



# Chapter 9

## Hydraulic system

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### Degrees of difficulty

<p><b>Easy</b>, suitable for novice with little experience</p>	<p><b>Fairly easy</b>, suitable for beginner with some experience</p>	<p><b>Fairly difficult</b>, suitable for competent DIY mechanic</p>	<p><b>Difficult</b>, suitable for experienced DIY mechanic</p>	<p><b>Very difficult</b>, suitable for expert DIY or professional</p>
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### Specifications

#### Pressure regulator

Cut-out pressure .....	170 ± 5 bars
Cut-in pressure .....	145 ± 5 bars

#### Torque wrench settings

Hydraulic pipe unions:	Nm	lbf ft
3.5 and 4.5 mm diameter pipes .....	8	6
6.35 mm diameter pipes:		
With sleeve seal .....	10	7
Without sleeve seal .....	13	10
10 mm diameter pipes .....	30	22

#### 1 General information and precautions

##### General information

The hydraulic suspension, the braking system, and where applicable the power steering system are pressurised by a common hydraulic system.

Hydraulic fluid is drawn from the hydraulic reservoir, mounted in the engine compartment, and is delivered under pressure to the hydraulic pressure regulator. The hydraulic system is pressurised by a belt-driven pump, which is driven by the engine crankshaft pulley.

From the pressure regulator, fluid passes to the security valve, which is connected to the compensator control valve and the front and rear suspension height corrector units.

Fluid from the suspension height corrector units flows to the suspension hydraulic unit

cylinders. From the suspension hydraulic unit cylinders, the low pressure return fluid is returned to the hydraulic reservoir.

The height correctors maintain the suspension at the manually-selected height by admitting fluid to, and releasing fluid from, the suspension cylinders according to the movement of the front and rear anti-roll bars to which they are connected.

The hydraulic fluid flow in the suspension system is controlled by an electronic control unit, via solenoid valves. The control unit receives signals from various sensors, and regulates the hydraulic fluid pressure and flow within the suspension system to suit the prevailing driving conditions.

Hydraulic pressure for the braking system is supplied from the compensator control valve with separate front and rear circuits. The front circuit is supplied direct from the compensator control valve, whilst the rear brake circuits operate in conjunction with hydraulic circuits to the rear suspension. This arrangement results in the braking effort being

biased in favour of the front brakes, and at the same time regulates the braking effort on the rear wheels according to the load on the rear suspension - the greater the load, the greater the pressure on the rear suspension, thus the more braking effort. On models with ABS, the hydraulic pressure to all four brakes is controlled by a hydraulic modulator - further details can be found in Chapter 10.

A flow distributor is fitted between the high pressure pump and the pressure regulator unit. The purpose of the flow distributor is to control the hydraulic pressure between the steering circuit and the suspension and brake circuits.

Procedures for the basic system components are given in this Chapter. The overall hydraulic system comprises a number of valves, regulators and actuators. Any work involving components not covered in this Chapter or Chapter 11 should be referred to a Citroën dealer or qualified specialist. Similarly, system checking and fault diagnosis work should be entrusted to a Citroën dealer or specialist.

## Precautions



**Warning:** The fluid used in the XM hydraulic system is LHM mineral fluid, which is green in colour. The use of any other type of fluid will damage the system rubber seals and hoses. Keep the fluid carefully sealed in its original container.

In an emergency, SAE 10 or SAE 20 engine oil (no other type of fluid) may be used in the system, but in this case the complete hydraulic system **must** be drained, and fresh LHM fluid substituted at the earliest opportunity.

If there is any possibility of fluid other than genuine LHM fluid being in the system, drain the complete hydraulic system, and fill it with the special rinsing solution obtainable from Citroën dealers. Bleed the system and leave the solution in the circuit for approximately 600 miles (1000 km), then drain it out and fill with LHM fluid. If the rubber seals are damaged by the incorrect fluid, it will also be necessary to renew these items at the same time (it is wise to entrust this task to a Citroën dealer or specialist).

Use only genuine spare parts. Components are identified by their white or green colour, and are of a special quality for use with LHM fluid.

Cleanliness is of the utmost importance when working on the hydraulic system and its components. Clean all adjacent areas before disconnecting components. After removal, blank off all orifices, and ensure that components, pipes and hoses do not get contaminated.

