing against sharp edges, or against moving suspension/transmission components and/or the auxiliary drivebelt, by being trapped or crushed between carelessly-refitted components, or melted by being forced into contact with the hot engine castings, coolant pipes, etc. In almost all cases, damage of this sort is caused in the first instance by incorrect routing on reassembly, after previous work has been carried out.

3 Depending on the extent of the problem, damaged wiring may be repaired by rejoining the break or splicing-in a new length of wire, using solder to ensure a good connection, and remaking the insulation with adhesive insulating tape or heat-shrink tubing, as appropriate. If the damage is extensive, given the implications for the vehicle's future reliability, the best long-term answer may well be to renew that entire section of the loom, however expensive this may appear.

4 When the actual damage has been repaired, ensure that the wiring loom is re-routed correctly, so that it is clear of other components, and not stretched or kinked, and is secured out of harm's way using the plastic clips, guides and ties provided.

5 Check all electrical connectors, ensuring that they are clean, securely fastened, and that each is locked by its plastic tabs or wire clip, as appropriate. If any connector shows external signs of corrosion (accumulations of white or green deposits, or streaks of "rust"), or if any is thought to be dirty, it must be unplugged and cleaned using electrical contact cleaner. If the connector pins are severely corroded, the connector must be renewed; note that this may mean the renewal of that entire section of the loom - see your local Ford dealer for details.

6 If the cleaner completely removes the corrosion to leave the connector in a satisfactory condition, it would be wise to pack the connector with a suitable material which will exclude dirt and moisture, preventing the corrosion from occurring again; a Ford dealer may be able to recommend a suitable product.

7 Check the condition of the battery connections - remake the connections or renew the leads if a fault is found (see Chapter 5). Use the same techniques to ensure that all earth points in the engine compartment provide good electrical contact through clean, metal-to-metal joints, and that all are securely fastened. (In addition to the earth connection at the engine lifting eye, and that from the transmission to the body/battery, there are others in various places, so check carefully).

8 Refer to Section 27 for details of spark plug (HT) lead checks.

14 Air conditioning system check



Warning: The air conditioning system is under high pressure. Do not loosen any fittings or remove any components until

after the system has been discharged. Air conditioning refrigerant must be properly discharged into an approved type of container, at a dealer service department or an automotive air conditioning repair facility capable of handling the refrigerant safely. Always wear eye protection when disconnecting air conditioning system fittings.

1 The following maintenance checks should be performed on a regular basis, to ensure that the air conditioner continues to operate at peak efficiency:

- a) Check the auxiliary drivebelt. If it's worn or deteriorated, renew it (see Section 11).
- b) Check the system hoses. Look for cracks, bubbles, hard spots and deterioration. Inspect the hoses and all fittings for oil bubbles and seepage. If there's any evidence of wear, damage or leaks, renew the hose(s).
- c) Inspect the condenser fins for leaves, insects and other debris. Use a "fin comb" or compressed air to clean the condenser.
- d) Check that the drain tube from the front of the evaporator is clear - note that it is normal to have clear fluid (water) dripping from this while the system is in operation, to the extent that quite a large puddle can be left under the vehicle when it is parked.



Warning: Wear eye protection when using compressed air!

2 It's a good idea to operate the system for about 30 minutes at least once a month, particularly during the Winter. Long term non-use can cause hardening, and subsequent failure, of the seals.

3 Because of the complexity of the air conditioning system and the special equipment necessary to service it, in-depth fault diagnosis and repairs are not included in this manual. For more complete information on the air conditioning system, refer to the Haynes "Automotive Heating and Air Conditioning Manual".

4 The most common cause of poor cooling is simply a low system refrigerant charge. If a noticeable drop in cool-air output occurs, the following quick check will help you determine if the refrigerant level is low.

5 Warm the engine up to normal operating temperature.

6 Place the air conditioning temperature selector at the coldest setting, and put the blower at the highest setting. Open the doors - to make sure the air conditioning system doesn't cycle off as soon as it cools the passenger compartment.

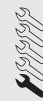
7 With the compressor engaged - the clutch will make an audible click, and the centre of the clutch will rotate - feel the inlet and outlet pipes at the compressor. One side should be cold, and one hot. If there's no perceptible difference between the two pipes, there's something wrong with the compressor or the system. It might be a low charge - it might be something else. Take the vehicle to a dealer service department or an automotive air conditioning specialist.

15 Valve clearance adjustment



Refer to Chapter 2, Part A.

16 Engine oil and filter change



1 Frequent oil changes are the best preventive maintenance the home mechanic can give the engine, because ageing oil becomes diluted and contaminated, which leads to premature engine wear.

2 Make sure that you have all the necessary tools before you begin this procedure (see illustration). You should also have plenty of rags or newspapers handy, for mopping up any spills. To avoid any possibility of scalding, and to protect yourself from possible skin irritants and other harmful contaminants in used engine oils, it is advisable to wear gloves when carrying out this work.

3 Access to the underside of the vehicle is greatly improved if the vehicle can be lifted on a hoist, driven onto ramps, or supported by axle stands.



Warning: Do not work under a vehicle which is supported only by an hydraulic or scissors-type jack, or by bricks, blocks of wood, etc.

4 If this is your first oil change, get under the vehicle and familiarise yourself with the position of the engine oil drain plug location in the sump. The engine and exhaust components will be warm during the actual work, so try to anticipate any potential

problems while the engine and accessories are cool.

5 The oil should preferably be changed when the engine is still fully warmed-up to normal operating temperature, just after a run (the needle on the temperature gauge should be in the "Normal" sector of the gauge); warm oil and sludge will flow out more easily. Park the vehicle on firm, level ground, apply the handbrake firmly, then select 1st or reverse gear (manual transmission) or the "P" position (automatic transmission). Open the bonnet and remove the engine oil filler cap from the cylinder head cover, then remove the oil level dipstick from its tube (see Section 3).

6 Raise the front of the vehicle, and support it securely on axle stands. Remove the front right-hand roadwheel to provide access to the oil filter; if the additional working clearance is required, remove also the auxiliary drivebelt cover.



Warning: To avoid personal injury, never get beneath the vehicle when it is supported by only by a jack. The jack provided with your vehicle is designed solely for raising the vehicle to remove and refit the roadwheels. Always use axle stands to support the vehicle when it becomes necessary to place your body underneath the vehicle.

7 Being careful not to touch the hot exhaust components, place the drain pan under the drain plug, and unscrew the plug (see illustrations). If possible, try to keep the plug pressed into the sump while unscrewing it by hand the last couple of turns. As the plug releases from the threads, move it away sharply, so the stream of oil issuing from the sump runs into the pan, not up your sleeve! Allow the oil to drain into the drain pan, and check the condition of the plug's sealing washer; renew it if worn or damaged.

8 Allow some time for the old oil to drain, noting that it may be necessary to reposition the pan as the oil flow slows to a trickle; when the oil has completely drained, wipe clean the drain plug and its threads in the sump and refit the plug, tightening it to the specified torque wrench setting.

9 Reposition the drain pan under the oil filter



16.2 These tools are required when changing the engine oil and filter



16.7A Engine oil drain plug location in the sump on HCS and CVH engines



16.7B Removing the engine oil drain plug on the Zetec engine



16.9 Removing the oil filter on the CVH engine using a strap wrench



16.10A Lubricate the filter's sealing ring with clean engine oil before installing the filter on the engine



16.10B Engine oil filter (HCS engine)

then, using a suitable filter removal tool, unscrew the oil filter from the cylinder block; be prepared for some oil spillage (see illustration). Check the old filter to make sure that the rubber sealing ring hasn't stuck to the engine; if it has, carefully remove it. Withdraw the filter through the wheel arch, taking care to spill as little oil as possible.

10 Using a clean, lint-free rag, wipe clean the cylinder block around the filter mounting. If there are no specific instructions supplied with it, fit a new oil filter as follows. Apply a light coating of clean engine oil to the filter's sealing ring. Screw the filter into position on the engine until it seats, then tighten it through a further half- to three-quarters of a turn *only* (see illustrations). Tighten the filter by hand only - do not use any tools.

11 Remove the old oil and all tools from under the vehicle, refit the roadwheel, and lower the vehicle to the ground.

12 Refill the engine with oil, using the correct grade and type of oil, as given in "Lubricants, fluids and capacities". Pour in half the specified quantity of oil first, then wait a few minutes for the oil to fall to the sump. Continue adding oil a small quantity at a time, until the level is up to the lower notch on the dipstick. Adding approximately 0.5 to 1.0 litre will raise the level to the dipstick's upper notch.

