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Chapter 8 Driveshafts

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Degrees of difficulty

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

Torque wrench settings

	Nm	lbf ft
Driveshaft retaining nut	320	236
Right-hand driveshaft intermediate bearing retaining bolt nuts	10	7
Front suspension lower balljoint nut	45	33
Roadwheel bolts	90	66

1 General information

Drive is transmitted from the differential to the front wheels by means of two solid-steel driveshafts of unequal length.

Both driveshafts are splined at their outer ends, to accept the wheel hubs, and are threaded so that each hub can be secured to the end of the driveshaft by a large nut. The inner end of each driveshaft is splined to accept the differential sun gear.

Constant velocity (CV) joints are fitted to each end of the driveshafts, to ensure the smooth and efficient transmission of power through all suspension and steering angles. The inner constant velocity joints are of the tripod type, and the outer joints are of the ball-and-cage type.

On the right-hand side, due to the length of the driveshaft, the inner constant velocity joint is situated approximately halfway along the shaft's length, and an intermediate support bearing is mounted in the engine/transmission rear mounting bracket.

2 Driveshaft - removal and refitting

Note: A balljoint separator tool will be required for this operation. A new suspension lower balljoint nut will be required on refitting.

Removal

1 Chock the rear wheels of the car, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove the appropriate front roadwheel. On models where access to the driveshaft nut

can be obtained by removing the wheel trims, before jacking up the vehicle, loosen the driveshaft nut as follows.

- a) Chock the front wheels, and remove the wheel trim.
- b) Apply the parking brake firmly.
- c) Proceed as described in paragraph 6.
- d) Loosen the driveshaft nut using a socket and extension.

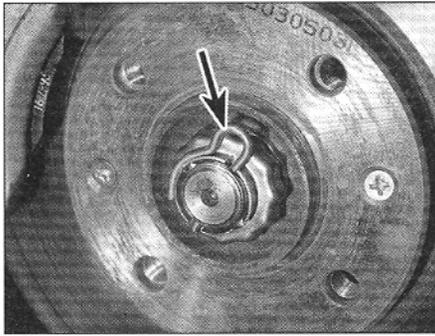
2 Using a screwdriver, release the securing clip, and remove the cover from the battery, then disconnect the battery negative lead.

3 Where applicable, remove the engine undershield.

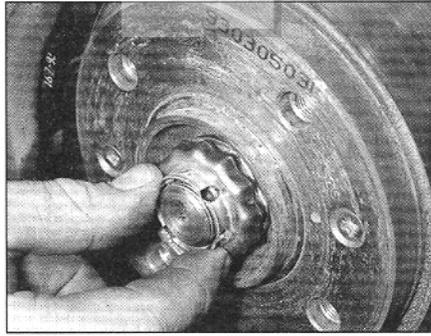
4 Drain the transmission oil or fluid as described in Chapter 7A or 7B.

5 On models equipped with ABS, remove the ABS wheel sensor as described in Chapter 10.

6 If the driveshaft nut has been loosened, proceed to paragraph 8, otherwise withdraw



2.6a Withdraw the R-clip (arrowed) . . .



2.6b . . . and remove the locking cap

the R-clip and remove the locking cap from the driveshaft retaining nut (see illustrations).
7 Refit at least two roadwheel bolts to the front hub, and tighten them securely. Have an assistant firmly depress the brake pedal to prevent the front hub from rotating, then using a socket and a long extension bar, slacken and remove the driveshaft retaining nut. Alternatively, a tool can be fabricated from two lengths of steel strip (one long, one short) and a nut and bolt; the nut and bolt forming the pivot of a forked tool. Bolt the tool to the hub using two wheel bolts, and hold the tool to prevent the hub from rotating as the driveshaft retaining nut is undone (see Tool Tip). This nut is very tight; make sure that there is no risk of pulling the car off the axle stands. (If the roadwheel trim allows access to the driveshaft nut, the initial slackening can be done with the wheels chocked and on the ground.)

8 Slacken and partially unscrew the suspension lower balljoint nut (unscrew the nut as far as the end of the threads on the balljoint to prevent damage to the threads as the joint is released), then release the balljoint using a balljoint separator tool (see illustration). Remove the nut.

Left-hand driveshaft

9 Carefully pull the hub carrier assembly outwards, and withdraw the driveshaft outer constant velocity joint from the hub assembly. If necessary, the shaft can be tapped out of the hub using a soft-faced mallet.