Use only petrol to clean hydraulic components.

Before carrying out any work on hydraulic system components, depressurise the system (see Section 2), and then disconnect the battery negative lead.

## 2 Hydraulic system – depressurising, pressurising and priming

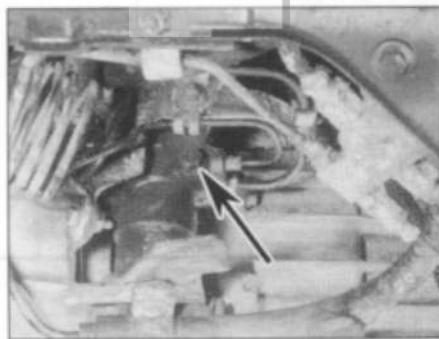


### Depressurising

**Note:** Refer to the precautions given at the beginning of Section 1 before proceeding. The following operation must be carried out with the engine running. The system can be depressurised with the engine stopped, but special equipment is required, and the operation should therefore be entrusted to a Citroën dealer or a qualified specialist.

1 The hydraulic system is depressurised using the pressure regulator pressure release screw. The release screw is located on the main accumulator assembly mounted at the front of the transmission (see illustration).

2 Ensure that the pressure regulator pressure release screw is fully closed (see paragraph 1).



2.1 Hydraulic pressure regulator pressure release screw (arrowed) – viewed from under front of vehicle

3 Move the suspension mode switch to the 'Auto' (models up to 1992) or 'Normal' (models from 1993) position, as applicable (see illustration).

4 With the engine running, set the suspension height control lever to the 'Low' position.

5 Allow the engine to run for approximately one minute, whilst the vehicle suspension sinks down. **Do not** move the steering wheel.

6 When the suspension has stopped sinking, stop the engine, then unscrew the pressure regulator pressure release screw by one turn (see paragraph 1). It should be possible to hear a whistling sound, which indicates that hydraulic fluid under pressure is flowing and returning to the reservoir.



**Warning:** Do not remove the pressure release screw, as the sealing ball beneath the screw is easily lost.

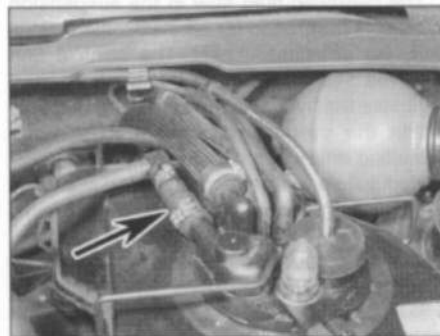
### Pressurising

7 On completion of work, to pressurise the system, tighten the pressure regulator pressure release screw, then move the suspension height control lever to the 'Maximum' position.

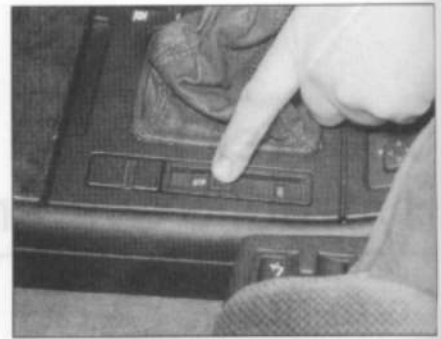
8 Start the engine, and allow the vehicle suspension to rise to its maximum height. Operate the height control lever through its full range of movement several times to check the operation of the hydraulic system.

### Priming

9 Normally, the system will prime automatically when the engine is started,



2.11 High pressure fluid hose (arrowed)



2.3 Moving the suspension mode switch to the 'Normal' position

however sometimes it may be necessary to assist priming of the high pressure pump as follows.

10 Ensure that the pressure regulator pressure release screw has been slackened (see paragraph 1).

11 Disconnect the high pressure fluid hose from the top of the reservoir (see illustration).

12 Pour LHM hydraulic fluid directly into the hose.

13 Start the engine.

14 Reconnect the hose as soon as the fluid level in the hose falls.

15 Once the pump has been primed, slacken and then tighten the pressure regulator pressure release screw several times to bleed the air from the system.