13 Start the engine. The oil pressure warning light will take a few seconds to go out while the new filter fills with oil; do not race the

engine while the light is on. Run the engine for a few minutes, while checking for leaks around the oil filter seal and the drain plug.

14 Switch off the engine, and wait a few minutes for the oil to settle in the sump once more. With the new oil circulated and the filter now completely full, recheck the level on the dipstick, and add more oil as necessary.

15 Dispose of the used engine oil safely, with reference to "General repair procedures" in the Reference Sections of this manual.

17 Idle speed and mixture check and adjustment



General

1 Many of the engines fitted to Escort and Orion models are equipped with fuel injection systems of one sort or another which are entirely controlled by the engine management system. On most of these vehicles, it isn't possible to make any adjustments to the idle speed or the mixture settings without specialist test equipment of a type usually only found at a Ford dealer or fuel injection specialist. However, the very nature of these highly-sophisticated systems means they don't go out of tune very often (if ever), so that it's one less maintenance operation to worry about.

2 On carburettor and 1.6 litre EFI fuel-injected engines, certain checks and adjustments are

necessary as part of the service requirements, and these are described below.

Idle speed and mixture check and adjustment - carburettor engines

3 Before carrying out the following checks and adjustments, ensure that the spark plugs are in good condition and correctly gapped (Section 27). To carry out the checks/adjustments, an accurate tachometer and an exhaust gas analyser (CO meter) will be required.

4 Make sure that all electrical components are switched off during the following procedures.

5 Connect a tachometer to the engine in accordance with its manufacturer's instructions, and insert the probe of an exhaust gas analyser (CO meter) into the exhaust tailpipe. As previously mentioned, these items are essential in obtaining an accurate setting. If they are not available, an approximate check/adjustment can be made as a temporary measure, providing they are further checked out as soon as is possible using a tachometer and a CO meter (or by a Ford dealer).

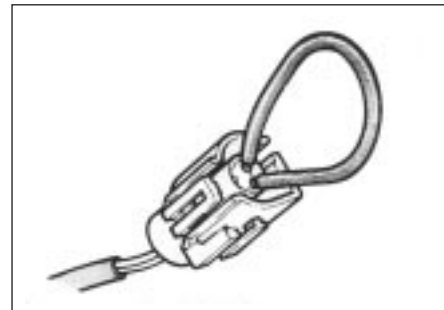
6 Run the engine at a fast idle speed until it reaches its normal operating temperature and the radiator cooling fan cuts in. Turn the engine off, then disconnect the radiator cooling fan lead at the thermostatic switch connector. Now connect a temporary wire to the fan switch multi-plug, as shown (see illustration) to enable the fan to operate



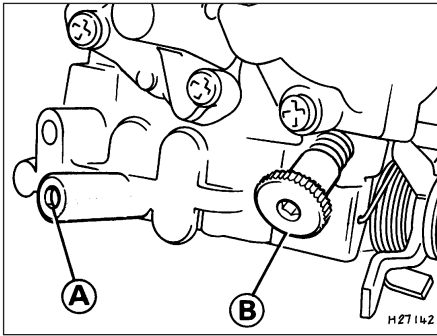
16.10C Engine oil filter (CVH engine)



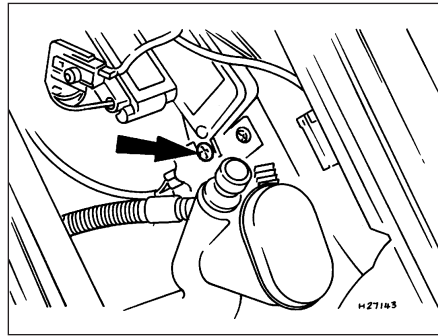
16.10D Engine oil filter (Zetec engine)



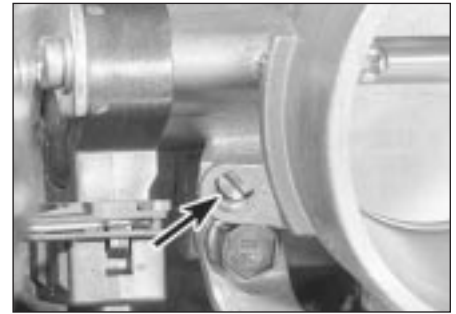
17.6 Cooling fan thermostatic switch multi-plug with temporary bridging wire connected



17.11 Carburettor idle mixture adjustment screw (A) and idle speed screw (B)



17.16 Mixture CO adjusting screw (arrowed) on the 1.6 litre EFI engine



17.18 Base idle speed adjusting screw (arrowed) in the throttle housing on the 1.6 litre EFI engine

continuously during the following checks and adjustments (if this is specified). Take care to keep clear of the fan during the following operations when working in the engine compartment.

7 Where fitted, disconnect the throttle kicker vacuum pipe, and plug the end. To identify the throttle kicker unit, refer to Chapter 4.

8 Check that the vehicle lighting and other electrical loadings (apart from the radiator cooling fan) are switched off, then restart the engine. Increase the engine speed to 3000 rpm for 30 seconds, and repeat this at three-minute intervals during the check/adjustment procedures. This will ensure that any excess fuel is cleared from the inlet manifold.

9 Ensure that the throttle is fully released, allow the meters to stabilise for a period of 3 to 5 seconds, then check the idle speed against that specified. If adjustment is necessary, turn the idle speed screw until the engine is idling at the specified speed. Any checks and adjustments must be completed within 30 seconds of the meters stabilising.

10 If adjustment to the mixture is required, the tamperproof cap will need to be removed from the carburettor to gain access to the mixture screw. To do this, first unclip the fuel trap from the side of the air cleaner unit, then remove the air cleaner unit, ensuring that the crankcase ventilation trap remains connected. Prise free the tamperproof cap (with the aid of a thin-bladed screwdriver), then with the vacuum and emissions control pipes connected to it, relocate the air cleaner unit temporarily into position.

11 Turn the mixture adjustment screw clockwise to weaken the mixture, or anti-clockwise to richen it, until the CO reading is as given in the Specifications (see illustration). If a CO meter is not being used, weaken the mixture as described, then enrich the mixture until the maximum engine speed is obtained, consistent with even running.

12 If necessary, re-adjust the idle speed then check the CO reading again. Repeat as necessary until both the idle speed and CO reading are correct.

13 Where required by law (as in some European countries), fit a new tamperproof cap to the mixture adjustment screw.

14 Disconnect the tachometer and the CO meter, refit the air cleaner unit, and reconnect the fan switch lead to complete.

Base idle speed and mixture check and adjustment - 1.6 litre EFI engines

15 Proceed as described above in paragraphs 4 to 6 inclusive, then continue as follows.

16 Run the engine at a fast idle speed until it reaches its normal operating temperature and the cooling fan cuts in. Check the CO content of the exhaust, and compare it against the specified reading. If the CO content reading is incorrect, it can be adjusted by prising free the tamperproof cap for access to the CO adjustment screw (see illustration), and turning the screw in the required direction to suit.

17 Check the base idle speed by first disconnecting the multi-plug from the idle speed control valve. Increase the engine speed to 2000 rpm, hold it at that speed for 30 seconds, then fully release the throttle and check if the base idle speed registered is as specified.

18 If adjustment is necessary, prise free the tamperproof plug using a suitable small screwdriver to gain access to the base idle adjustment screw in the throttle body. Turn the screw in the required direction to adjust the base idle speed to the specified amount. Turning the screw anti-clockwise increases the idle speed (see illustration).

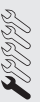
19 Repeat the procedure outlined in

paragraph 17 to recheck and further adjust the base idle speed if required, then fit a new tamperproof plug into position.

20 Reconnect the idle speed control valve multi-plug, and check that the engine speed briefly rises to about 900 rpm, then drops down to the specified normal idle speed.

21 On completion, disconnect the tachometer and the CO meter, but continue running the engine at idle speed for a period of about five minutes, to enable the engine management module to relearn its values before switching it off.

18 Manual transmission oil level check



1 The manual transmission does not have a dipstick. To check the oil level, raise the vehicle and support it securely on axle stands, making sure that the vehicle is level. On the lower front side of the transmission housing, you will see the filler/level plug. Unscrew and remove it - an Allen key or bit will probably be required (see illustration). If the lubricant level is correct, the oil should be up to the lower edge of the hole.