10 Support the driveshaft, then withdraw the inner constant velocity joint from the

transmission, taking care not to damage the driveshaft oil seal. Remove the driveshaft from the vehicle.

Right-hand driveshaft

11 Loosen the two intermediate bearing retaining bolt nuts, then rotate the bolts through 90°, so that their offset heads are clear of the bearing outer race (see illustration).

12 Carefully pull the hub carrier assembly outwards, and withdraw the driveshaft outer constant velocity joint from the hub assembly. If necessary, the shaft can be tapped out of the hub using a soft-faced mallet.

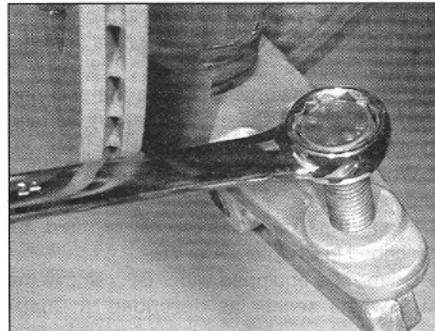
13 Support the outer end of the driveshaft, then pull on the inner end of the shaft to free the intermediate bearing from its mounting bracket.

14 Once the driveshaft end is free from the transmission, remove the driveshaft from the vehicle.

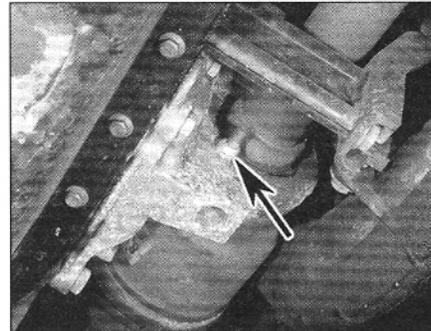
Refitting

15 Before installing the driveshaft, examine the driveshaft oil seal in the transmission for signs of damage or deterioration and, if necessary, renew it, with reference to Chapter 7A or 7B. (Having got this far it is worth renewing the seal as a matter of course.)

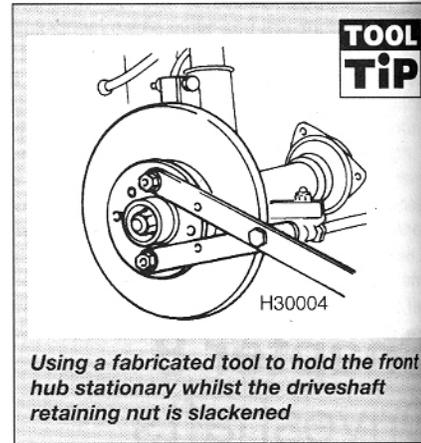
16 Thoroughly clean the driveshaft splines, and the apertures in the transmission and hub assembly. Apply a thin film of grease to the oil seal lips, and to the driveshaft splines and shoulders. Check that all gaiter clips are securely fastened.



2.8 Releasing the suspension lower balljoint using a balljoint separator tool



2.11 Right-hand driveshaft intermediate bearing retaining bolt nut (arrowed)



Using a fabricated tool to hold the front hub stationary whilst the driveshaft retaining nut is slackened

Left-hand driveshaft

17 Offer up the driveshaft, and locate the joint splines with those of the differential sun gear, taking great care not to damage the oil seal. Push the joint fully into position.

18 Locate the outer constant velocity joint splines with those of the hub, and slide the joint back into position in the hub.

19 Align the suspension lower balljoint with the lower arm, then refit and tighten a new retaining nut to the specified torque setting.

20 Lubricate the inner face and threads of the driveshaft retaining nut with clean engine oil, and refit it to the end of the driveshaft. Use the method employed on removal to prevent the hub from rotating, and tighten the driveshaft retaining nut to the specified torque. Check that the hub rotates freely.

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On models where access to the driveshaft nut can be obtained by removing the wheel trims, the driveshaft nut can be tightened with the parking brake applied, and the vehicle resting on its wheels.

21 Engage the locking cap with the driveshaft nut so that one of its cut-outs is aligned with the driveshaft hole. Secure the cap in position with the R-clip.

22 Where applicable, refit the ABS wheel sensor, with reference to Chapter 10.

23 Where applicable, refit the engine undershield.

24 Refit the roadwheel, then lower the vehicle to the ground and tighten the roadwheel bolts to the specified torque.

25 Reconnect the battery negative lead, and refit the battery cover.

26 Refill the transmission with the specified type and amount of fluid/oil, and check the level using the information given in Chapters 1A or 1B and 7A or 7B.