16 Move the suspension height control lever to the 'Maximum' position, then top up the level in the fluid reservoir.

## 3 Hydraulic pipes – renewal



**Note:** Refer to the precautions given at the beginning of Section 1 before proceeding. New pipe seals must be used on refitting.

1 Depressurise the hydraulic system as described in Section 2.

2 Before disconnecting a pipe, thoroughly clean the area around the union.

3 If a complete pipe section is to be removed, release the pipe from any retaining clips and mountings. Avoid distorting or damaging the pipe as it is removed.

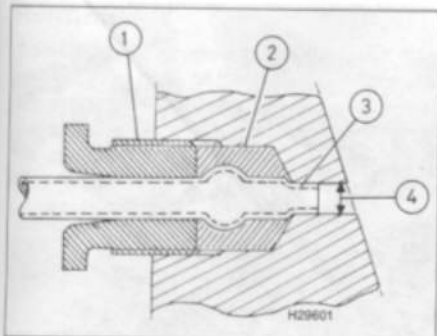
4 Plug all openings to prevent the entry of dirt into the system.

5 To ensure that a perfect seal exists when hydraulic pipe joints are assembled, the following procedure must be carried out.

6 Clean the relevant fluid port, the hydraulic pipe, the union nut, and the rubber seal, and lightly lubricate them with LHM fluid.

7 Slide the rubber seal onto the end of the pipe until the pipe protrudes from it.

8 Reconnect the pipe so that the end of the pipe enters the relevant fluid port. Ensure that the sealing rubber fully enters its location in



### 3.8 Hydraulic pipe end fitting details

- |               |              |
|---------------|--------------|
| 1 Union nut   | 3 Pipe end   |
| 2 Rubber seal | 4 Fluid bore |

the fluid port (see illustration). Also check that the end of the pipe is seated centrally in the port.

9 Screw the union nut into position, whilst keeping the pipe stationary. Do not overtighten the union nut.

10 On completion, check that the hydraulic system pipes do not touch each other or surrounding components which may stress or chafe the pipes.

11 Pressurise and if necessary prime the hydraulic system as described in Section 2.

12 Check and if necessary top up the hydraulic fluid level as described in "Weekly checks".

### 4 High pressure (hydraulic fluid) pump – removal and refitting



**Note:** Refer to the precautions given at the beginning of Section 1 before proceeding. New seals will be required when reconnecting the fluid pipes, and a new hose clip will be required.

#### Removal

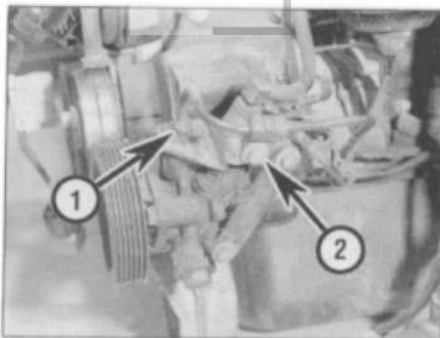
1 The pump is located at the right-hand side of the engine, and shares a drivebelt with the alternator. On most models, the pump is easily accessible from the top of the engine compartment, but on the 2.5 litre diesel engine, the pump is mounted below the alternator, and access must be obtained from underneath the vehicle.

2 Depressurise the hydraulic system as described in Section 2.

3 On the 2.5 litre diesel engine, chock the rear wheels, then jack up the front of the vehicle and support securely on axle stands (see *Jacking, and Vehicle Support*). Similarly, if necessary, to improve access, remove the right-hand front roadwheel, and the wheel arch liner.

4 Remove the auxiliary drivebelt as described in Chapter 1A or 1B.

5 Place a container beneath the pump to catch escaping hydraulic fluid, then unscrew the union nuts, and disconnect the fluid pipes



### 4.5 Disconnect the hydraulic pump fluid feed pipe (1) and unbolt the pipe bracket (2) – 2.5 litre diesel engine model

from the pump. Be prepared for fluid spillage, and plug the open ends of the pipes and pump. If necessary, unbolt the pipe support brackets to allow the pipes to be moved clear (see illustration).

6 Similarly, disconnect the fluid hose from the pump. Discard the hose clip, and use a new one on refitting.

7 Working at the rear of the pump, unscrew the lower through-bolt and nut securing the pump to the mounting bracket (see illustration).

