

SECTION 14**Maintenance**

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SECTION 14

Maintenance

MAINTENANCE

1. Maintenance service life

TEST AND/OR MAINTENANCE POINT
BACRAM

MAINTENANCE OPERATIONS

SERVICE M1

SERVICE M2

SERVICE M3

SERVICE M4

MAINTENANCE

Maintenance service table

The following table will help you select the Programmed Maintenance Plan that best suits your vehicle's operating conditions. This table is a useful reference for the choice of the maintenance plan as it combines the type of transport profile with the appropriate maintenance plan. The programmed maintenance plan covers the following types of vehicle use:

R = On-road operation

H = Heavy duty operation

Km distance for each type of operation is specified in the table below.

Type of use	Km intervals				Time intervals				
	EO	MI	M2	MFP	EO	MI	M2	MFP	M12
R (on-road operation)	10.000**	20.000	60.000	—	—	400h*	1200h*	—	At expiration of warranty period
H (heavy duty operation)	10.000	20.000	60.000	—	200h*	400h*	1200h*	—	
R/H	—	—	—	40.000**	—	—	—	—	
R/H	—	—	—	60.000**	—	—	—	—	
R/H	—	—	—	100.000	—	—	—	2000h*	
R/H	—	—	—	120.000	—	—	—	2400h*	
R/H	—	—	—	—	—	—	—	Every year	
R/H	—	—	—	—	—	—	—	Every 2 years	

EO = Engine oil change only

M = Maintenance operations to be carried out at specified time and km intervals

MFP = Maintenance service not included in the Maintenance Service Plan

M12 = End of Warranty coupon

h = hour

***** = 4x4 vehicles only

****** = 8 vehicles only (engines with pre-combustion chamber)

User group	Transport profile						
	Civil assistance	Municipal use	Light use off-road	Heavy duty off-road	Long distance transport (≤ 250)	Medium distance transport (≤ 200)	Sh dist: distrib Multi-lo
General mixed cargo					R	R	
Bakery food transport						R	
Meat and fish transport					R	R	
Milk transport					R	R	
Dairy produce transport					R	R	
Fruit and vegetables transport					R	R	
Loose material transport			H		R	R	
Drinks transport					R	R	
Retail foodstuff delivery						R	
Electrical goods transport					R	R	
Electronic goods transport					R	R	
Chemicals and drug transport					R	R	
Consumer goods transport					R	R	
Public works and builders		H	R	H		R	
Daily rental					R	R	
Municipal uses		R	H				
Civil assistance	H					R	
Leisure use Bus			H			R	

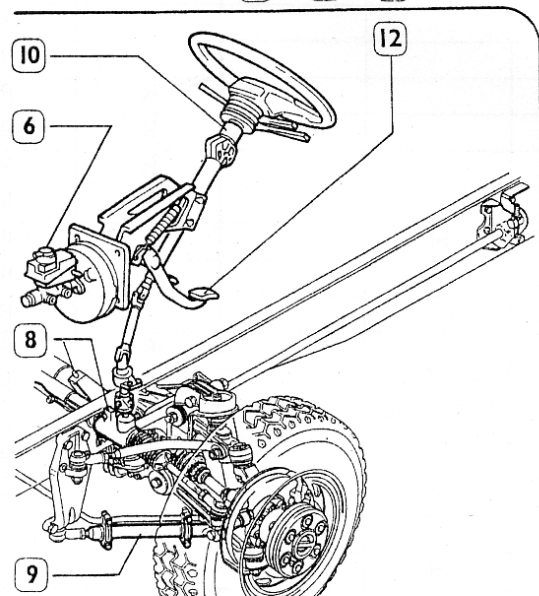
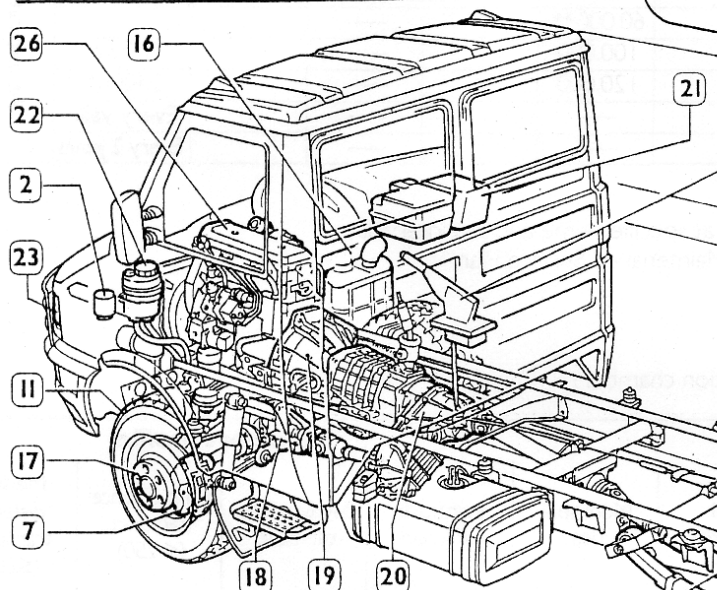
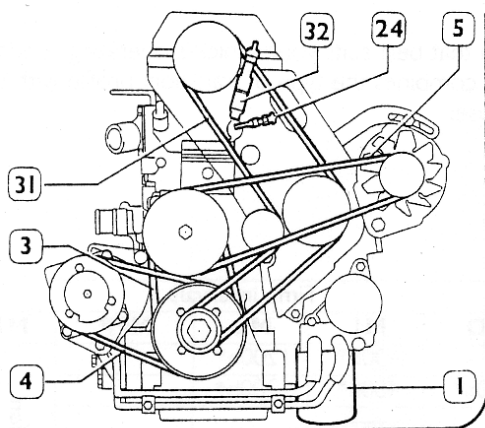