Right-hand driveshaft

27 Check that the intermediate bearing rotates smoothly, without any sign of roughness or undue free play between its

inner and outer races. If necessary, renew the bearing as described in Section 5. Examine the dust seal for signs of damage or deterioration, and renew if necessary.

28 Apply a smear of grease to the outer race of the intermediate bearing.

29 Pass the inner end of the shaft through the bearing mounting bracket.

30 Carefully locate the inner driveshaft splines with those of the differential sun gear, taking care not to damage the oil seal. Align the intermediate bearing with its mounting bracket, and push the driveshaft fully into position. If necessary, use a soft-faced mallet to tap the outer race of the bearing into position in the mounting bracket.

31 Locate the outer constant velocity joint splines with those of the hub, and slide the joint back into position in the hub.

32 Ensure the intermediate bearing is correctly seated, then rotate its retaining bolts back through 90°, so that their offset heads are resting against the bearing outer race. Tighten the retaining nuts to the specified torque.

33 Carry out the operations described above in paragraphs 19 to 26.

3 Driveshaft inner joint gaiter – renewal

1 Remove the driveshaft from the vehicle as described in Section 2.

2 Secure the driveshaft in a vice equipped with soft jaws, and release the two rubber gaiter retaining clips. If necessary, the gaiter retaining clips can be cut to release them.

3 Slide the rubber gaiter down the shaft, to expose the outer constant velocity joint. Scoop out the excess grease.

4 Using a hammer and suitable soft metal drift, sharply strike the inner member of the outer joint to drive it off the end of the shaft. The joint is retained on the driveshaft by a circlip, and striking the joint in this manner forces the circlip into its groove, so allowing the joint to slide off.

5 Once the joint assembly has been removed, remove the circlip from the groove in the

driveshaft splines, and discard it. A new circlip must be fitted on reassembly.

6 Tape over the splines on the driveshaft, and carefully remove the outer constant velocity joint rubber gaiter, and the gaiter inner end plastic bush. It is recommended that the outer joint gaiter is also renewed, regardless of its apparent condition.

7 Release the retaining clips, then slide the inner gaiter off the shaft, and remove its plastic bush. As the gaiter is released, the joint outer member will also be freed from the end of the shaft (see illustrations).

8 Thoroughly clean the joint using paraffin, or a suitable solvent, and dry it thoroughly. Check the tripod joint bearings and joint outer member for signs of wear, pitting or scuffing on their bearing surfaces. Check that the bearing rollers rotate smoothly and easily around the tripod joint, with no traces of roughness.

9 If on inspection, the tripod joint or outer member reveal signs of wear or damage, it will be necessary to renew the complete driveshaft assembly, since the joint is not available separately. If the joint is in satisfactory condition, obtain a repair kit consisting of a new gaiter, retaining clips, and the correct type and quantity of grease. Although not strictly necessary, it is also recommended that the outer constant velocity joint gaiter is renewed, regardless of its apparent condition.

10 On reassembly, pack the inner joint with the grease supplied in the gaiter kit. Work the grease well into the bearing tracks and rollers, while twisting the joint.

11 Clean the shaft, using emery cloth to remove any rust or sharp edges which may damage the gaiter, then slide the plastic bush and inner joint gaiter along the driveshaft. Locate the plastic bush in its recess on the shaft, and seat the inner end of the gaiter on top of the bush.

12 Fit the outer member over the end of the shaft, and locate the gaiter in the groove on the joint outer member. Push the outer member onto the joint, so that its spring-loaded plunger is compressed, then lift the outer edge of the gaiter to equalise air pressure in the gaiter. Fit both the inner and

outer retaining clips, securing them in position using the information given in Section 4, paragraph 11. Ensure the gaiter retaining clips are securely tightened, then check that the joint moves freely in all directions.

13 Refit the outer constant velocity joint components using the information given in Section 4, paragraph 11.

4 Driveshaft outer joint gaiter – renewal

1 Remove the driveshaft from the car as described in Section 2.

2 Secure the driveshaft in a vice equipped with soft jaws, and release the two rubber gaiter retaining clips. If necessary, the gaiter retaining clips can be cut to release them.