2 If the transmission needs more lubricant (if the oil level is not up to the hole), use a syringe, or a plastic bottle and tube, to add more (see illustration). Stop filling the transmission when the lubricant begins to run out of the hole.



18.1 Unscrewing the manual transmission oil filler/level plug



18.2 Topping-up the oil level in the BC type transmission



19.2A Check the condition of the track rod end balljoint dust cover (arrowed)



19.2B Check the condition of the lower arm balljoint dust cover (arrowed)



19.2C Check the condition of the steering rack gaiters

3 Refit the filler/level plug, and tighten it to the specified torque wrench setting. Drive the vehicle a short distance, then check for leaks.
4 The need for regular topping-up can only be due to a leak, which should be found and rectified without delay.

19 Steering, suspension and roadwheel check



Front suspension and steering check

1 Apply the handbrake, then raise the front of the vehicle and support it on axle stands.
2 Visually inspect the balljoint dust covers and the steering gear gaiters for splits, chafing or deterioration (**see illustrations**). Any wear of these components will cause loss of lubricant, together with dirt and water entry, resulting in rapid deterioration of the balljoints or steering gear.
3 Check the power-assisted steering fluid hoses (where fitted) for chafing or deterioration, and the pipe and hose unions for fluid leaks. Also check for signs of fluid leakage under pressure from the steering gear rubber gaiters, which would indicate failed fluid seals within the steering gear.
4 Grasp the roadwheel at the 12 o'clock and 6 o'clock positions, and try to rock it (**see illustration**). Very slight free play may be felt, but if the movement is appreciable, further



19.4 Checking for wear in the front suspension and hub bearings

investigation is necessary to determine the source. Continue rocking the wheel while an assistant depresses the footbrake. If the movement is now eliminated or significantly reduced, it is likely that the hub bearings are at fault. If the free play is still evident with the footbrake depressed, then there is wear in the suspension joints or mountings.

5 Now grasp the wheel at the 9 o'clock and 3 o'clock positions, and try to rock it as before. Any movement felt now may again be caused by wear in the hub bearings or the steering track rod balljoints. If the outer track rod end balljoint is worn, the visual movement will be obvious. If the inner joint is suspect, it can be felt by placing a hand over the rack-and-pinion rubber gaiter, and gripping the track rod. If the wheel is now rocked, movement will be felt at the inner joint if wear has taken place.

6 Using a large screwdriver or flat bar, check for wear in the suspension mounting bushes by levering between the relevant suspension component and its attachment point. Some movement is to be expected, as the mountings are made of rubber, but excessive wear should be obvious. Also check the condition of any visible rubber bushes, looking for splits, cracks or contamination of the rubber.

7 With the vehicle standing on its wheels, have an assistant turn the steering wheel back-and-forth, about an eighth of a turn each way. There should be very little, if any, lost movement between the steering wheel and roadwheels. If this is not the case, closely observe the joints and mountings previously described, but in addition, check the steering column universal joints for wear, and also check the rack-and-pinion steering gear itself.

Rear suspension check

8 Chock the front wheels, then raise the rear of the vehicle and support it on axle stands.

9 Check the rear hub bearings for wear, using the method described for the front hub bearings (paragraph 4).

10 Using a large screwdriver or flat bar, check for wear in the suspension mounting bushes by levering between the relevant suspension component and its attachment

point. Some movement is to be expected, as the mountings are made of rubber, but excessive wear should be obvious. Check the condition of the shock absorbers and their bushes/mountings. On Van models, check the leaves of the leaf springs for signs of cracking, distortion, or other damage.

Roadwheel check and balancing

11 Periodically remove the roadwheels, and clean any dirt or mud from the inside and outside surfaces. Examine the wheel rims for signs of rusting, corrosion or other damage. Light alloy wheels are easily damaged by "kerbing" whilst parking, and similarly, steel wheels may become dented or buckled. Renewal of the wheel is very often the only course of remedial action possible.

12 The balance of each wheel and tyre assembly should be maintained, not only to avoid excessive tyre wear, but also to avoid wear in the steering and suspension components. Wheel imbalance is normally signified by vibration through the vehicle's bodyshell, although in many cases it is particularly noticeable through the steering wheel. Conversely, it should be noted that wear or damage in suspension or steering components may cause excessive tyre wear. Out-of-round or out-of-true tyres, damaged wheels and wheel bearing wear/maladjustment also fall into this category. Balancing will not usually cure vibration caused by such wear.

13 Wheel balancing may be carried out with the wheel either on or off the vehicle. If balanced on the vehicle, ensure that the wheel-to-hub relationship is marked in some way prior to subsequent wheel removal, so that it may be refitted in its original position.

20 Driveshaft rubber gaiter and CV joint check



1 The driveshaft rubber gaiters are very important, because they prevent dirt, water and foreign material from entering and damaging the constant velocity (CV) joints. External contamination can cause the gaiter

material to deteriorate prematurely, so it's a good idea to wash the gaiters with soap and water occasionally.

2 With the vehicle raised and securely supported on axle stands, turn the steering onto full-lock, then slowly rotate each front wheel in turn. Inspect the condition of the outer constant velocity (CV) joint rubber gaiters, squeezing the gaiters to open out the folds. Check for signs of cracking, splits, or deterioration of the rubber, which may allow the escape of grease, and lead to the ingress of water and grit into the joint (**see illustration**). Also check the security and condition of the retaining clips. Repeat these checks on the inner CV joints. If any damage or deterioration is found, the gaiters should be renewed as described in Chapter 8.

3 At the same time, check the general condition of the outer CV joints themselves, by first holding the driveshaft and attempting to rotate the wheels. Any appreciable movement in the CV joint indicates wear in the joint, wear in the driveshaft splines, or a loose driveshaft retaining nut. Repeat this check on the inner joints, by holding the inner joint yoke and attempting to rotate the driveshaft.



20.2 Check the driveshaft gaiters by hand for cracks and/or leaking grease

suspension parts, secure the exhaust system with new mountings.

5 Check the running condition of the engine by inspecting inside the end of the tailpipe; the exhaust deposits here are an indication of the engine's state of tune. The inside of the tailpipe should be dry, and should vary in colour from dark grey to light grey/brown; if it is black and sooty, or coated with white deposits, the engine is in need of a thorough fuel system inspection.



21.2 If any of the exhaust system rubber mountings are to be renewed, ensure that the replacements are of the correct type - their colour is a good guide. Those nearest to the catalytic converter are more heat-resistant than the others

whenever a defect is suspected in the braking system. Any of the following symptoms could indicate a potential brake system defect:

- The vehicle pulls to one side when the brake pedal is depressed.*
- The brakes make scraping or dragging noises when applied.*
- Brake pedal travel is excessive.*
- The brake fluid requires repeated topping-up.*

2 A thorough inspection should be made to confirm the thickness of the linings, as follows.

Disc brakes

3 Jack up the front or rear of the vehicle, as applicable, and support it on axle stands. Where rear brake pads are fitted, also jack up the rear of the vehicle and support on axle stands.

4 For better access to the brake calipers, remove the wheels.

5 Look through the inspection window in the caliper, and check that the thickness of the friction lining material on each of the pads is not less than the recommended minimum thickness given in the Specifications. **Note:** *Bear in mind that the lining material is normally bonded to a metal backing plate.*

6 If it is difficult to determine the exact thickness of the pad linings, or if you are at all concerned about the condition of the pads, then remove them from the calipers for further inspection (refer to Chapter 9).

7 Check the remaining brake caliper(s) in the same way.

8 If any one of the brake pads has worn down to, or below, the specified limit, *all four* pads at that end of the car must be renewed as a set (ie all the front pads or all the rear pads).

9 Measure the thickness of the discs with a micrometer, if available, to make sure that they still have service life remaining. If any disc is thinner than the specified minimum thickness, renew it (refer to Chapter 9). In any case, check the general condition of the discs. Look for excessive scoring and discolouration caused by overheating. If these

21 Exhaust system check



1 With the engine cold (at least three hours after the vehicle has been driven), check the complete exhaust system, from its starting point at the engine to the end of the tailpipe. Ideally, this should be done on a hoist, where unrestricted access is available; if a hoist is not available, raise and support the vehicle on axle stands.