Use of Engine oil: **Olío Fiat VS MAX Diesel**

API CD-CCMC PD2 / MIL-L-2104D

Change engine oil at least once a year, if distance covered is less than specified for the type of service you have chosen.

TEST AND/OR MAINTENANCE POINTS DIAGRA

[illegible]

The following diagram shows a 4x4 vehicle but it also applies

* 4x4 Vehicles

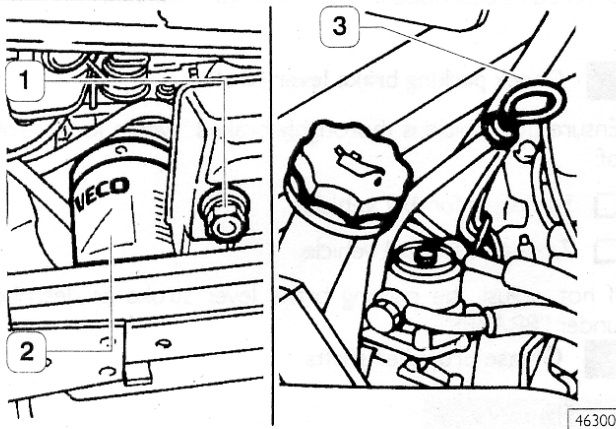
** .8 Vehicles (engine with pre-combustion chamber)

Intervals		at expiration of warranty period
	MFP	
1*		MI 2
1*		
ie		
	2000h*	
	2400h*	
	every year	
	every 2 years	

MAINTENANCE OPERATIONS SERVICE M1

1 Change engine oil and engine oil filter

Figure 43



Remove oil level dipstick (3).
Remove acoustic insulation panel from under the vehicle.
Remove oil sump plug (1) and drain engine oil in a suitable container.
Dismantle the oil filter (2) using tool 99360091.



Wet seal with engine oil before assembling new cartridges.

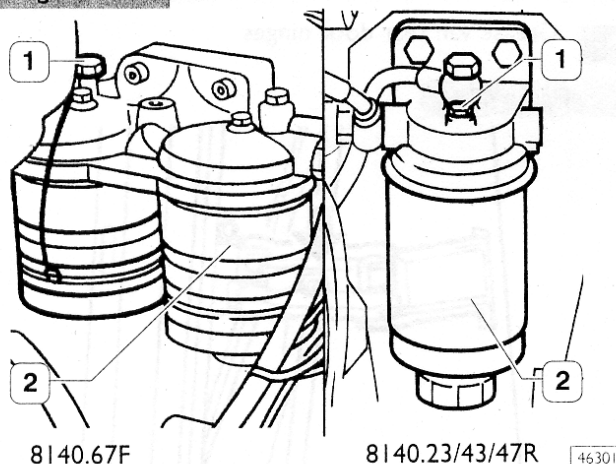
Screw in the oil filter (2) by hand until it touches the engine mounting and then tighten 3/4 turn (tightening torque 25 Nm).

Fit plug (1).

Through filler (4) pour oil in the specified quantity and quality (refer to Capacities table, chapter GENERAL).

Change fuel filters

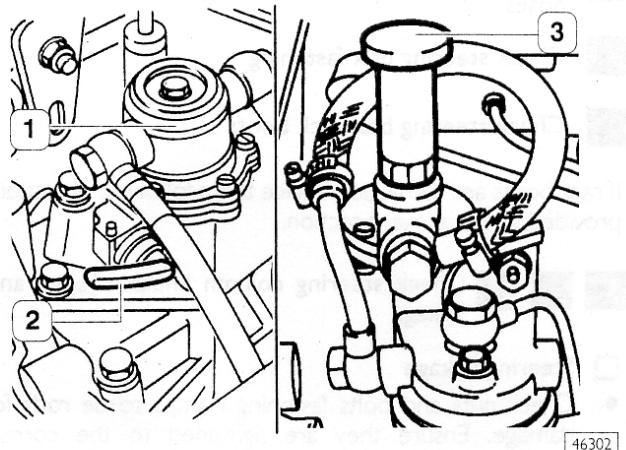
Figure 44



Use tool 99360314 to dismantle fuel filter (2).
Screw in the new filter by hand. Ensure the rubber seal and the sealing face are clean and are not damaged.
Air-bleed the fuel system as follows.

