

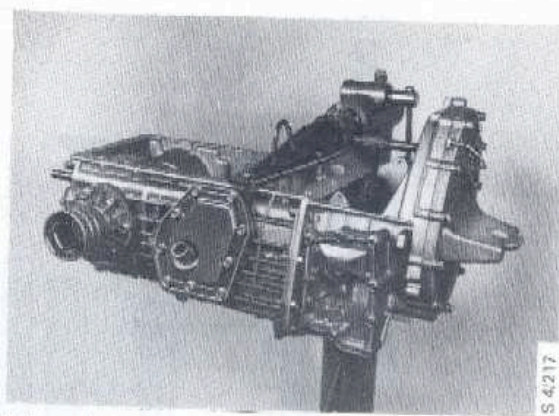
Manual transmission, 5-speed

The transmission is designed for front-wheel drive in such a way that all shafts and gears, the differential and inner universal joints form an integral unit.

All forward gears are synchromesh and reverse is engaged by a sliding gear. The shafts are journalled in the transmission housing in ball and taper roller bearings. The pinion shaft gearwheels are journalled on bushes. All gearwheels except reverse are permanently in mesh engaged and have helical teeth. The layshaft gears are mounted on needle bearings and the constant mesh gear is run on individual balls.

The front of the transmission assembly consists of a primary drive which transmits the engine power via the clutch to the gearbox itself. The latter is located underneath the engine, and part of the transmission case serves as an engine oil sump.

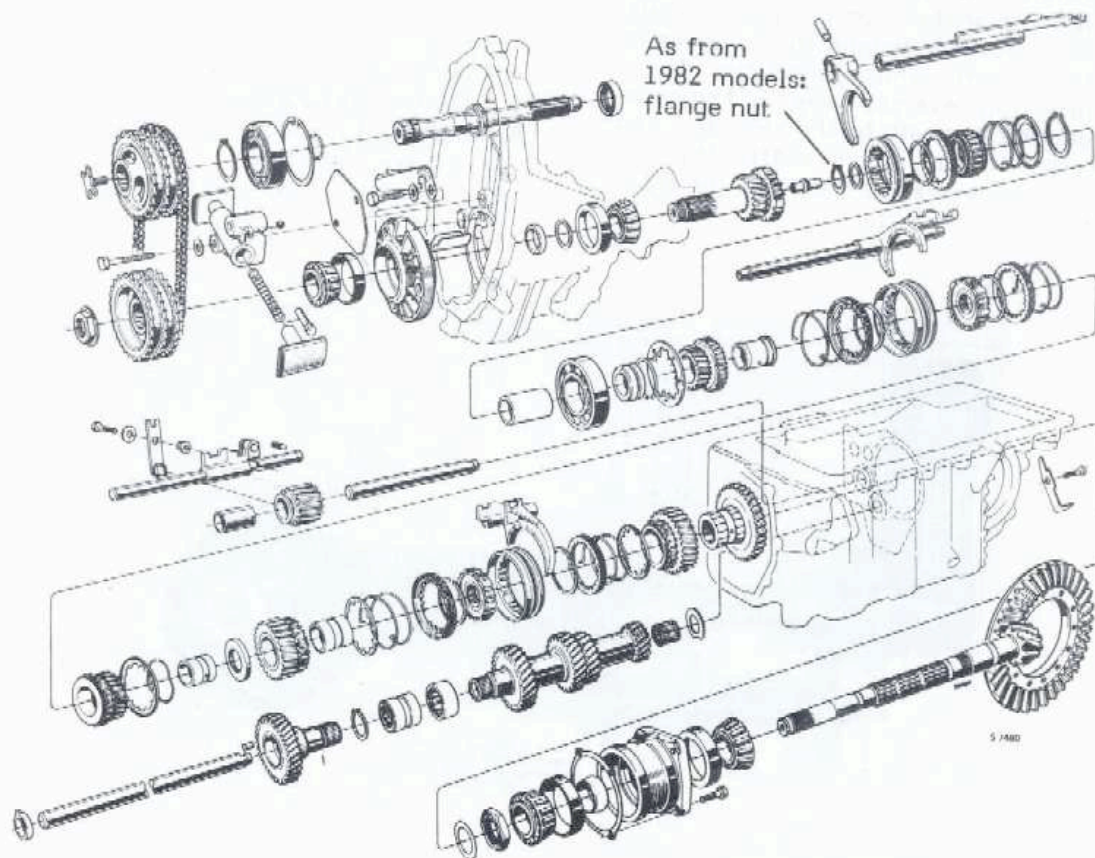
The operation of the transmission is illustrated in the diagram. Shaft power is transmitted through the clutch and primary gear to the input shaft in the gearbox. When the car is being driven in 1st gear, power is transmitted by the layshaft to the