2 Check the pipes and connections for evidence of leaks, severe corrosion, or damage. Make sure that all brackets and rubber mountings are in good condition, and tight; if any of the mountings are to be renewed, ensure that the replacements are of the correct type (**see illustration**). Leakage at any of the joints or in other parts of the system will usually show up as a black sooty stain in the vicinity of the leak. **Note:** *Exhaust sealants should not be used on any part of the exhaust system upstream of the catalytic converter - even if the sealant does not contain additives harmful to the converter, pieces of it may break off and foul the element, causing local overheating.*

3 At the same time, inspect the underside of the body for holes, corrosion, open seams, etc, which may allow exhaust gases to enter the passenger compartment. Seal all body openings with silicone or body putty.

4 Rattles and other noises can often be traced to the exhaust system, especially the rubber mountings. Try to move the system, silencer(s) and catalytic converter. If any components can touch the body or

22 Underbody and fuel/brake line check



1 With the vehicle raised and supported on axle stands or over an inspection pit, thoroughly inspect the underbody and wheel arches for signs of damage and corrosion. In particular, examine the bottom of the side sills, and any concealed areas where mud can collect. Where corrosion and rust is evident, press and tap firmly on the panel with a screwdriver, and check for any serious corrosion which would necessitate repairs. If the panel is not seriously corroded, clean away the rust, and apply a new coating of underseal. Refer to Chapter 11 for more details of body repairs.

2 At the same time, inspect the PVC-coated lower body panels for stone damage and general condition.

3 Inspect all of the fuel and brake lines on the underbody for damage, rust, corrosion and leakage. Also make sure that they are correctly supported in their clips. Where applicable, check the PVC coating on the lines for damage.

23 Brake check



Note: *For detailed photographs of the brake system, refer to Chapter 9.*

1 The work described in this Section should be carried out at the specified intervals, or

1•24 Every 10 000 miles

conditions exist, remove the relevant disc and have it resurfaced or renewed (refer to Chapter 9).

10 Before refitting the wheels, check all brake lines and hoses (refer to Chapter 9). In particular, check the flexible hoses in the vicinity of the calipers, where they are subjected to most movement. Bend them between the fingers (but do not actually bend them double, or the casing may be damaged) and check that this does not reveal previously-hidden cracks, cuts or splits.

Rear drum brakes

11 Chock the front wheels, then jack up the rear of the vehicle and support on axle stands. **12** For better access, remove the rear wheels.

13 To check the brake shoe lining thickness without removing the brake drums, prise the rubber plugs from the backplates, and use an electric torch to inspect the linings of the leading brake shoes. Check that the thickness of the lining material on the brake shoes is not less than the recommendation given in the Specifications.

14 If it is difficult to determine the exact thickness of the brake shoe linings, or if you are at all concerned about the condition of the shoes, then remove the rear drums for a more comprehensive inspection (refer to Chapter 9) (see illustration).

15 With the drum removed, check the shoe return and hold-down springs for correct installation, and check the wheel cylinders for leakage of brake fluid. Check the friction surface of the brake drums for scoring and discoloration. If excessive, the drum should be resurfaced or renewed.

16 Before refitting the wheels, check all brake lines and hoses (refer to Chapter 9). On completion, apply the handbrake and check that the rear wheels are locked. The handbrake also requires periodic adjustment, and if its travel seems excessive, refer to Section 33.

24 Door and bonnet check and lubrication

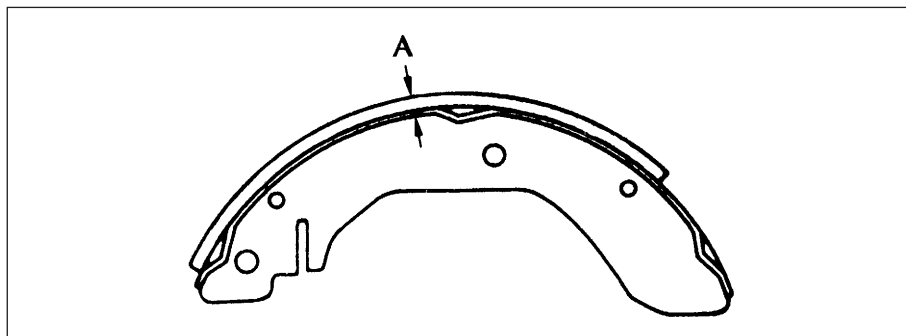


1 Check that the doors, bonnet and tailgate/boot lid close securely. Check that the bonnet safety catch operates correctly. Check the operation of the door check straps. **2** Lubricate the hinges, door check straps, the striker plates and the bonnet catch sparingly with a little oil or grease.

25 Roadwheel nut tightness check



1 Apply the handbrake. **2** Remove the wheel covers, using the flat end of the wheelbrace supplied in the tool kit



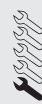
23.14 If the lining is bonded to the brake shoe, measure the lining thickness from the outer surface to the metal shoe, as shown here (A); if the lining is riveted to the shoe, measure from the lining outer surface to the rivet head

(on some models it will be necessary to unscrew the retaining bolts with a special key).

3 Check that the roadwheel nuts are tightened to the specified torque wrench setting.

4 Refit the wheel covers.

26 Road test



Check the operation and performance of the braking system

1 Make sure that the vehicle does not pull to one side when braking, and that the wheels do not lock prematurely when braking hard.

2 Check that there is no vibration through the steering when braking.

3 Check that the handbrake operates correctly, without excessive movement of the lever, and that it holds the vehicle stationary on a slope.

4 Test the operation of the brake servo unit as follows. With the engine switched off, depress the footbrake four or five times to exhaust the vacuum, then hold the pedal depressed. Start the engine, and there should be a noticeable "give" in the brake pedal as vacuum builds up. Allow the engine to run for at least two minutes, and then switch it off. If the brake pedal is depressed again, it should be possible to detect a hiss from the servo as the pedal is depressed. After about four or five applications, no further hissing should be heard, and the pedal should feel considerably firmer.

Steering and suspension

5 Check for any abnormalities in the steering, suspension, handling or road "feel".

6 Drive the vehicle, and check that there are no unusual vibrations or noises.

7 Check that the steering feels positive, with no excessive sloppiness or roughness, and check for any suspension noises when cornering and driving over bumps.

Drivetrain

8 Check the performance of the engine, transmission and driveshafts.

9 Check that the engine starts correctly, both when cold and when hot.

10 Listen for any unusual noises from the engine and transmission.

11 Make sure that the engine runs smoothly when idling, and that there is no hesitation when accelerating.

12 On manual transmission models, check that all gears can be engaged smoothly without noise, and that the gear lever action is not abnormally vague or "notchy".

13 On automatic transmission models, make sure that the drive seems smooth without jerks or engine speed "flare-ups". Check that all the gear positions can be selected with the vehicle at rest. If any problems are found, they should be referred to a Ford dealer.

14 Listen for a metallic clicking sound from the front of the vehicle, as the vehicle is driven slowly in a circle with the steering on full-lock. Carry out this check in both directions. If a clicking noise is heard, this indicates wear in a driveshaft joint, in which case renew the joint if necessary.

Clutch

15 Check that the clutch pedal moves smoothly and easily through its full travel, and that the clutch itself functions correctly, with no trace of slip or drag. If the movement is uneven or stiff in places, check that the cable is routed correctly, with no sharp turns.

16 Inspect both ends of the clutch inner cable, both at the transmission end and inside the car, for signs of wear and fraying.

17 Check the pedal self-adjusting mechanism as described in Chapter 8, if necessary.

Instruments and electrical equipment

18 Check the operation of all instruments and electrical equipment.

19 Make sure that all instruments read correctly, and switch on all electrical equipment in turn, to check that it functions properly.

Every 20 000 miles

27 Spark plug renewal



Note: Spark plug renewal at this service interval is only necessary on the HCS and CVH engines. On the Zetec engine, the recommended interval for spark plug renewal is every 30 000 miles or three years.

Spark plug check and renewal

1 It is vital for the correct running, full performance and proper economy of the engine that the spark plugs perform with maximum efficiency. The most important factor in ensuring this is that the plugs fitted are appropriate for the engine. The suitable type is given in the Specifications Section at the beginning of this Chapter, on the Vehicle Emissions Control Information (VECI) label located on the underside of the bonnet (only on models sold in some areas) or in the vehicle's Owner's Handbook. If the correct type is used and the engine is in good condition, the spark plugs should not need attention between scheduled renewal intervals. Spark plug cleaning is rarely necessary, and should not be attempted unless specialised equipment is available, as damage can easily be caused to the firing ends.