- ☐ Loosen screw (1).

Figure 45



4x2 Vehicles

Operate lever (2) of fuel pump (1) until no air remains in the system. Close the bleed screw (1) and continue operating the lever until it starts idling.

Operate piston (3) of priming pump (4) until no air remains in the system.

Close the bleed screw.



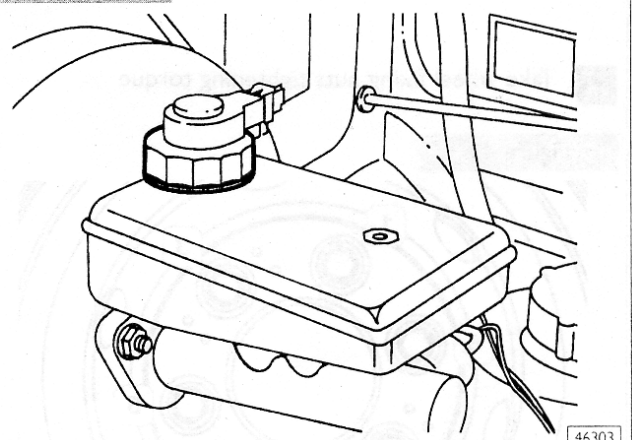
Should the engine stop owing to lack of fuel with air ingress in the system (if the above bleeding system proves useless), unscrew connections of at least two injectors, start the starter motor and retighten the connections once all air is expelled from the system.

Check operation of various drive belts

Visually check condition of drive belts. If worn, damaged, or loose, replace them as described in the relevant chapters.

Check brake system fluid level

Figure 46



Check brake system fluid level. If level is low, top up as required (refer to Capacities table, chapter GENERAL).

Check brake discs for wear

If excessively worn, replace brake discs as described in the relevant chapter.

6 Check tightening of aftercooler system clamps and hoses

8 Check steering box fastening

8 Check steering box rack boots

If rack boots are damaged, replace them following instructions provided in the relevant section.

8 9 10 Check steering column knuckle joints and linkage

☐ **Steering linkage**

- Check nuts and bolts fastening clamps to tie rods for damage. Ensure they are tightened to the correct torque.
- Check tie rods and threaded parts for damage.

☐ **Knuckle joints**

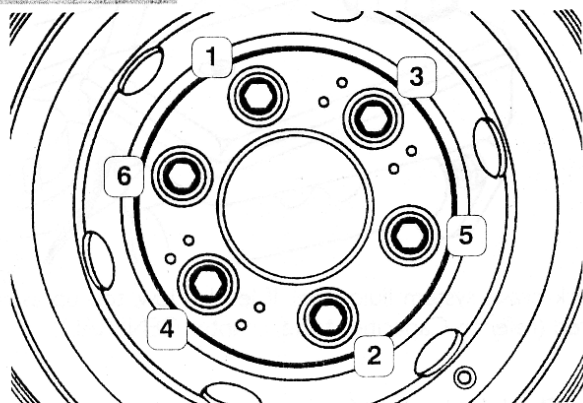
- Clean knuckle joints.
- Do not use solvents to clean knuckle joints. Only clean cloths should be used.
- Check all knuckle joint components for scoring which should not be more than 1 mm deep. In particular examine the plate cover in proximity of the rolled area.
- Check the protection boot. It should be securely fixed to the knuckle joint body and pin by means of a circlip. The boot should not be able to turn.
- Check the protection boot for damage or wear.
- Compress the protection boots with your hand and ensure lubrication grease issues from them.
- Check nuts and split nuts for damage.

☐ **Check steering column**

Ensure play between splined sections and universal joints is as specified.
If not, replace the parts concerned.

11 Take wheel fixing nuts tightening torque

Figure 47



46313

Undo fastening nuts and retighten them to the specified torque. Follow the sequence indicated in the figure.

12 Check alignment of clutch and brake pedals

The clutch pedal should be in line with the brake pedal. If not, proceed as described in the "CLUTCH" section.

13 Check parking brake lever stroke

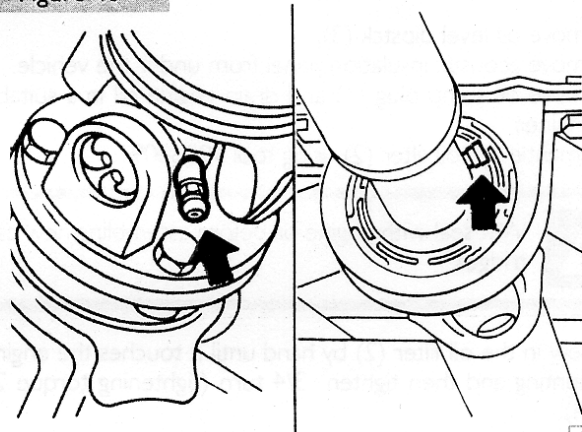
Ensure the vehicle is thoroughly braked with a lever stroke of:

- ☐ 5 releases for 4x2 vehicles
- ☐ 7 releases for 4x4 vehicle.

If not, adjust the parking brake lever stroke as described under "BRAKES".