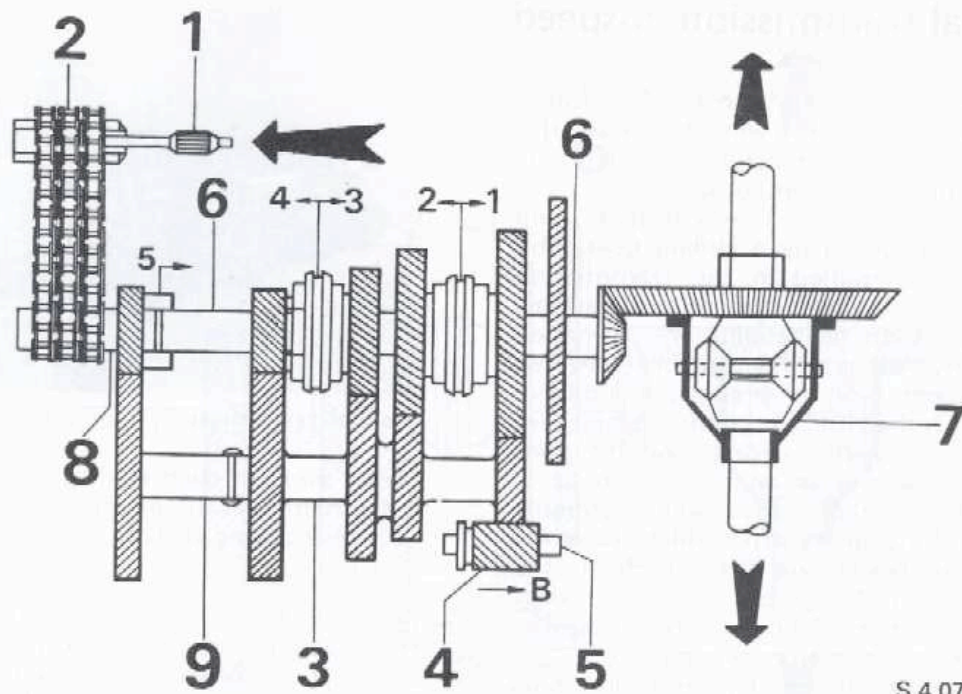
Manual transmission, 5-speed

pinion shaft through the No. 1 gear, which is journalled on the pinion shaft and locked to it by a sliding sleeve.

For driving in 2nd, 3rd or 4th, power is transmitted to the pinion in the same way but with No. 2, No 3 or No. 4 locked to the pinion shaft by a sleeve. For driving in top gear, the input shaft in the gearbox is locked to the pinion shaft direct by a sleeve, i.e. in this case power is not transmitted through the layshaft.



5-speed transmission, exploded view

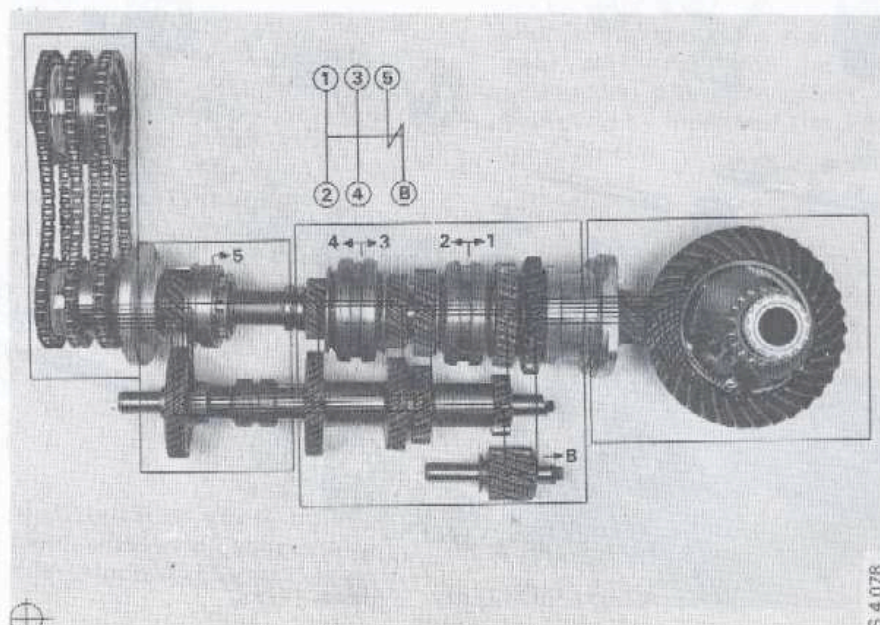


S 4 077

Reverse drive is provided by an idler shaft for reverse gear. A gear journaled on this shaft is in constant mesh with 1st gear on the layshaft. The gear pinion can be engaged with a gearwheel on the pinion shaft. This gear is located behind the 1st gear on the pinion shaft. Thus, when the car is being driven in reverse, power is transmitted from the layshaft to the reverse gear, and thence to the pinion shaft. This arrangement reverses the direction of rotation of the pinion shaft.

5-speed transmission, schematic diagram

1. Clutch shaft
2. Primary drive
3. Layshaft gear cluster
4. Reverse gear
5. Reverse gear shaft
6. Pinion shaft
7. Differential housing
8. Input shaft
9. Constant mesh gear



S 4 078

5-speed transmission, lubricating system

General

The gearbox components are lubricated by the oil in the gearbox sump. The oil flows through distribution oilways to the same level in the primary gear case, the gearbox case and the final drive case. A ball valve is fitted in the primary gear case to prevent changes in the level of the lubricant when the car is travelling downhill, thereby ensuring that the final drive unit will be properly lubricated.

Lubrication

The crown wheel and the layshaft gears are partially submerged in oil. When the transmission is running, the oil is delivered to the primary gear chain case via an oil catcher. The oil collected here forms a sump which lubricates the chains, sprockets and input shaft bearing. Excess oil is returned to the primary gear case and the gearbox case via two oil catchers which lubricate the pinion shaft gear. The oil flows through drilled oilways in the input and pinion shafts and via connecting pipes to 4 lubrication points on the pinion shaft for the gear bearings.