8 Where applicable, unscrew the bolts securing the pipe bracket to the rear of the pump.

9 Unscrew the remaining mounting bolt, and withdraw the pump.

#### Refitting

10 Refitting is a reversal of removal, bearing in mind the following points.

- Use a new clip when reconnecting the fluid hose.
- Where applicable, use new seals when reconnecting the hydraulic fluid pipes (see Section 3).
- Refit and tension the auxiliary drivebelt as described in Chapter 1A or 1B.
- On completion, pressurise, and if necessary prime the pump as described in Section 2.
- Check and if necessary top up the hydraulic fluid level as described in "Weekly checks".



### 5.3 Disconnect the fluid pipes from the top of the pressure regulator



### 4.7 Hydraulic pump lower through-bolt (arrowed) – 2.5 litre diesel engine model

### 5 Hydraulic pressure regulator unit – removal and refitting



**Note:** Refer to the precautions given at the beginning of Section 1 before proceeding. New pipe seals and a new hose clip will be required on refitting.

#### Removal

1 Depressurise the hydraulic system as described in Section 2.

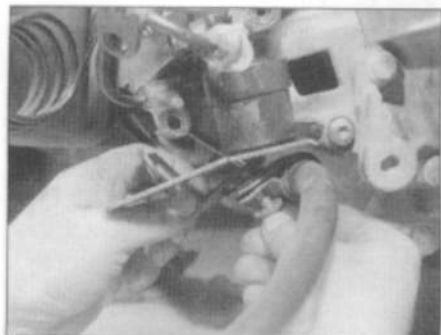
2 Place a container under the regulator unit (to catch escaping hydraulic fluid), then working under the unit, release the securing clip, and disconnect the fluid hose. Be prepared for fluid spillage, and plug the open ends of the hose and regulator.

3 Working at the top of the unit, unscrew the unions and disconnect the two fluid pipes (see illustration). Again, be prepared for fluid spillage, and plug the open ends of the pipes and regulator.

4 Where applicable, unscrew the nut and bolt securing the pipe clamps at the top of the unit, to allow the pipes to be moved clear.

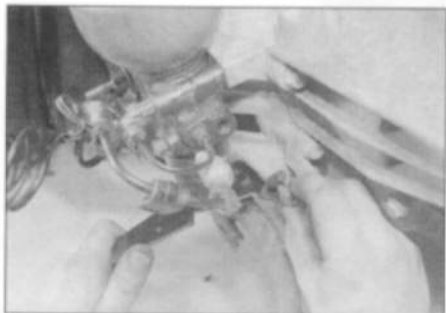
5 Unscrew the bolt, and separate the lower hose bracket from the regulator bracket (see illustration).

6 Unscrew the securing nut, and separate the pipe brackets from the regulator unit front securing stud.



### 5.5 Unscrew the bolt and separate the lower hose bracket from the regulator bracket





**5.7 Unscrew the bolt securing the regulator unit mounting bracket to the transmission**



**5.8 Removing the regulator securing stud**



**5.9 Use new seals when reconnecting the fluid pipes**

**7** Unscrew the bolt securing the regulator unit mounting bracket to the transmission (see illustration).

**8** Unscrew the bolt and stud securing the front of the regulator to the transmission, and withdraw the unit (see illustration).

**Refitting**

**9** Refitting is a reversal of removal, bearing in mind the following points (see illustration).

- a) Ensure that the fluid pipe brackets are correctly refitted, and that none of the pipes are strained.
- b) Where applicable, use new seals when reconnecting the fluid pipes.
- c) On completion, pressurise the hydraulic system as described in Section 2.
- d) Check and if necessary top up the hydraulic fluid level as described in "Weekly checks".