14 Grease propeller shafts

Figure 48



46304

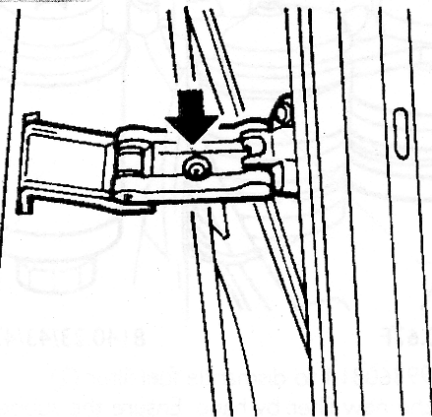
Pour TUTELA MR2 grease through the appropriate grease nipples (→).



Grease the propeller shafts at least once a year if annual mileage is equal to or less than 20,000 km.

15 Grease van rear door hinges

Figure 49



46305

Pour TUTELA MR2 grease through the appropriate grease nipples (→).

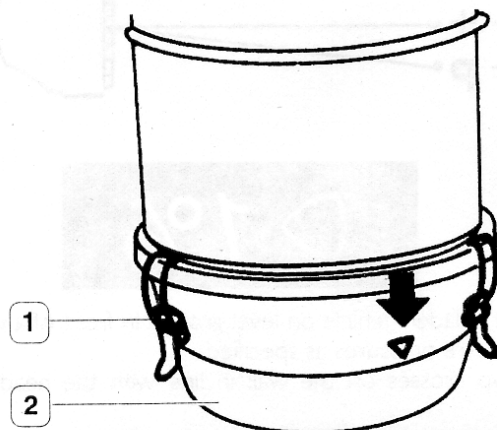


Grease the propeller shafts at least once a year if annual mileage is equal to or less than 20,000 km.

- Check tightening of air intake system clamps and hoses.
- Visual check of E.G.R. system components.

16 Change oil bath filter oil

Figure 50



46306

Release springs (1) and remove the oil pan (2). Drain the oil from pan (2) and clean it accurately. Fill the pan (2) with oil up to the point indicated by the arrow. Refit the oil pan (2) to the case and fasten it by means of springs (1).

• Check mechanical assemblies for leaks

Should leaks from mechanical units be noticed proceed as described in the relevant chapter to remedy this inconvenience.

17 Check rear wheel hub bearings for grease leaks (59.12 vehicles excepted)

If grease leaks are detected, follow directions provided in the "WHEEL HUBS" chapter (maintenance section) to remedy this inconvenience.

• Check cooling and brake system pipes for leaks

Tighten connections and fastening clamps if leaks are detected. If damaged, replace the parts concerned.

- Check moving parts for interference.
- Road test and handling operations.

8 18 19 20 Check all mechanical assemblies for leaks

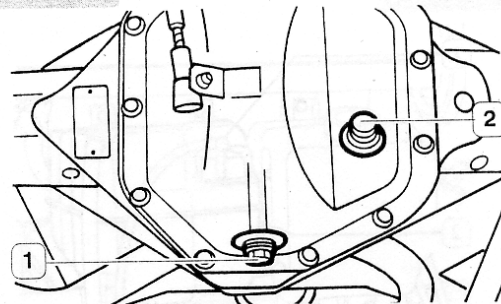
SERVICE M2



This service includes all M1 operations plus the following ones.

18 Change rear axle(s) oil, clean oil vapour breather

Figure 51



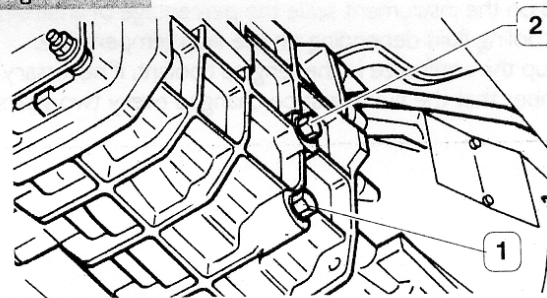
46310

Drain oil from the axle housing (the oil should be warm). Place a suitable container under plug (1); remove the plug and drain the oil.

Refit plug (1), remove plug (2) and pour oil in the specified quantity and the specified type in the relevant hole. Dismantle the oil vapour breather and clean it accurately.

19 Change transmission oil and clean oil vapour breather

Figure 52



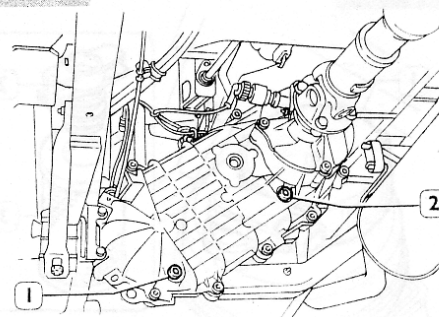
46308

Drain oil from the transmission case (the oil should be warm). Place a suitable container under plug (1); remove the plug and drain the oil.

Refit plug (1), remove plug (2) and pour oil in the specified quantity and the specified type in the relevant hole. Dismantle the oil vapour breather and clean it accurately.