Ventilation

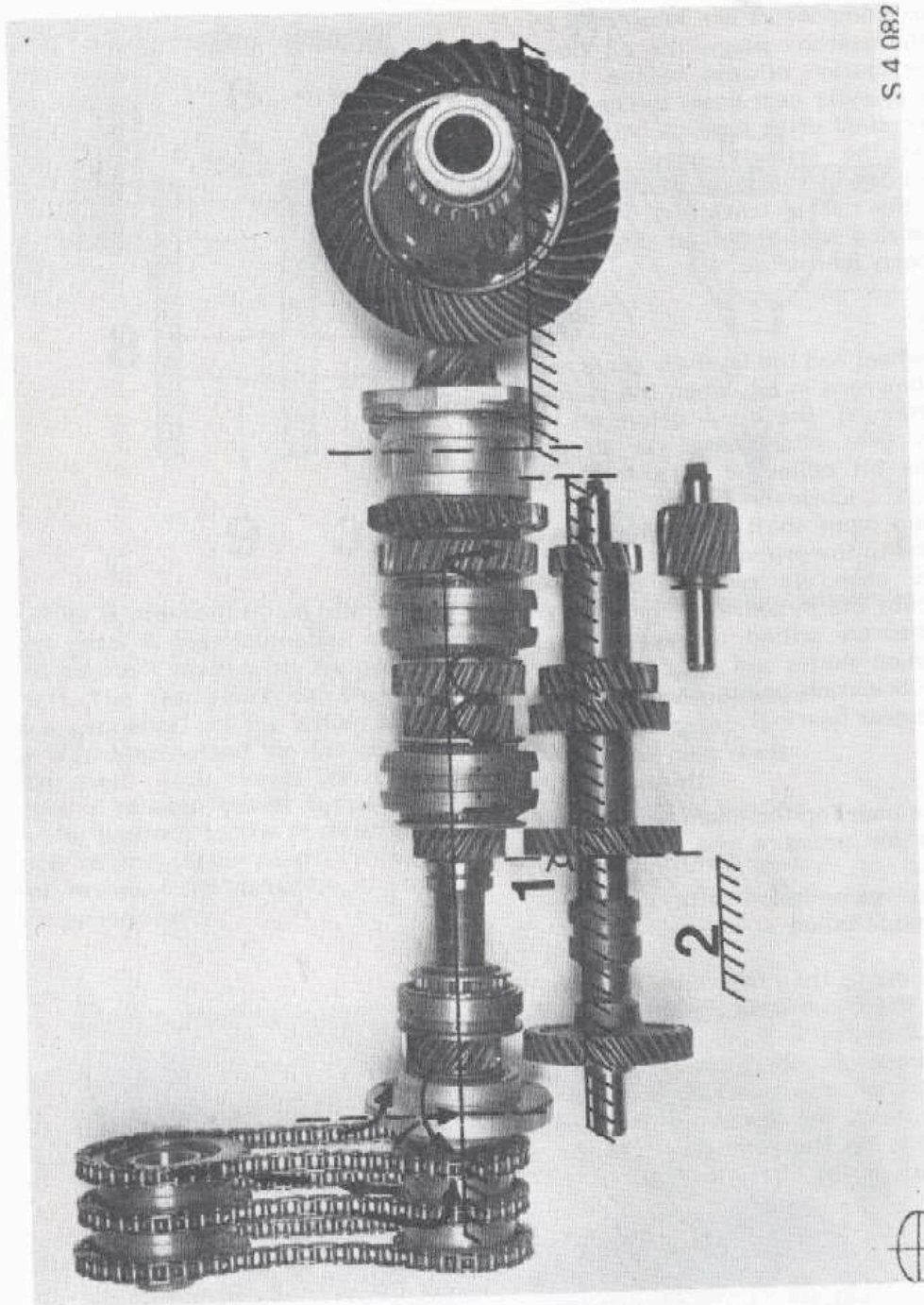
A vent in the panel on the chain case cover compensates for pressure changes in the transmission.

Refilling the transmission with oil after repair or reconditioning

Add 0.5 pint oil to the chain case through the panel in the chain case cover and the remaining 4.8 pints oil should be used to fill the transmission. Approx. 4.6 pints oil will flow through the aperture into the primary gear case. The lower periphery of the aperture is on the same level as the maximum mark on the dipstick.

Oil

Engine oil is used for lubrication and should only be changed after repair or reconditioning of the transmission. The oil level should be topped-up using the oil recommended in the specification. The oil level should be checked using the dipstick on the right-hand side of the transmission.



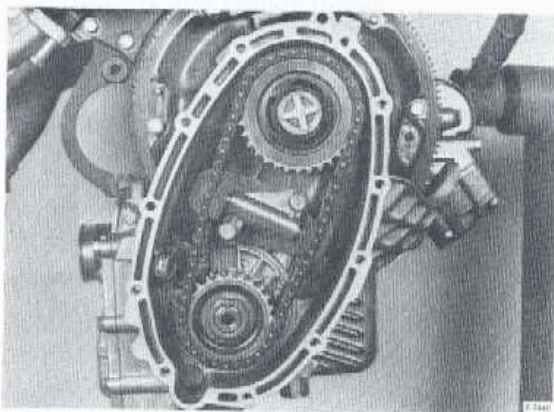
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Lubricating system