2 Spark plug removal and refitting requires a spark plug socket, with an extension which can be turned by a ratchet handle or similar. This socket is lined with a rubber sleeve, to protect the porcelain insulator of the spark plug, and to hold the plug while you insert it into the spark plug hole. You will also need a set of feeler gauges, to check the spark plug electrode gap, and a torque wrench to tighten the new plugs to the specified torque (see illustration).

3 To remove the spark plugs, first open the bonnet; the plugs are easily reached at the

top of the engine. Note how the spark plug (HT) leads are routed and secured by clips, and on some engines, how they're positioned along the channel in the cylinder head cover. To prevent the possibility of mixing up spark plug (HT) leads, it is a good idea to try to work on one spark plug at a time.

4 If the marks on the original-equipment spark plug (HT) leads cannot be seen, mark the leads 1 to 4, to correspond to the cylinder the lead serves (No 1 cylinder is at the timing belt/chain end of the engine). Pull the leads from the plugs by gripping the rubber boot sealing the cylinder head cover opening, not the lead, otherwise the lead connection may be fractured.

5 It is advisable to soak up any water in the spark plug recesses with a rag, and to remove any dirt from them using a clean brush, vacuum cleaner or compressed air before removing the plugs, to prevent any dirt or water from dropping into the cylinders.

Warning: Wear eye protection when using compressed air!

6 Unscrew the spark plugs, ensuring that the socket is kept in alignment with each plug - if the socket is forcibly moved to either side, the porcelain top of the plug may be broken off. If any undue difficulty is encountered when unscrewing any of the spark plugs, carefully check the cylinder head threads and tapered sealing surfaces for signs of wear, excessive corrosion or damage; if any of these conditions is found, seek the advice of a Ford dealer as to the best method of repair.

7 As each plug is removed, examine it as follows - this will give a good indication of the condition of the engine. If the insulator nose is covered with light tan to greyish-brown deposits, then the mixture is correct, and it is likely that the engine is in good condition.

8 If the tip and insulator nose are covered with hard black-looking deposits, then this is indicative that the mixture is too rich. Should the plug be black and oily, then it is likely that



27.2 Tools required for changing spark plugs

the engine is fairly worn, as well as the mixture being too rich.

9 If the insulator nose of the spark plug is clean and white, with no deposits, this is indicative of a weak mixture.

10 If you are renewing the spark plugs, purchase the new plugs, then check each of them first for faults such as cracked insulators or damaged threads. Note also that, whenever the spark plugs are renewed as a routine service operation, the spark plug (HT) leads should be checked as described below.

11 The spark plug electrode gap is of considerable importance as, if it is too large or too small, the size of the spark and its efficiency will be seriously impaired. The gap should be set to the value given in the Specifications Section of this Chapter. New plugs will not necessarily be set to the correct gap, so they should always be checked before fitting.

12 The spark plug gap is correct when the correct-size feeler gauge or wire gauge is a firm sliding fit between the electrodes (see illustrations).

13 To adjust the electrode gap, bend open, or close up, the outer plug electrode until the correct gap is achieved (see illustration). The centre electrode should never be bent, as this



27.12A Measuring a spark plug gap with a feeler gauge



27.12B Spark plug manufacturers recommend using a wire-type gauge when checking the gap - if the wire or feeler gauge does not slide between the electrodes with a slight drag, adjustment is required



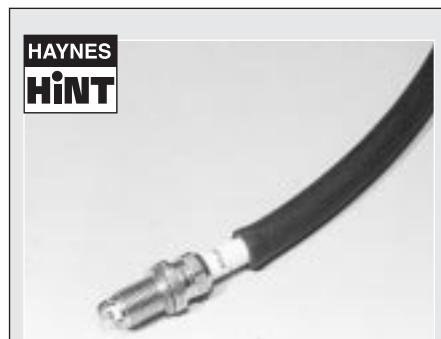
27.13 To change the gap, bend the outer electrode only, and be very careful not to crack or chip the porcelain insulator surrounding the centre electrode

1•26 Every 20 000 miles

may crack the insulation and cause plug failure, if nothing worse. If the outer electrode is not exactly over the centre electrode, bend it gently to align them. Special spark plug gap adjusting tools are available from motor accessory shops, or from certain spark plug manufacturers.

14 Before fitting the spark plugs, check that the threaded connector sleeves at the top of the plugs are tight, and that the plug exterior surfaces and threads are clean. Brown staining on the porcelain, immediately above the metal body, is quite normal, and does not necessarily indicate a "leak" between the body and insulator.

15 Apply a smear of copper-based grease or anti-seize compound to the threads of each plug, and screw them in by hand where possible. Take extra care to enter the plug threads correctly, as the cylinder head is of aluminium alloy.



It's often difficult to insert spark plugs into their holes without cross-threading them. To avoid this possibility, fit a short piece of rubber hose over the end of the spark plug. The flexible hose acts as a universal joint, to help align the plug with the plug hole. Should the plug begin to cross-thread, the hose will slip on the spark plug, preventing thread damage.

16 When each spark plug is started correctly on its threads, screw it down until it just seats

lightly, then tighten it to the specified torque wrench setting. If a torque wrench is not available - and this is one case where the use of a torque wrench is strongly recommended - tighten each spark plug through *no more than* 1/4 of a turn (CVH engines) or 1/16 of a turn (HCS engines) after it seats. HCS engines are fitted with taper-seat spark plugs, identifiable by not having a sealing washer, and these in particular should *NEVER* be overtightened - their tapered seats mean they are almost impossible to remove if abused.

17 Reconnect the spark plug (HT) leads in their correct order, using a twisting motion on the boot until it is firmly seated on the end of the spark plug and on the cylinder head cover.

Spark plug (HT) lead check

18 The spark plug (HT) leads should be checked whenever the plugs themselves are renewed. Start by making a visual check of the leads while the engine is running. In a darkened garage (make sure there is ventilation) start the engine and observe each lead. Be careful not to come into contact with any moving engine parts. If there is a break in the lead, you will see arcing or a small spark at the damaged area.

19 The spark plug (HT) leads should be inspected one at a time, to prevent mixing up the firing order, which is essential for proper engine operation. Each original lead should be numbered to identify its cylinder. If the number is illegible, a piece of tape can be marked with the correct number, and wrapped around the lead (the leads should be numbered 1 to 4, with No 1 lead nearest the timing belt end of the engine). The lead can then be disconnected.

20 Check inside the boot for corrosion, which will look like a white crusty powder. Clean this off as much as possible; if it is excessive, or if cleaning leaves the metal connector too badly eroded to be fit for further use, the lead must be renewed. Push the lead and boot back onto the end of the spark plug. The boot should fit tightly onto the end of the plug - if it doesn't, remove the lead and use pliers carefully to crimp the metal connector inside



27.22 Measure the resistance of the spark plug (HT) leads - if any exceeds the specified maximum value, renew all the leads as a set

the boot until the fit is snug.

21 Using a clean rag, wipe the entire length of the lead to remove built-up dirt and grease. Once the lead is clean, check for burns, cracks and other damage. Do not bend the lead sharply, because the conductor might break.

22 Disconnect the lead from the ignition coil by pressing together the plastic retaining catches and pulling the end fitting off the coil terminal. Check for corrosion and for a tight fit. If a meter with the correct measuring range is available, measure the resistance of the disconnected lead from its coil connector to its spark plug connector (**see illustration**). If the resistance recorded for any of the leads exceeds the value specified, all the leads should be renewed as a set. Refit the lead to the coil, noting that each coil terminal is marked with its respective cylinder number, so that there is no risk of mixing up the leads and upsetting the firing order.

23 Inspect the remaining spark plug (HT) leads, ensuring that each is securely fastened at the ignition coil and spark plug when the check is complete. If any sign of arcing, severe connector corrosion, burns, cracks or other damage is noticed, obtain new spark plug (HT) leads, renewing them as a set. If new spark plug leads are to be fitted, remove and refit them one at a time, to avoid mix-ups in the firing order.