20 Change transfer case oil and clean oil vapour breather

Figure 53



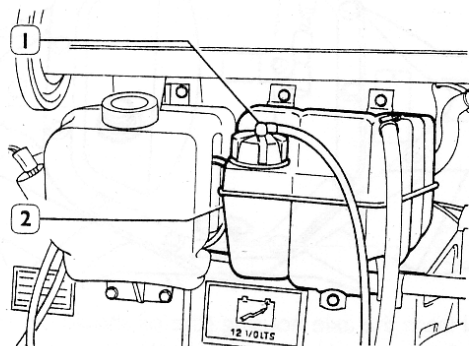
46309

Drain oil from the transfer case (the oil should be warm). Place a suitable container under plug (1); remove the plug and drain the oil.

Refit plug (1), remove plug (2) and pour oil in the specified quantity and the specified type in the relevant hole. Dismantle the oil vapour breather and clean it accurately.

21 Check antifreeze concentration in engine coolant

Figure 54



46307

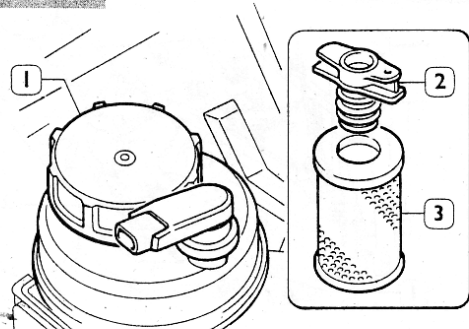


Remember that when the engine is warm pressure in the cooling system is very high. Therefore take care in removing plug 1.

Dismantle plug (1) and use hydrometer 99395858 to take a sample of cooling fluid from the expansion tank (2). Read on the instrument scale the percentage of antifreeze in the cooling fluid depending on the fluid temperature. Top up the antifreeze in the engine coolant, if necessary. Remember that the fluid must be changed every two years.

Change steering hydraulic system filter

Figure 55

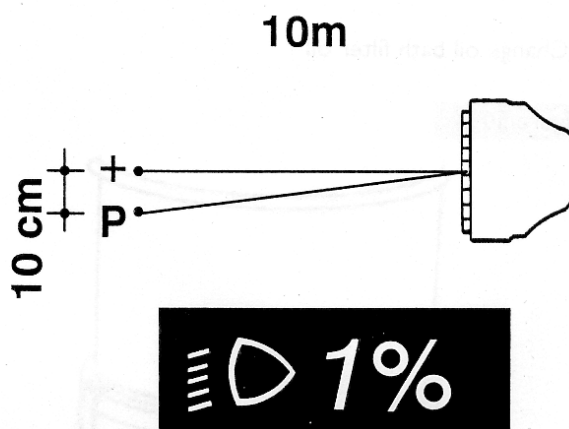


46297

Clean the oil tank accurately before removing cap (1) to prevent the oil from being fouled by foreign matters. Remove tank cap (1) and pull out the oil filter (2). Disconnect the hitching device (2) from the oil filter (3) and replace the latter with a new one.

23 Check headlight aiming

Figure 56



46311

Place the unladen vehicle on level ground in front of a white wall, with tyre pressures as specified.

Draw two crosses on the wall in line with the headlamp centres.

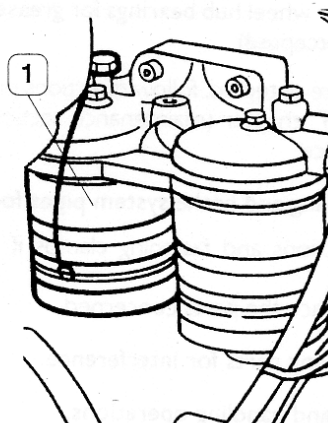
Position headlight levelling control (where fitted) on 0.

Position the vehicle 10 metres from the wall and switch on the dipped (low beam) lights. The distance between the crosses and points P (corresponding to the beam inclination angle) should be 10 cm (1% as shown on the label).

24 Check operation of preheating plugs (.8 vehicles)

- Change auxiliary fuel filter (.8 vehicles)

Figure 57



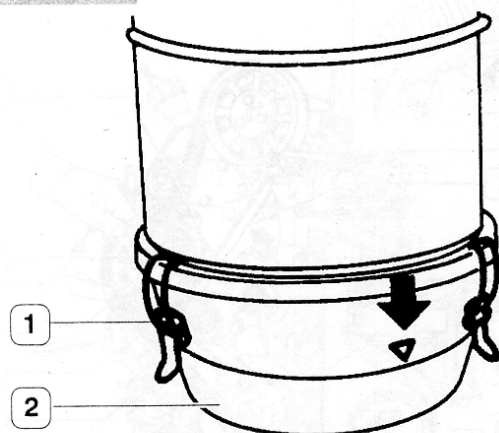
46312

Use tool 99360314 to dismantle the auxiliary fuel filter (1). Screw in the new filter by hand. Ensure the rubber seal and the sealing face are not damaged and clean. Air-bleed the fuel system as described on page 5.