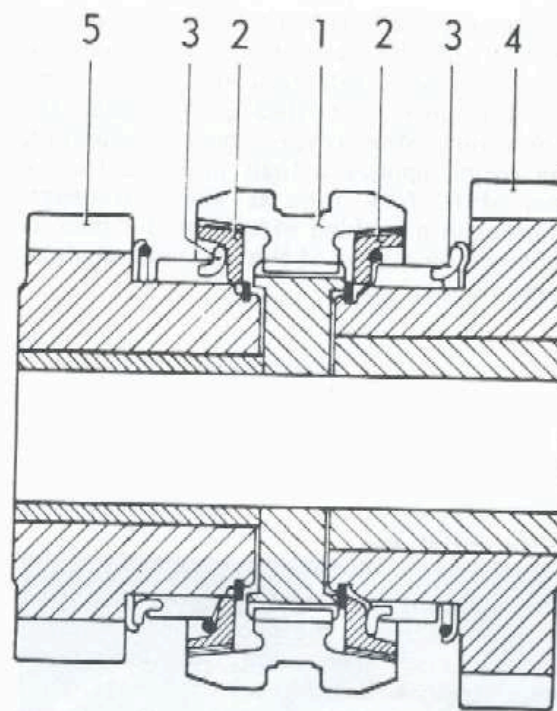
1. Ball valve
Oil level

Primary gear

The primary gear consists of a chain transmission comprising three simple chains. Located between the chains is a chain tensioner comprising two spring-loaded tensioner pads with hydraulic damping. Oil flows continuously from the primary gear case to the oil trap of the chain tensioner housing. Non-return valves providing an hydraulic damping function are located in the passages between the oil trap and the chain tensioner cylinders.



Primary gear



S 4545

Synchromesh unit

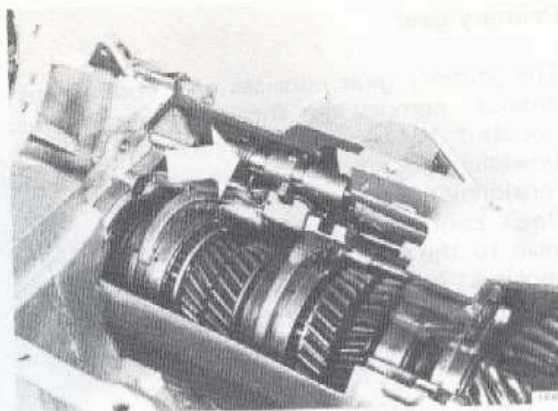
1. Synchromesh sleeve
2. Synchromesh ring
3. Spring
4. 1st speed gearwheel
5. 2nd speed gearwheel

Synchromesh mechanism

The synchromesh mechanism works as follows (see illustration). When the synchromesh sleeve is about to engage with the coupling teeth of second gear, the internal taper of the sleeve first makes contact with the spring-loaded synchromesh ring which is engaged with the gear wheel. In its outermost position, the synchromesh ring can turn approximately half the pitch of one tooth in relation to the gear. If the second gear is running at a different speed to the pinion shaft at the time when second gear is about to be engaged, and the sleeve is starting to move towards second gear position, the sleeve will be blocked by the teeth on the synchromesh ring which

turned in relation to the teeth of the pinion. Friction between the taper in the sleeve and the synchromesh ring will cause the sleeve and gear to run at the same speed, whereupon the torque acting on the synchromesh ring will be reduced. It will now be possible for the teeth on the synchromesh ring and the synchromesh sleeve to slide into engagement with the teeth on the pinion.

The gearbox is fitted with a braking device which provides smoother gear-changing when reverse is selected. The device comprises a spring mounted on the gear selector rod. When reverse gear is selected, the spring applies a light pressure to the gear shift fork for 1st and 2nd gears, whereupon a braking effect on the gear is achieved by means of the 1st gear synchromesh sleeve.



Braking device for reverse gear

Differential, etc.

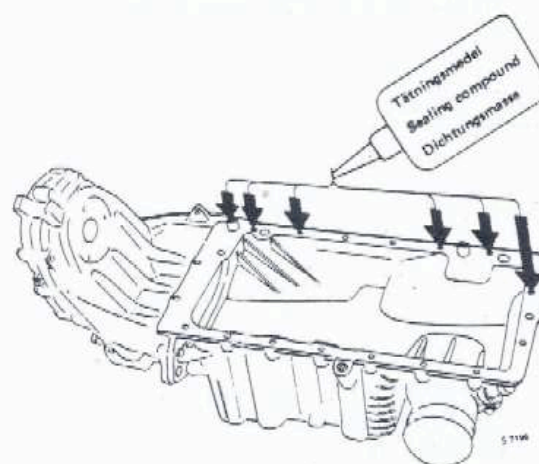
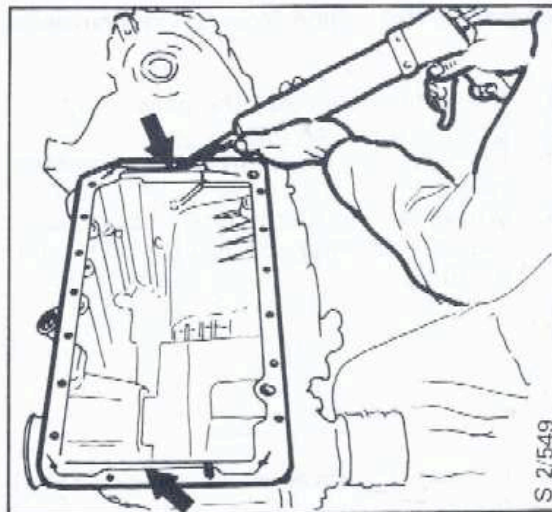
The differential assembly consists of two differential gears and two front axle gears, one for each front axle. All these gears have straight, bevel teeth. The axle gears are splined to the ends of the inner drivers. The crown wheel, which is driven from the transmission by the pinion shaft, is bolted to the differential case.