3 Slide the rubber gaiter down the shaft, to expose the outer constant velocity joint. Scoop out the excess grease.

4 Using a hammer and suitable soft metal drift, sharply strike the inner member of the outer joint to drive it off the end of the shaft. The joint is retained on the driveshaft by a circlip, and striking the joint in this manner forces the circlip into its groove, so allowing the joint to slide off.

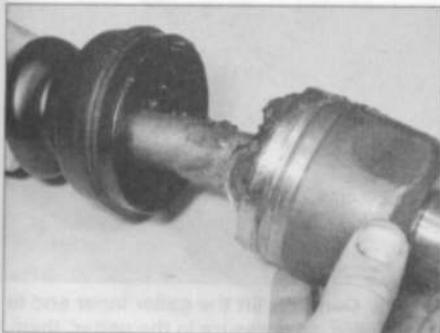
5 Once the joint assembly has been removed, remove the circlip from the groove in the driveshaft splines, and discard it. A new circlip must be fitted on reassembly.

6 Withdraw the rubber gaiter from the driveshaft, and slide off the gaiter inner end plastic bush.

7 With the constant velocity joint removed from the driveshaft, thoroughly clean the joint using paraffin, or a suitable solvent, and dry it thoroughly. Carry out a visual inspection of the joint.

8 Move the inner splined driving member from side to side, to expose each ball in turn at the top of its track. Examine the balls for cracks, flat spots, or signs of surface pitting.

9 Inspect the ball tracks on the inner and outer members. If the tracks have widened, the balls will no longer be a tight fit. At the same time, check the ball cage windows for wear or cracking between the windows.



3.7a Release the inner gaiter retaining clips, and remove the joint outer member



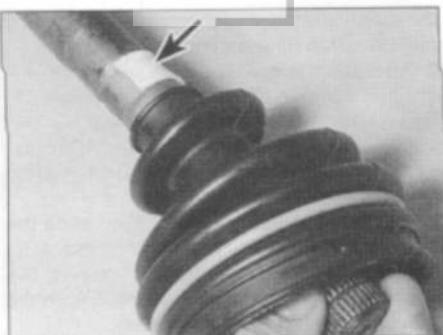
3.7b Slide the gaiter off the end of the driveshaft . . .



3.7c . . . and remove the plastic bush



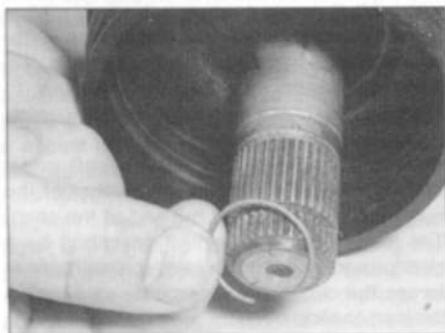
4.11a Fit the hard plastic rings to the outer CV joint garter . . .



4.11b . . . then slide on the new plastic bush (arrowed), and seat it in its recess in the shaft. Slide the garter onto the shaft . . .



4.11c . . . and seat the garter inner end on top of the plastic bush



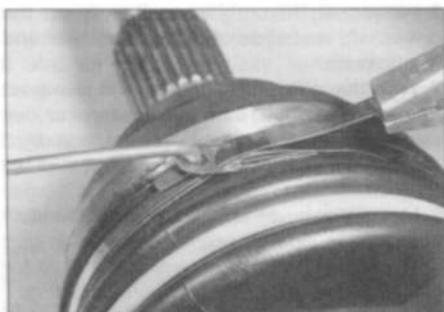
4.11d Fit the new circlip to its groove in the driveshaft splines . . .



4.11e . . . then locate the joint outer member on the splines, and slide it into position over the circlip. Ensure that the joint is retained by the circlip before proceeding



4.11f Pack the joint with the grease, working it into the ball tracks while twisting the joint, then locate the garter outer lip in its groove on the outer member



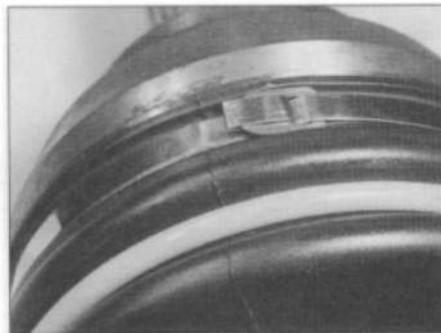
4.11g Fit the outer garter retaining clip and, using a hook fabricated out of a welding rod and a pair of pliers, pull the clip tightly to remove all slack



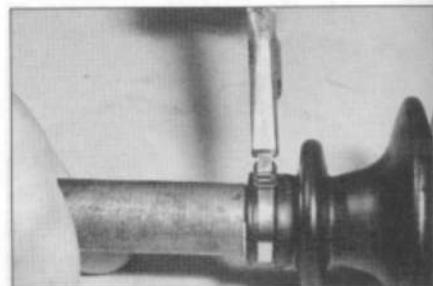
4.11h Bend the clip end back over the buckle, then cut the excess clip



4.11i Fold the clip end underneath the buckle . . .