- Check operation of E.G.R. system (if fitted)

- 16** Remove and wash oil bath air cleaner components (if fitted)

Figure 58



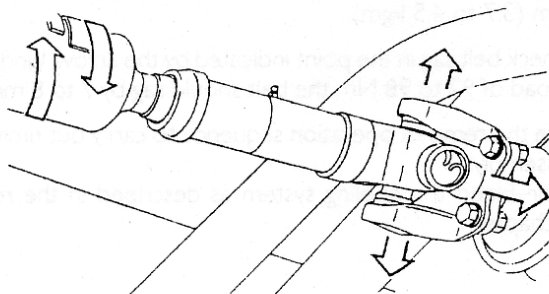
46306

Release springs (1) and remove the oil pan (2). Drain the oil from pan (2) and clean it accurately. Dismantle the metal filtering element and wash it accurately. Clean the inside of the filter housing. Refit the filtering element.

Fill the pan (2) with oil up to the point indicated by the arrow. Refit the oil pan (2) to the case and fasten it by means of springs (1).

- 21** Check leaf spring fastening
- 22** Check engine suspension fastening
- 23** Check cardan joints and propeller shaft flange fastening

Figure 59



23808

Check play between splined sections while turning the propeller shaft in one direction and the sliding sleeve in the opposite direction at the same time.

Work on sleeve forks to check spiders for wear; if so, replace them.

If play figures are not as specified, overhaul the propeller shaft as described in the relevant chapter.

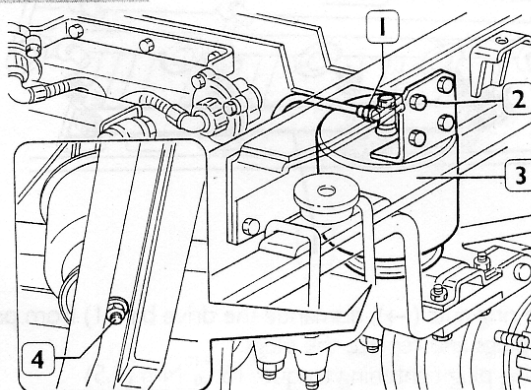
Check fastening of propeller shafts to associated mechanical assemblies.

- 28** Check air suspension levelling (if fitted)

Check and if necessary adjust air suspension levelling as described in the relevant manual.

- 29** Check air spring fastening – Air suspension system (if fitted)

Figure 60



39226

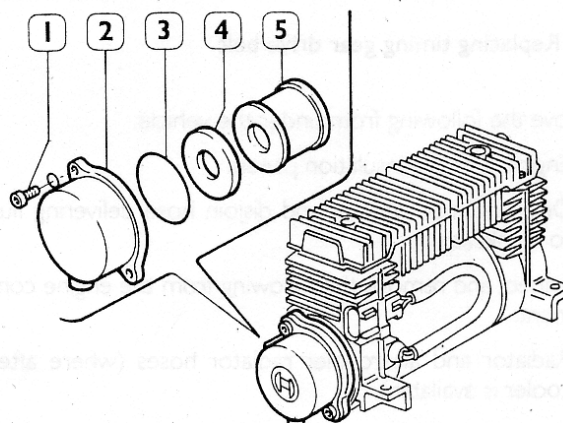
Ensure air spring (3) fastening nut (1) and screws (2) are tightened to the correct torque.

- Check moving parts for interference
- Check operation of automatic chassis lubrication system

SERVICING OPERATIONS NOT INCLUDED IN THE MAINTENANCE PLAN (SERVICE MFP)

- 30** Change air suspension filter (if fitted)

Figure 61



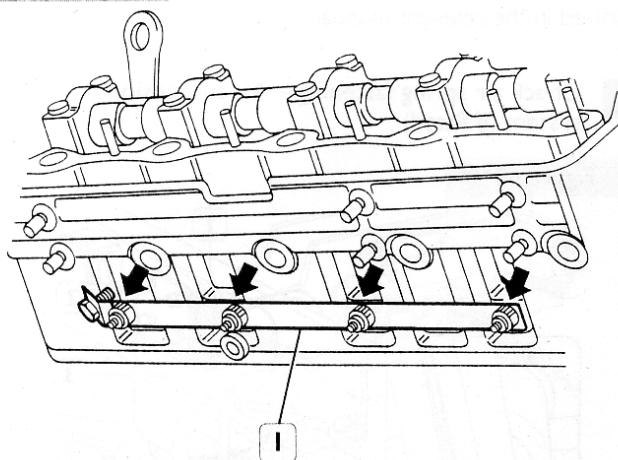
46299

Remove screws (1) and dismantle cover (2) from compressor (6).

Clean housings and then replace air cleaner (5) and rings (3 and 4).

24 Replace preheating plugs (.8 vehicles every 60,000 km)

Figure 62



Remove ring nuts (→), dismantle the drive bar (1) from preheating plugs and replace the plugs.