The speedometer drive gear is secured to the differential case by a lock ring. Its rotation is transmitted by a worm gear to the speedometer cable attachment.

The following measures are important when fitting together the engine and transmission.

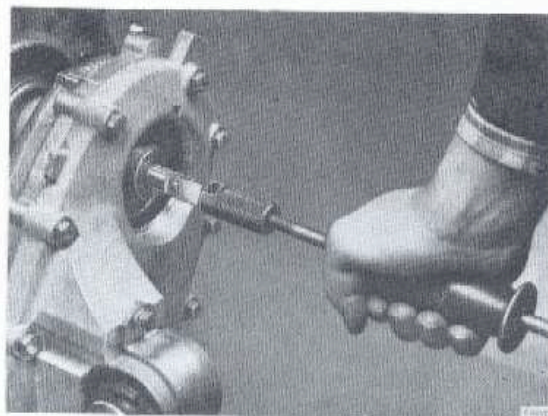
- Make sure that the mating surfaces between the engine and transmission are scrupulously clean.
- Check that the two guide sleeves are fitted in the transmission.
- Fit a new gasket on the transmission flange. Apply Dirko or Bostik Silicon sealing compound to both the end flanges indicated in the upper picture.
- Apply thread sealing compound to the six bolts indicated in the lower illustration.

Assemble in the reverse order.

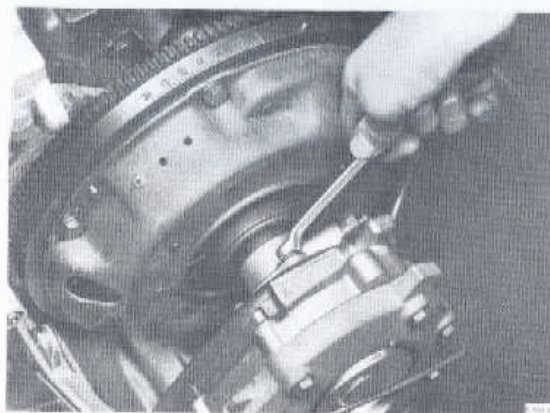


Separating the engine from the transmission

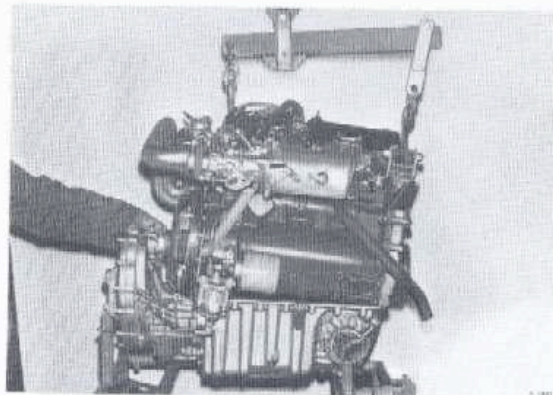
1. Clean the outside of the power unit.
2. Drain the engine oil.
3. Remove the cover over the flywheel ring gear.
4. Withdraw the clutch shaft using tapping-out hammer 83 90 270 and joint 87 90 529.



5. Remove the three slave cylinder fixing bolts.
6. Remove all bolts in the mating flanges of the engine and transmission.



7. Carefully lift the engine away from the transmission (see illustration), removing the guide sleeve for the release bearing at the same time.



If the engine and transmission fail to separate, never attempt to force them apart without first checking that all bolts have been removed.

Manual 5-speed transmissions

For work on the transmission, it will not usually be necessary to separate the engine and transmission. However, the flywheel and starter motor must always be dismantled first.

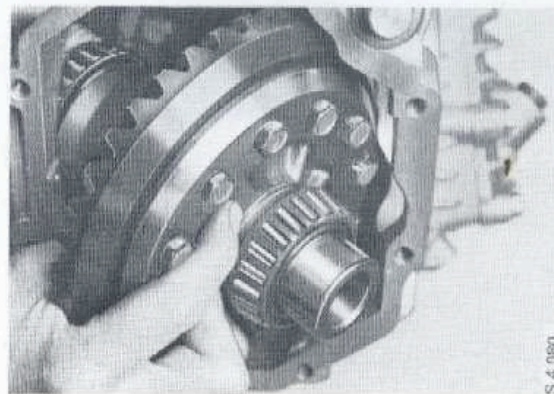
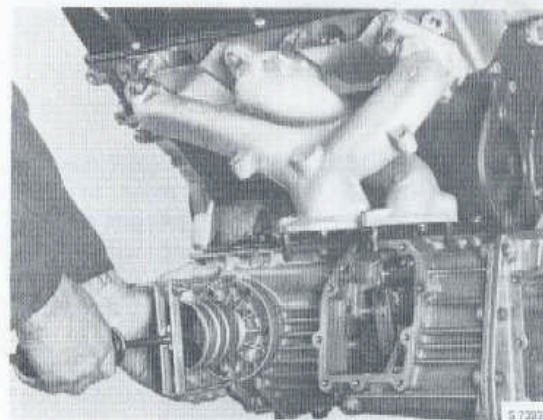
Dismantling

(Proceed in the following order as far as necessary in order to remove whichever component needs attention:)

1. Clean the transmission case and drain the oil:
 - a. with the transmission horizontal and
 - b. with the transmission vertical. Let the oil drain out of the primary drive case.
2. Remove the following covers:
 - Front cover on the primary drive case.
 - Side cover on the primary drive case (there will still be some oil in the primary gear case).
 - Side cover on transmission case.
 - Final drive cover.
3. Measure the backlash between the pinion and crown wheel, see section 473.
4. Remove the differential bearing seat retaining bolts and remove the seats and inner driver using tool 83 90 270 and puller 87 90 776.
Save the spring and plunger at the shaft end of the driver, and the shims, which can be re-used on the condition that the differential gear backlash has not been altered by the exchange of some components.
5. Remove the differential assembly. For dismantling of the differential assembly see section 473.
6. Measure the clearance between the pinion and the centre of the crown wheel. See section 473.