Every 30 000 miles or 3 years

28 Coolant renewal



Note: If the antifreeze used is Ford's own, or of similar quality, the coolant need not be renewed for the life of the vehicle. If the vehicle's history is unknown, if antifreeze of lesser quality is known to be in the system, or simply if you prefer to follow conventional servicing intervals, the coolant should be changed periodically (typically, every 2 years) as described here. Refer also to "Antifreeze - notes on renewal" in this Section.



Warning: Do not allow antifreeze to come in contact with your skin or painted surfaces of the vehicle. Flush contaminated areas immediately with plenty of water. Don't store new coolant, or leave old coolant lying around, where it's accessible to children or pets - they're attracted by its sweet smell. Ingestion of even a small amount of coolant can be fatal! Wipe up garage-floor and drip-pan spills immediately. Keep antifreeze containers covered, and repair cooling system leaks as soon as they're noticed.

Warning: Never remove the expansion

tank filler cap when the engine is running, or has just been switched off, as the cooling system will be hot, and the consequent escaping steam and scalding coolant could cause serious injury.

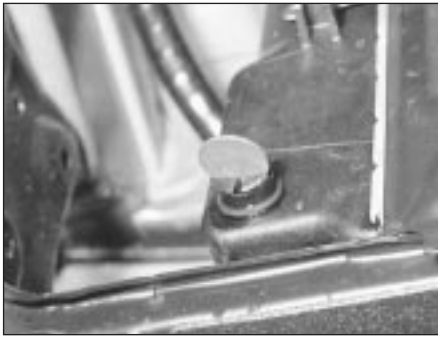
Coolant draining



Warning: Wait until the engine is cold before starting this procedure.

1 To drain the system, first remove the expansion tank filler cap (see Section 3).

2 If the additional working clearance is required, raise the front of the vehicle and support it securely on axle stands.



28.3 Use a small coin to unscrew the radiator drain plug

3 Where fitted, remove the radiator undershield (eight or nine screws), then place a large drain tray underneath, and unscrew the radiator drain plug - you can use a small coin to do this, as the plug's slotted for this purpose (see illustration). Direct as much of the escaping coolant as possible into the tray.

System flushing

4 With time, the cooling system may gradually lose its efficiency, as the radiator core becomes choked with rust, scale deposits from the water, and other sediment (refer also to "Antifreeze - notes on renewal" later in this Section). To minimise this, as well as using only good-quality antifreeze and clean soft water, the system should be flushed as follows whenever any part of it is disturbed, and/or when the coolant is renewed.

5 With the coolant drained, refit the drain plug, and refill the system with fresh water. Refit the expansion tank filler cap, start the engine and warm it up to normal operating temperature, then stop it and (after allowing it to cool down completely) drain the system again. Repeat as necessary until only clean water can be seen to emerge, then refill finally with the specified coolant mixture as described below.

6 If only clean, soft water and good-quality antifreeze (even if not to Ford's specification) has been used, and the coolant has been renewed at the suggested intervals, the above procedure will be sufficient to keep clean the system for a considerable length of time. If, however, the system has been neglected, a more thorough operation will be required, as follows.

7 First drain the coolant, then disconnect the radiator top and bottom hoses. Insert a garden hose into the top hose, and allow water to circulate through the radiator until it runs clean from the bottom outlet.

8 To flush the engine, insert the garden hose into the thermostat water outlet, and allow water to circulate until it runs clear from the bottom hose. If, after a reasonable period, the water still does not run clear, the radiator should be flushed with a good proprietary cleaning agent.

9 In severe cases of contamination, reverse-

flushing of the radiator may be necessary. To do this, remove the radiator (Chapter 3), invert it, and insert the garden hose into the bottom outlet. Continue flushing until clear water runs from the top hose outlet. A similar procedure can be used to flush the heater matrix.

10 The use of chemical cleaners should be necessary only as a last resort. Normally, regular renewal of the coolant will prevent excessive contamination of the system.

Coolant filling

11 With the cooling system drained and flushed, ensure that all disturbed hose unions are correctly secured, and that the radiator drain plug is securely tightened. Refit the radiator undershield, noting that it is located by three clips at its front edge; tighten the retaining screws securely. If it was raised, lower the vehicle to the ground.

12 Prepare a sufficient quantity of the specified coolant mixture (see below); allow for a surplus, so as to have a reserve supply for topping-up.

13 Slowly fill the system through the expansion tank; since the tank is the highest point in the system, all the air in the system should be displaced into the tank by the rising liquid. Slow pouring reduces the possibility of air being trapped and forming airlocks.

14 Continue filling until the coolant level reaches the expansion tank "MAX" level line, then cover the filler opening to prevent coolant splashing out.

15 Start the engine and run it at idle speed, until it has warmed-up to normal operating temperature and the radiator cooling fan has cut in; watch the temperature gauge to check for signs of overheating. If the level in the expansion tank drops significantly, top-up to the "MAX" level line, to minimise the amount of air circulating in the system.

16 Stop the engine, allow it to cool down completely (overnight, if possible), then uncover the expansion tank filler opening and top-up the tank to the "MAX" level line. Refit the filler cap, tightening it securely, and wash off any spilt coolant from the engine compartment and bodywork.

17 After refilling, always check carefully all components of the system (but especially any unions disturbed during draining and flushing) for signs of coolant leaks. Fresh antifreeze has a searching action, which will rapidly expose any weak points in the system.

18 Note: *If, after draining and refilling the system, symptoms of overheating are found which did not occur previously, then the fault is almost certainly due to trapped air at some point in the system, causing an airlock and restricting the flow of coolant; usually, the air is trapped because the system was refilled too quickly. In some cases, airlocks can be released by tapping or squeezing the various hoses. If the problem persists, stop the engine and allow it to cool down completely, before unscrewing the expansion tank filler cap or disconnecting hoses to bleed out the trapped air.*

Antifreeze mixture

19 If the antifreeze used is not to Ford's specification, it should always be renewed at the suggested intervals (typically, every 2 years). This is necessary not only to maintain the antifreeze properties, but also to prevent the corrosion which would otherwise occur as the corrosion inhibitors become progressively less effective. Always use an ethylene glycol-based antifreeze which is suitable for use in mixed-metal cooling systems.

20 If the antifreeze used is to Ford's specification, the levels of protection it affords are indicated in the Specifications Section of this Chapter. To give the recommended *standard* mixture ratio for this antifreeze, 40% (by volume) of antifreeze must be mixed with 60% of clean, soft water; if you are using any other type of antifreeze, follow its manufacturer's instructions to achieve the correct ratio. It is best to make up slightly more than the system's specified capacity, so that a supply is available for subsequent topping-up.

21 Before adding antifreeze, the cooling system should be completely drained, preferably flushed, and all hoses checked for condition and security. As noted earlier, fresh antifreeze will rapidly find any weaknesses in the system.

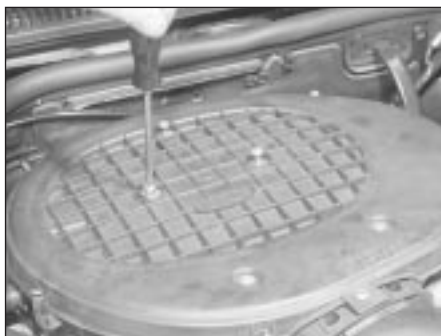
22 After filling with antifreeze, a label should be attached to the expansion tank, stating the type and concentration of antifreeze used, and the date installed. Any subsequent topping-up should be made with the same type and concentration of antifreeze. If topping-up using antifreeze to Ford's specification, note that a 50/50 mixture is permissible, purely for convenience.

23 Do not use engine antifreeze in the windscreen/tailgate washer system, as it will damage the vehicle's paintwork. A screenwash additive should be added to the washer system in its maker's recommended quantities.

Antifreeze - notes on renewal

24 Ford state that, where antifreeze to Ford specification ESD-M97B-49-A is used, it will last the lifetime of the vehicle. This is subject to it being used in the recommended concentration, unmixed with any other type of antifreeze or additive, and topped-up when necessary using only that antifreeze mixed 50/50 with clean water. If any other type of antifreeze is added, the lifetime guarantee no longer applies; to restore the lifetime protection, the system must be drained and thoroughly reverse-flushed before fresh coolant mixture is poured in.

25 If the vehicle's history (and therefore the quality of the antifreeze in it) is unknown, owners who wish to follow Ford's recommendations are advised to drain and thoroughly reverse-flush the system before refilling with fresh coolant mixture. If the appropriate quality of antifreeze is used, the coolant can then be left for the life of the vehicle.