Preheating plug tightening torque: $15 \pm_{-0}^{+10}$ Nm (1.5)

Ring nut tightening torque: $2 \pm_{-0.5}^{+0}$ Nm ($0.2 \pm_{-0.05}^{+0}$ kgm)



After assembly, check continuity again as possible warping resulting from the fitting pressure can lead to a continuity break.



Change water pump and alternator drive belts. Change belt of air-conditioner compressor, if fitted (every 100,000 km)

Replace drive belts as described in the relevant chapter, "ENGINE" section.

Replacing timing gear drive belt

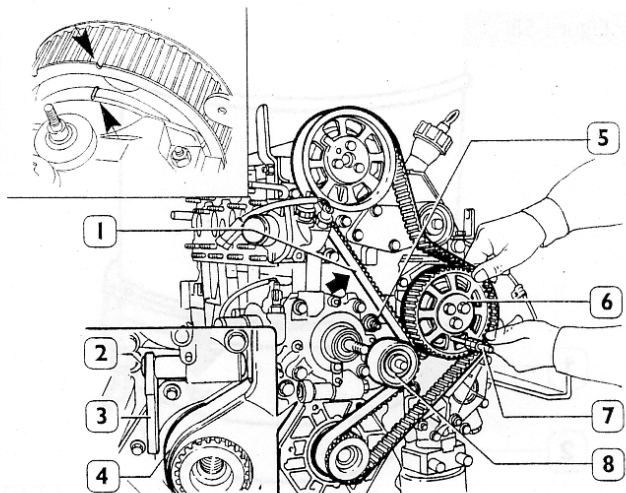
Remove the following from under the vehicle:

- ☐ Engine acoustic insulation panels.
- ☐ Drain radiator coolant and disjoin hose delivering fluid to crankcase.

Disconnect and remove the following from the engine compartment:

- ☐ Radiator and aftercooler radiator hoses (where aftercooler is available).
- ☐ Filter and turbocharger air sleeve.
- ☐ Oil vapour recirculation line.
- ☐ Thermostarter and timing cover fuel line.
- ☐ Fan.
- ☐ Timing cover.

Figure 63



45079

Turn the crankshaft so that notches (→) on camshaft pulley and tappets cover face each other. Introduce tool 993606068 (7) through the pulley hole (6) and the matching one on the auxiliary unit (piston of cylinder no.1 to T.D.C.)

To relieve the pressure of push rod (2) on the belt tightener roller (8), insert a suitable wrench (3) between the belt tightener cylinder and the push rod. Slacken nut (5).

Dismantle the lower cover (4) and replace the timing belt (1).

- ☐ Fit the lower cover (4) and tighten screws and fixing nut to the specified torque.
- ☐ Remove tool (3) so as to enable push rod (2) to tighten timing belt (1) by means of belt tightener (8).
- ☐ Remove tool 99360608 (7) from pulley (6).
- ☐ Have the crankshaft perform three turns. Follow the above instructions to check whether reference points to be used for timing the engine are aligned when piston of cylinder no.1 is at T.D.C.
- ☐ Work on the crankshaft to tension the timing belt. Lock the tightener roller fixing nut (5) to a torque of 37 to 45 Nm (3.7 to 4.5 kgm).
- ☐ Check belt sag in the point indicated by the arrow. Under a load of 92 to 98 Nm the belt should sag by 7 to 8 mm.

Reverse the removal operation sequence to carry out timing gear assembly.

Then air-bleed the cooling system as described in the relevant chapter.

32 Check and set injectors, as required (every 120,000 km)

Injector check and setting should be carried out using equipment 99305017. Specified setting figures are those given in the following table:

ENGINE	SETTING PRESSURE
8140.67F	120 ⁺⁸
8140.23/43	240 ^{-12*}
8140.47 R	240 ^{+8*}

* In the case of figures under 200 bars, set injectors to 230 bars.

If readings are not as specified, dismantle the injector and replace shims.

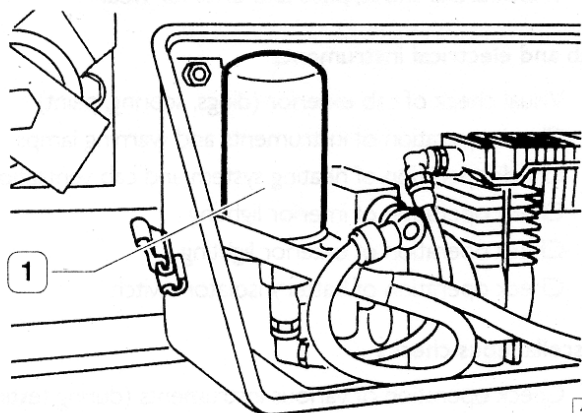
Also ensure that the atomized fluid issues evenly from each nozzle hole. Then check that at a slightly lower pressure no drippings from the injector can be noticed.

Engine coolant change (every 100,000 km – 4x4 vehicles every 2400 h)

With engine cold, remove the expansion tank plug. Open the heating fluid tap (in the cab) thoroughly. Place a suitable container under the vehicle at the radiator drain plug. Remove the drain plug and drain the fluid. Fit the plug. Refill and air-bleed the unit as described in the relevant chapter.