**6 Hydraulic fluid reservoir - removal and refitting**

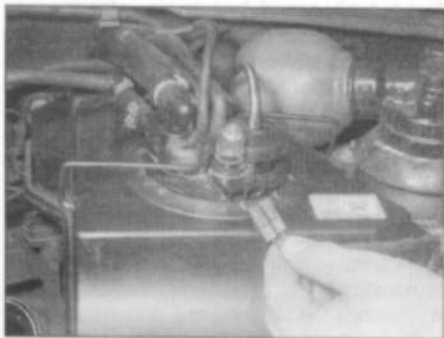
**Removal**

- 1** Depressurise the hydraulic system as described in Section 2.
- 2** Remove the air cleaner cover, and the air cleaner air intake trunking, as described in Chapter 4A or 4B.
- 3** Disconnect the wiring plug from the hydraulic fluid level indicator, and pull the two fluid return hoses from the reservoir centre section (see illustrations).
- 4** Release the clip securing the centre section to the top of the reservoir (see illustration).
- 5** Carefully lift the centre section out of the

reservoir, then cover it and place it to one side, clear of the reservoir - take care not to damage the filters as the centre section is withdrawn (see illustration). Ideally, the centre section should be placed in a suitable container to prevent any possibility of dirt entry.

**HAYNES HINT** Cut the top off a large plastic bottle, and store the reservoir centre section in the bottle.

**6** Remove the reservoir securing screw, and release the securing clip, then release the reservoir from the locating guide, and withdraw the reservoir from the engine compartment (see illustrations). Empty the contents of the reservoir into a suitable container.



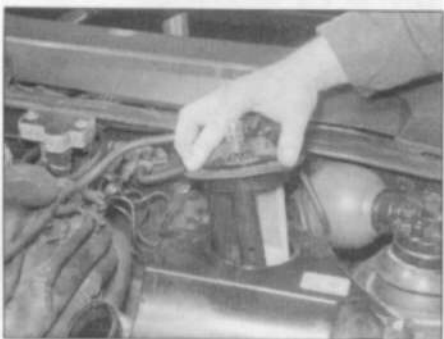
**6.3a Disconnect the wiring plug from the hydraulic fluid level indicator . . .**



**6.3b . . . and pull the fluid return hoses from the reservoir centre section**



**6.4 Release the reservoir centre section securing clip . . .**



**6.5 . . . then lift the centre section from the reservoir**



**6.6a Hydraulic fluid reservoir securing screw . . .**



**6.6b . . . and securing clip (arrowed)**

## Refitting

7 Refitting is a reversal of removal, but make sure that the base of the reservoir is correctly engaged with the locating guide.

8 Refill the hydraulic system with fluid, as described in Chapter 1A or 1B.

### 7 Hydraulic fluid reservoir bulbs – removal and refitting

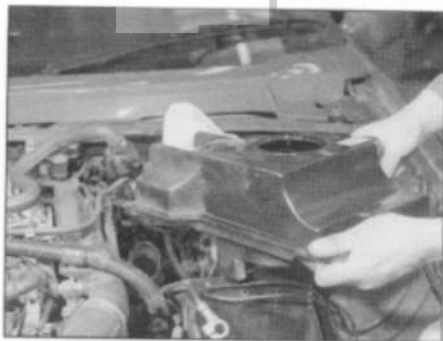


## Removal

**Note:** A strap wrench will be required for this operation. A new seal will be required on refitting.

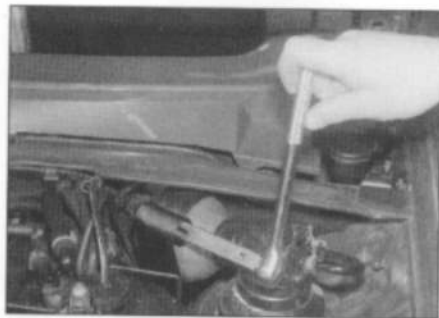
1 Depressurise the hydraulic system as described in Section 2.

2 Using a strap wrench, loosen the bulb, then



6.6c Removing the hydraulic fluid reservoir

unscrew the bulb from the relevant hydraulic unit (**see illustration**). Note that the bulbs are self-sealing. But be prepared for fluid spillage from the hydraulic unit. Plug the open end of the hydraulic unit to prevent dirt ingress.



7.2 Using a strap wrench to unscrew a front suspension unit hydraulic reservoir bulb

## Refitting

3 Grease the contact face of the bulb, and refit the bulb using a new seal. Tighten the bulb by hand only.

4 Check and if necessary top up the hydraulic fluid level as described in "Weekly checks".