29.1A On carburettor and CFI engines, undo the air cleaner cover retaining screws . . .



29.1B . . . and release the clips . . .



29.1C . . . then lift off the cover and withdraw the element

26 If any antifreeze other than Ford's is to be used, the coolant must be renewed at regular intervals to provide an equivalent degree of protection; the conventional recommendation is to renew the coolant every two years.

27 The above assumes the use of a mixture (in exactly the specified concentration) of clean, soft water and of antifreeze to Ford's specification or equivalent. It is also assumed that the cooling system is maintained in a scrupulously-clean condition, by ensuring that only clean coolant is added on topping-up, and by thorough reverse-flushing whenever the coolant is drained.

General cooling system checks

28 The engine should be cold for the cooling system checks, so perform the following procedure before driving the vehicle, or after it has been shut off for at least three hours.

29 Remove the expansion tank filler cap (see Section 3), and clean it thoroughly inside and out with a rag. Also clean the filler neck on the expansion tank. The presence of rust or corrosion in the filler neck indicates that the coolant should be changed. The coolant inside the expansion tank should be relatively clean and transparent. If it is rust- coloured, drain and flush the system, and refill with a fresh coolant mixture.

30 Carefully check the radiator hoses and heater hoses along their entire length; renew any hose which is cracked, swollen or deteriorated (see Section 12).

31 Inspect all other cooling system

components (joint faces, etc.) for leaks. A leak in the cooling system will usually show up as white- or rust-coloured deposits on the area adjoining the leak. Where any problems of this nature are found on system components, renew the component or gasket with reference to Chapter 3.

32 Clean the front of the radiator with a soft brush to remove all insects, leaves, etc, embedded in the radiator fins. Be careful not to damage the radiator fins, or cut your fingers on them.

29 Air cleaner element renewal



1 The air cleaner filter element is located in the air cleaner assembly mounted either on top of the carburettor or CFI unit, or on the left-hand side of the engine compartment. Undo the retaining screws and/or release the clips, and lift the air cleaner cover (see illustrations).

2 Lift out the element, and wipe out the housing. Check that no foreign matter is visible, either in the air inlet or in the air mass meter, as applicable.

3 If carrying out a routine service, the element must be renewed regardless of its apparent condition. Note that the small foam PCV filter in the rear right-hand corner of the air cleaner housing must be cleaned whenever the air filter element is renewed (see Section 30).

4 If you are checking the element for any other reason, inspect its lower surface; if it is oily or very dirty, renew the element. If it is only moderately dusty, it can be re-used after blowing it clean from the upper to the lower surface with compressed air.



Warning: Wear eye protection when using compressed air! Because it is a pleated-paper type filter, it cannot be washed or re-oiled. If it cannot be cleaned satisfactorily with compressed air, discard and renew it.



Caution: Never drive the vehicle with the air cleaner filter element removed. Excessive engine wear could result, and backfiring could even cause a fire under the bonnet.

5 Refitting is the reverse of the removal procedure. Ensure that the element and cover are securely seated, so that unfiltered air cannot enter the engine.

Air cleaner temperature control system check (carburettor fuel system)

6 In order for the engine to operate efficiently, the temperature of the air entering the inlet system must be controlled within certain limits.

7 The air cleaner has two sources of air, one direct from the outside of the engine compartment, and the other from a shroud on the exhaust manifold. On HCS engines, a wax-controlled thermostatic valve controls a



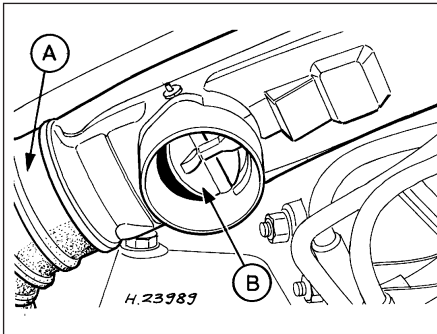
29.1D On EFI and SEFI engines, undo the air cleaner cover retaining screws . . .



29.1E . . . and release the clips . . .



29.1F . . . then lift off the cover and withdraw the element



29.8 Air cleaner inlet and flap valve on the HCS engine

A Main air cleaner inlet (cool air)
B Warm air duct (flap open)

flap inside the air cleaner inlet. When the ambient air temperature is below a predetermined level, the flap admits air heated from the exhaust manifold shroud; as the ambient temperature rises, the flap opens to admit more cool air from the engine compartment until eventually it is fully open. A similar system is used on CVH engines, except that a vacuum actuator modifies any opening or closing action of the temperature sensor on the flap valve, according to the level of the inlet manifold vacuum under running conditions.

HCS engines

8 This check must be made when the engine is cold. Detach and remove the air cleaner inlet trunking. Examine the position of the check valve within the duct. When the underbonnet air temperature is below 28°C, the valve must be open to allow hot air to enter the filter (see illustration).

9 Refit the inlet trunking. Start the engine and run it until it reaches its normal operating temperature, then stop the engine, remove the inlet trunking and check that the valve has closed off the air passage from the exhaust and opened the main (cool) air inlet.

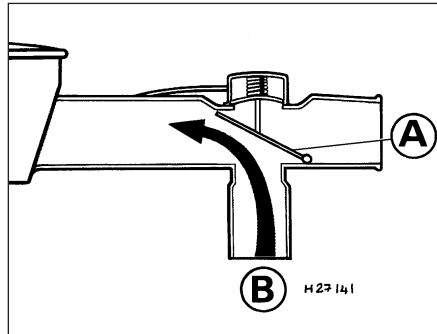
10 If the flap does not operate correctly, check that it is not seized. Apart from this there is no adjustment possible, and the unit should be renewed if faulty. Refit the air inlet trunking on completion.

CVH engines

11 This check must be made when the engine is cold. Disconnect the main air inlet duct, and visibly check that the flap to the hot-air inlet is closed (i.e. open to the passage of cold air).

12 Start the engine, and check that with the engine idling, the hot-air inlet is open to allow warm air from the exhaust manifold area to enter the air cleaner. If the flap operates as described, it is functioning correctly (see illustration).

13 If the flap fails to operate as described, check the condition of the vacuum pipe and its connections, and check that the flap valve has not seized. If these are in order, either the



29.12 Air cleaner inlet and flap valve on the CVH engine

A Flap open (cool air inlet closed)
B Warm air inlet

temperature sensor or vacuum actuator is faulty, and a new air cleaner assembly must be obtained. Refit the main air duct on completion.

30 Positive Crankcase Ventilation (PCV) system check and filter cleaning

1 The function of the crankcase ventilation system is to reduce the emission of unburned hydrocarbons from the crankcase, and to minimise the formation of oil sludge. By ensuring that a depression is created in the crankcase under most operating conditions, particularly at idle, and by positively inducing fresh air into the system, the oil vapours and "blow-by" gases collected in the crankcase are drawn from the crankcase, through the air cleaner or oil separator, into the inlet tract, to be burned by the engine during normal combustion.

2 On HCS engines, the system consists of a vented oil filler cap (with an integral mesh filter) and a hose connecting it to the oil separator/engine breather valve connector on the underside of the air cleaner housing. A further hose leads from the adapter/filter to the inlet manifold.

3 On CVH engines, a closed-circuit type crankcase ventilation system is used, the function of which is basically the same as that described for the HCS engine type, but the breather hose connects directly to the rocker cover. The oil filler cap incorporates a separate filter in certain applications.

4 On Zetec engines, the crankcase ventilation system main components are the oil separator mounted on the front (radiator) side of the cylinder block/crankcase, and the Positive Crankcase Ventilation (PCV) valve set in a rubber grommet in the separator's left-hand upper end. The associated pipework consists of a crankcase breather pipe and two flexible hoses connecting the PCV valve to a union on the left-hand end of the inlet manifold, and a crankcase breather hose connecting the cylinder head cover to the air



30.8 The PCV system foam filter is located in the rear right-hand corner of the air cleaner housing on Zetec engines

cleaner assembly. A small foam filter in the air cleaner prevents dirt from being drawn directly into the engine.

5 Check that all components of the system are securely fastened, correctly routed (with no kinks or sharp bends to restrict flow) and in sound condition; renew any worn or damaged components.

6 If oil leakage is noted, disconnect the various hoses and pipes, and check that all are clear and unblocked. Remove the air cleaner assembly cover, and check that the hose from the cylinder head cover to the air cleaner housing is clear and undamaged.