Replace air suspension system drier filter (if fitted, every 120,000 km)

Figure 64



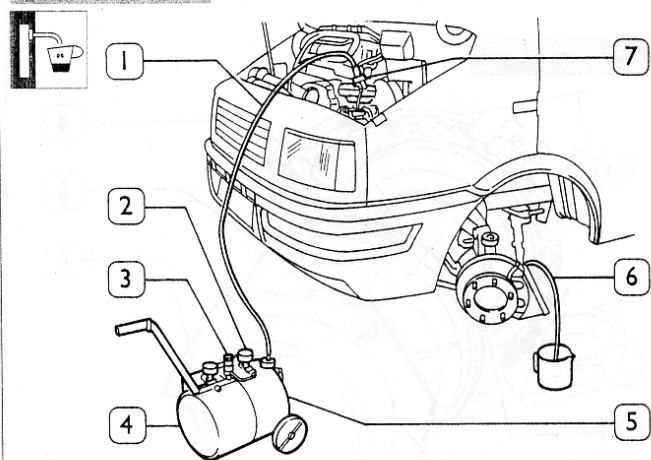
Use a suitable tool to dismantle the drier filter (1) from its mounting and fit a new filter in its place.



If an excessive quantity of oil is noticed either in the drier or in the delivery line during disassembly, check operation of the air compressor as described in the relevant chapter.

6 Change brake fluid

Figure 65



45023

Fit a transparent plastic pipe (2) to the brake caliper or rear brake cylinder bleed screw. Put one of the pipe ends in a container.

Open the bleed screw and depress the brake pedal until all the oil is discharged.

Repeat the same operation on all remaining wheels.

Use device 99306010 to refill the brake system with oil. Proceed as follows:

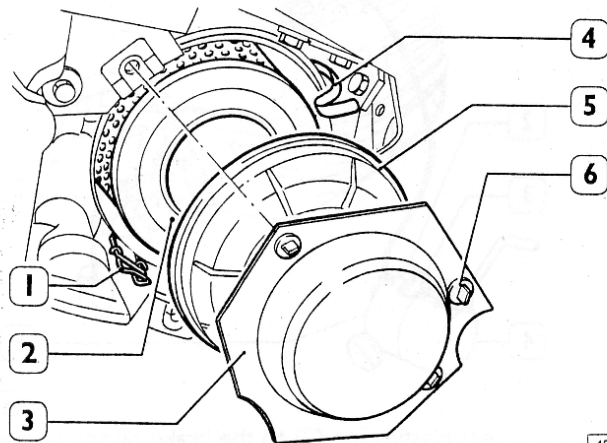
- ☐ Load the air reservoir (4).
- ☐ Fill the reservoir (5) with brake fluid.
- ☐ Fit a transparent plastic pipe (6) to the bleed screw. Put one of the pipe ends in a container partially filled with brake fluid.
- ☐ Change the brake fluid tank cover with a suitable one (7) taken from the de-aerator kit.
- ☐ Fit the pipe (1) of device 99306010 to the brake fluid tank cover.
- ☐ Undo the bleed screw one turn, open the tap (3) until the pressure gauge shows a pressure of 1 to 1.2 bars.

When the brake fluid issues evenly from the hydraulic system circuit, close the bleed screw and unload the air reservoir (4). Repeat the same operation with all the remaining wheels.

Replace air cleaner

Dismantle the air cleaner access door from under the vehicle.

Figure 66



45298

Remove screws (6) and remove guard (5).
Release hooks (1 and 4).
Remove cartridge (2).

Clean the inside of the filter housing, fit the new filter cartridge and the remaining dismantled parts in the reverse order.

SERVICE M12 – END OF WARRANTY COUPON

Service M12 should be carried out between the tenth and twelfth months of the warranty period.

Service M12 includes a thorough check of the vehicle and its main components. Distance covered and type of use of the vehicle shall obviously be taken into account.

Engine

- Check engine idling speed
- Visual check of engine exhaust system
- Check condition of various drive belts

Chassis and mechanical assemblies

- Check mechanical assemblies for leaks
- Check brake hydraulic system and cooling system for leaks
- Check oil level in hydraulic steering system
- Check condition of gear lever boot
- Check fastening of leaf spring anchoring bars, brackets and mountings
- Check steering box rack boots
- Check steering column, knuckle joints and linkage
- Check air suspension levelling
- Check fuel lines for leaks
- Check serviceability of air suspension bellows
- Check power steering hydraulic stop device
- Visual check of tyres for wear
- Check efficiency of boots, transmission, steering and clutch sleeves.

Brakes

- Check operation of service brakes
- Check operation of emergency and parking brake
- Check brake shoes, pads and discs for wear

Cab and electrical instruments

- Visual check of cab exterior (dings, scoring, paint)
- Check operation of instruments and warning lamps
- Check operation of heating system and cab ventilation
- Check operation of interior lighting
- Check operation of exterior lighting
- Check operation of battery isolator switch

Miscellaneous checks

- Check operation of various instruments (during testing)
- Check brake efficiency
- Smoke test (engine warm)
- Road test and handling operations