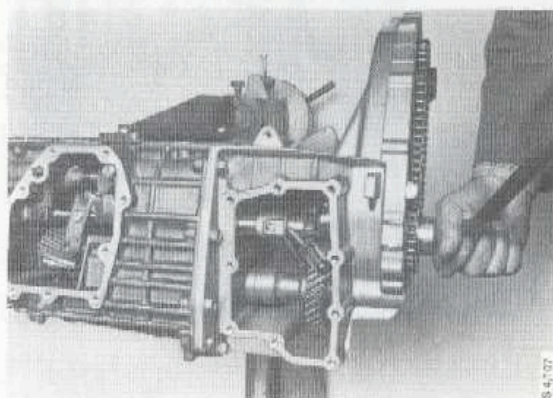
Important

Before dismantling the transmission, always measure the positions of the pinion gear and crown wheel. This is to check whether there is any error in their locations. If the pinion and crown wheel assembly is relatively new, i.e. if it has done less than 6,000 miles (10,000 km), it can be adjusted, but if the mileage is any greater the gears will have worn themselves into a given position. In the latter case, they should be reassembled in the same measured positions which they occupied before being dismantled.

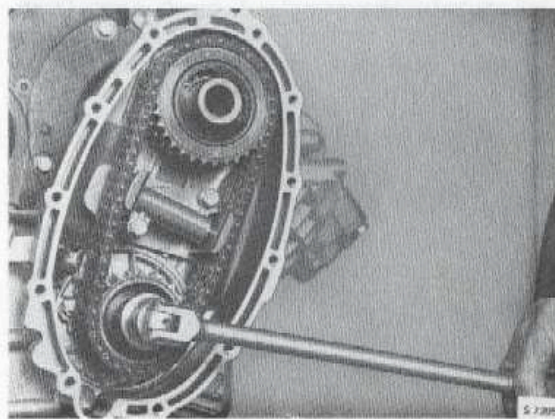


7. Remove the dowel in the gear-shift fork for 5th gear.

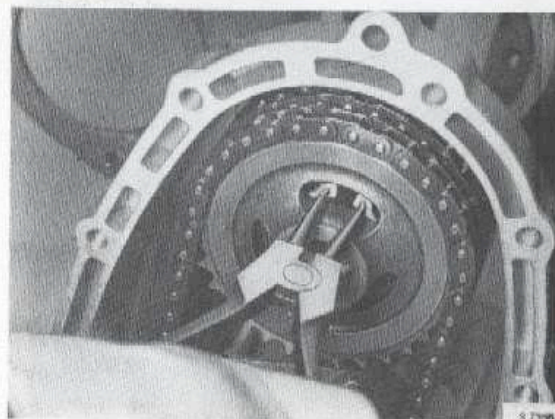
8. Move the gearwheel for reverse into reverse-gear position and select 5th gear.



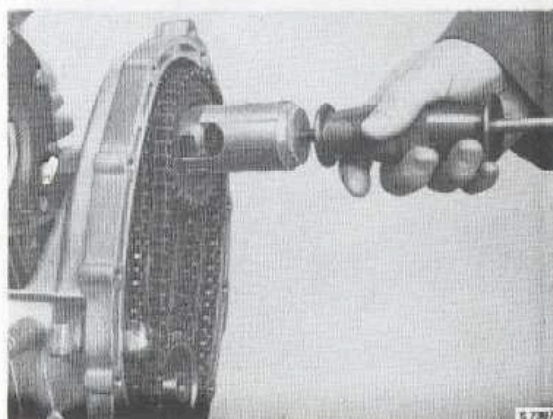
- 9 a. Free the shaft (lower sprocket) tab washer from the input shaft.
 - b. Remove the nut.
10. Remove the chain tensioner.