7 Where fitted, the PCV valve is designed to allow gases to flow out of the crankcase only, so that a depression is created in the crankcase under most operating conditions, particularly at idle. Therefore, if either the oil separator or the PCV valve are thought to be blocked, they must be renewed (see Chapter 6). In such a case, however, there is nothing to be lost by attempting to flush out the blockage using a suitable solvent. The PCV valve should rattle when shaken.

8 While the air filter element is removed (see Section 29), wipe out the housing, and on Zetec engines, withdraw the small foam filter from its location in the rear right-hand corner of the housing (see illustration). If the foam is badly clogged with dirt or oil, it must be cleaned by soaking it in a suitable solvent, and allowed to dry before being refitted.

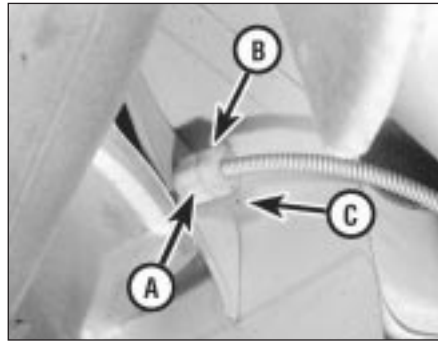
31 Oil filler cap check

1 On HCS engines, remove and inspect the cap to ensure that it is in good condition, and not blocked up with sludge.

2 Disconnect the hoses at the cap, and clean the cap if necessary by brushing the inner mesh filter with petrol, and blowing through with light pressure from an air line. Renew the cap if it is badly congested.



33.4A Handbrake adjustment plunger on drum brake models



33.4B Handbrake cable adjuster nut (A) locknut (B) and lockpin (C)

32 Automatic transmission fluid renewal



- 1 The automatic transmission fluid should only be changed when the transmission is cold.
- 2 Position the vehicle over an inspection pit, on vehicle ramps, or jack it up, but make sure that it is level.
- 3 Place a suitable container beneath the drain plug on the transmission sump pan. Remove the transmission fluid dipstick to speed up the draining operation.
- 4 Thoroughly clean the area around the drain plug in the transmission sump pan, then unscrew the plug and allow the fluid to drain into the container.
- 5 When all the fluid has drained (this may take quite some time) clean the drain plug, then refit it together with a new seal and tighten it securely.
- 6 Place a funnel with a fine mesh screen in the dipstick tube, and fill the transmission with the specified type of fluid. It is essential that no dirt is introduced into the transmission during this operation.
- 7 Depending on the extent to which the fluid was allowed to drain, it is possible that the amount of fluid required when filling the transmission may be more than the specified amount (see "Lubricants, fluids and capacities"). However, due to fluid remaining

in the system, it is more likely that less than the specified amount will be required. Add about half the specified amount, then run the engine up to its normal operating temperature and check the level on the dipstick. When the level approaches the maximum mark, proceed as detailed in Section 7 to check the level and complete the final topping-up as described.

33 Handbrake adjustment



- 1 Chock the front roadwheels and fully release the handbrake.
- 2 Raise the vehicle at the rear, and support it on axle stands.
- 3 Check that the handbrake cables are correctly routed and secured by the retaining clips at the appropriate points under the vehicle.

Drum brake models

- 4 The handbrake is checked for adjustment by measuring the amount of movement possible in the handbrake adjuster plungers. These are located on the inside face of each rear brake backplate (see illustration). The total movement of the two plungers combined should be between 0.5 and 2.0 mm. If the movement measured is outside of this tolerance, the handbrake is in need of

adjustment. Adjustment is made altering the position of the in-line cable adjuster sleeve (see illustration).

- 5 When adjustment to the handbrake is necessary, a new adjustment sleeve locking pin will be required, and this must therefore be obtained before making the adjustment.

- 6 To adjust the handbrake, first ensure that it is fully released, then firmly apply the footbrake a few times to ensure that the rear brake adjustment is taken up by the automatic adjusters. Extract the locking pin from the adjuster sleeve, then turn the sleeve to set the combined movement of the plungers within the tolerance range specified (0.5 to 2.0 mm). Turn the locking nut by hand as tight as is possible (two clicks) against the adjustment sleeve. Now grip the locknut with a suitable wrench, and turn it a further two clicks (maximum).

- 7 Secure the adjustment by inserting the new lock pin.

- 8 Check that the operation of the handbrake is satisfactory, then lower the vehicle to the ground, apply the handbrake and remove the chocks from the front wheels.

Disc brake models

- 9 Remove the blanking plug from the rear of the brake carrier plate, just below and to the rear of the brake caliper.

- 10 With the handbrake released, insert a screwdriver through the blanking plug hole and engage the end of the screwdriver in the teeth of the adjuster wheel. Move the screwdriver up and down to turn the adjuster wheel as necessary, until the wheel is just locked.

- 11 Now back off the adjuster wheel until the wheel can be turned freely without binding.

- 12 Repeat this procedure on the other brake assembly, then check the operation of the handbrake. Ensure that both wheels are locked when the handbrake lever is applied, and that both are released, with no trace of binding when the lever is fully released.

- 13 When all is satisfactory, refit the blanking plugs, and lower the vehicle to the ground. Reapply the handbrake and remove the chocks from the front wheels.

Every 60 000 miles

34 Timing belt renewal



Refer to Chapter 2, Part B or C as appropriate.

35 Fuel filter renewal



Warning: Petrol is extremely flammable, so extra precautions must be taken when working on any part of the fuel system. Do

not smoke, or allow open flames or bare light bulbs, near the work area. Also, do not work in a garage if a natural gas-type appliance with a pilot light is present. While performing any work on the fuel system, wear safety glasses, and have a suitable (Class B) fire extinguisher on hand. If you spill any fuel on your skin, rinse it off immediately with soap and water.

1 On fuel-injected engines, an in-line fuel filter is provided in the fuel pump outlet line, and is located below and to the rear of the engine, above the driveshafts. The filter performs a vital role in keeping dirt and other foreign matter out of the fuel system, and so must be renewed at regular intervals, or whenever you have reason to suspect that it may be clogged. It is always unpleasant working under a vehicle - pressure-washing or hosing

clean the underbody in the filter's vicinity will make working conditions more tolerable, and will reduce the risk of getting dirt into the fuel system.

2 Relieve any residual pressure in the system by removing the fuel pump fuse (No 5) and starting the engine; allow the engine to idle until it dies. Turn the engine over once or twice on the starter, to ensure that all pressure is released, then switch off the ignition.



Warning: This procedure will merely relieve the increased pressure necessary for the engine to run - remember that fuel will still be present in the system components, and take precautions accordingly before disconnecting any of them.

3 Noting the comments made in Section 1 of Chapter 5, disconnect the battery earth terminal.

4 Jack up the front of the vehicle, and securely support it on axle stands.

5 Using rag to soak up any spilt fuel, release the fuel feed and outlet pipe unions from the filter, by squeezing together the protruding locking lugs on each union, and carefully pulling the union off the filter stub. Where the unions are colour-coded, the feed and outlet pipes cannot be confused; where both unions are the same colour, note carefully which pipe is connected to which filter stub, and ensure that they are correctly reconnected on refitting.

6 Noting the arrows and/or other markings on the filter showing the direction of fuel flow (towards the engine), slacken the filter clamp



35.7 Fuel filter as fitted to 1.6 litre EFI engines showing direction of flow arrow

screw and withdraw the filter. Note that the filter will still contain fuel; care should be taken, to avoid spillage and to minimise the risk of fire.

7 On installation, slide the filter into its clamp so that the arrow marked on it faces the correct way (see illustration), then slide each pipe union on to its (correct) respective filter stub, and press it down until the locking lugs click into their groove. Tighten the clamp screw carefully, until the filter is just prevented from moving; do not overtighten the clamp screw, or the filter casing may be crushed.

8 Refit the fuel pump fuse and reconnect the battery earth terminal, then switch the ignition on and off five times, to pressurise the system. Check for any sign of fuel leakage around the filter unions before lowering the vehicle to the ground and starting the engine.

Every 3 years

36 Brake fluid renewal



The procedure is similar to that for the bleeding of the hydraulic system as described in Chapter 9, except that the brake fluid reservoir should be emptied by syphoning,

and allowance should be made for the old fluid to be removed from the circuit when bleeding a section of the circuit.