4.11j . . . then fold the buckle firmly down onto the clip to secure the clip in position



4.11k Carefully lift the garter inner end to equalise air pressure in the garter, then secure the inner garter retaining clip in position using the same method

10 If on inspection, any of the constant velocity joint components are found to be worn or damaged, it will be necessary to renew the complete joint assembly (where available), or even the complete driveshaft (where no joint components are available separately). Refer to your Citroën dealer for further information on parts availability. If the joint is in satisfactory condition, obtain a repair kit consisting of a new garter, circlip, retaining clips, and the correct type and quantity of grease.

11 To install the new garter, refer to the accompanying illustrations, and perform the operations shown (see illustrations 4.11a to 4.11k). Be sure to stay in order, and follow the

captions carefully. Note that the hard plastic rings are not fitted to all gaiters, and the gaiter retaining clips supplied with the repair kit may be different to those shown in the sequence. To secure this other type of clip in position, lock the ends of the clip together, then remove any slack in the clip by carefully compressing the raised section of the clip using a pair of side cutters.

12 Check that the constant velocity joint moves freely in all directions, then refit the driveshaft to the car as described in Section 2.

5 Right-hand driveshaft intermediate bearing – inspection and renewal



Note: A suitable bearing puller will be required, to draw the bearing and collar off the driveshaft end.

1 Remove the right-hand driveshaft as described in Section 2.

2 Check that the bearing outer race rotates smoothly and easily, without any signs of roughness or undue free play between the inner and outer races. If necessary, renew the bearing as follows.

3 Using a long-reach universal bearing puller, carefully draw the collar and intermediate bearing off the driveshaft inner end (see illustration). Apply a smear of grease to the inner race of the new bearing, then fit the

bearing over the end of the driveshaft. Using a hammer and suitable piece of tubing which bears only on the bearing inner race, tap the new bearing into position on the driveshaft, until it abuts the constant velocity joint outer member. Once the bearing is correctly positioned, tap the bearing collar onto the shaft until it contacts the bearing inner race.

4 Check that the bearing rotates freely, then refit the driveshaft as described in Section 2.

6 Driveshaft overhaul – general information

1 If any of the checks described in Chapter 1 reveal wear in any driveshaft joint, first remove the roadwheel trim or centre cap (as appropriate).

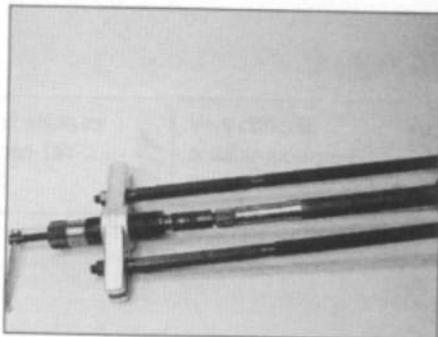
2 If the R-clip is fitted, the driveshaft nut should be correctly tightened; if in doubt, remove the R-clip and locking cap, and use a torque wrench to check that the nut is securely fastened. Once tightened, refit the locking cap and R-clip, then refit the centre cap or trim. Repeat this check on the remaining driveshaft nut.

3 Road test the vehicle, and listen for a metallic clicking from the front as the vehicle is driven slowly in a circle on full-lock. If a clicking noise is heard, this indicates wear in the outer constant velocity joint. This means

that the joint must be renewed; reconditioning is not possible.

4 If vibration, consistent with road speed, is felt through the car when accelerating, there is a possibility of wear in the inner constant velocity joints.

5 To check the joints for wear, remove the driveshafts, then dismantle them as described in Sections 3 and 4; if any wear or free play is found, the affected joint must be renewed. In the case of the inner joints (and on some models, the outer joints), this means that the complete driveshaft assembly must be renewed, as the joints are not available separately. Refer to your Citroën dealer for information on the availability of driveshaft components.



5.3 Using a long-reach bearing puller to remove the intermediate bearing from the right-hand driveshaft