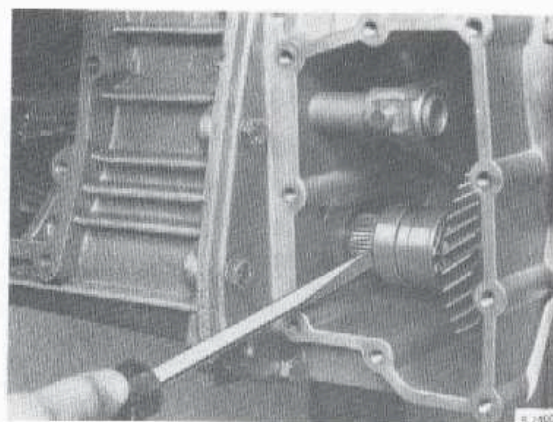
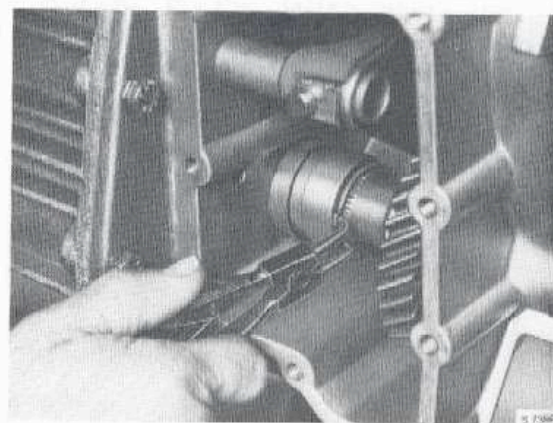
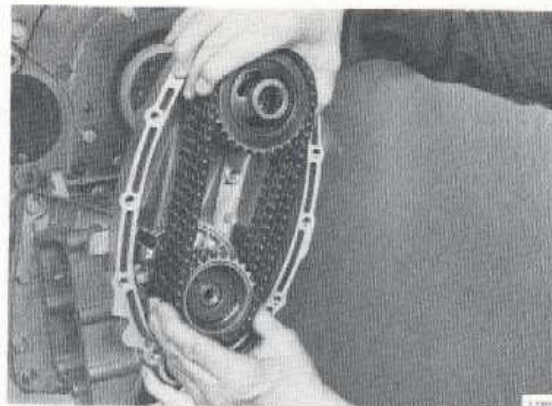
11. Remove the circlip from in front of the upper sprocket bearing.



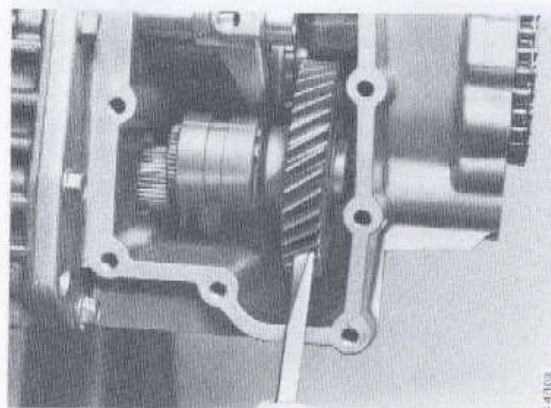
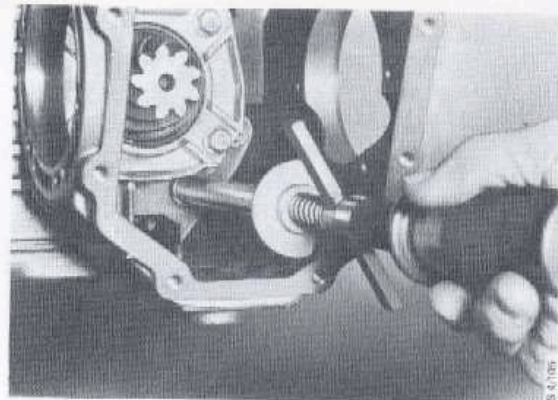
12. Remove the sprockets and the chains simultaneously. Slide hammer 83 90 270 and puller 83 90 891 may be needed to remove the sprockets.



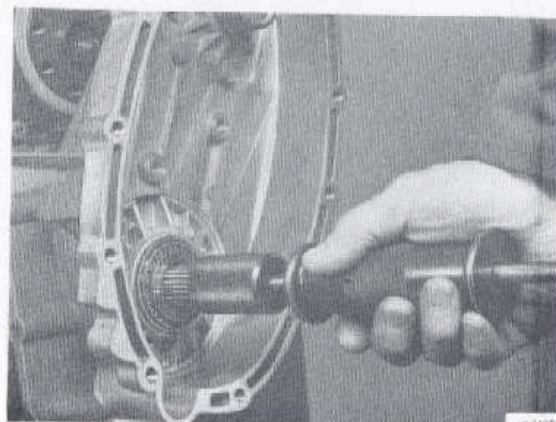
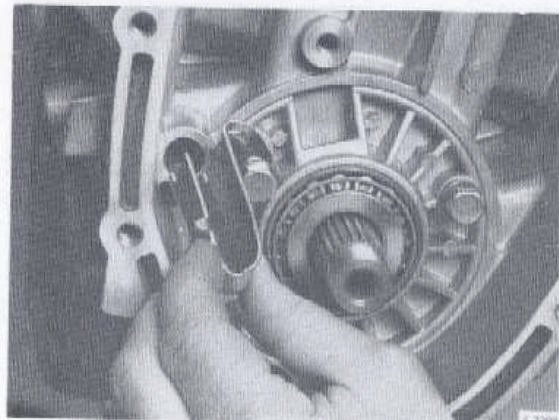
13. Separate the constant mesh gear from the layshaft gear cluster by removing the circlip from the groove and sliding the synchromesh sleeve towards the gear.



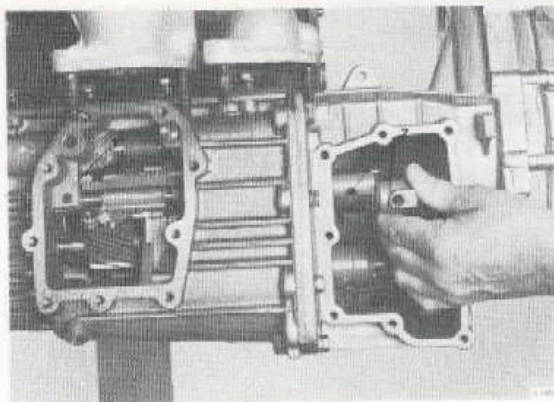
14. Remove the locking plate for the layshaft and reverse gear shaft. Using tools 83 90 049 and 83 90 270, withdraw the layshaft gear cluster and then remove the constant mesh gear, together with the syncromesh sleeve and thrust washer, through the side of the transmission case.



15. Remove the bolts and the oil catcher from the input shaft bearing case. Then remove the bearing case using slide hammer 83 90 270 and adapter 87 90 917.

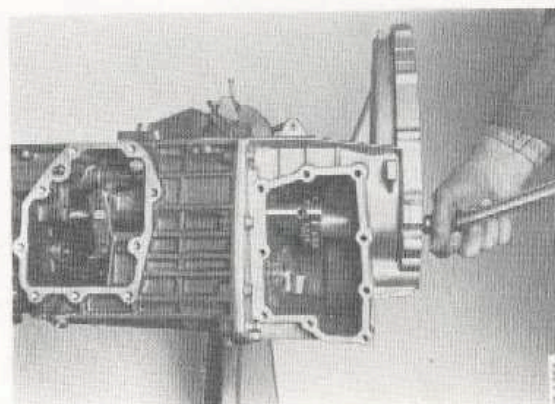
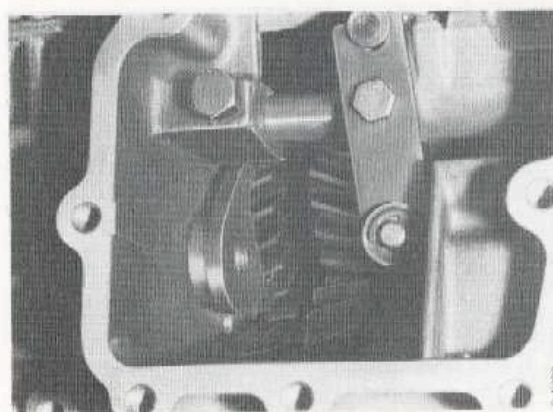
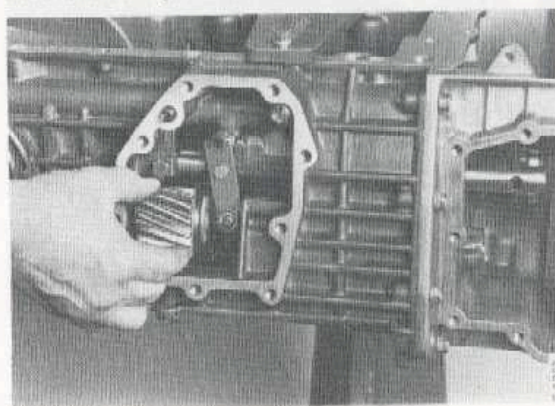


16. Slide the gear selector for fifth gear to the full extent of its travel and then remove the selector fork and the synchromesh sleeve.



1. Gear selector to stop
2. Hole for locking stud

17. Remove the gearwheel and shaft for reverse gear. Fit locking tool 87 90 503 to the reverse gearwheel. Release the circlip and unscrew the nut securing the synchro hub for fifth gear. Retain the hub and spacer.



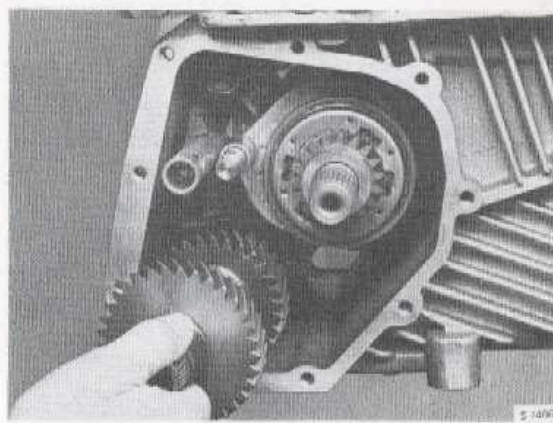
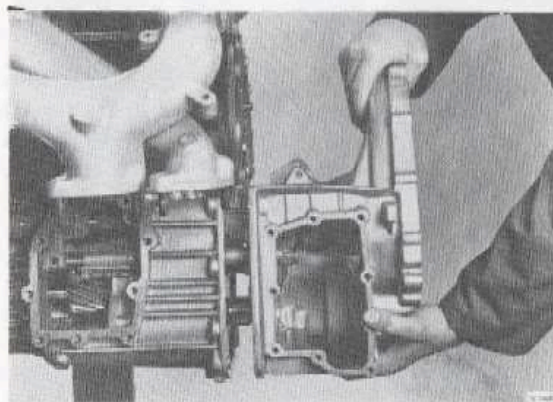
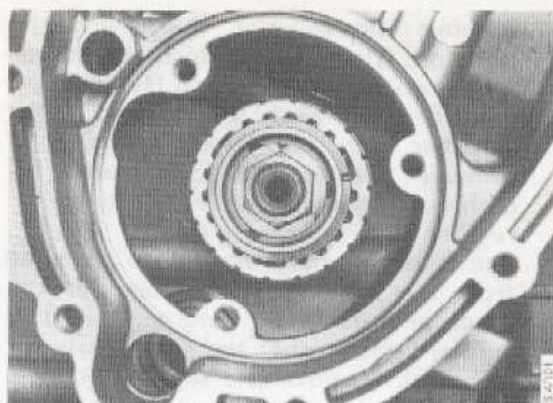


18. Remove all primary gear case retaining bolts and drift in the dowels so that the primary gear case can be separated from the gearbox housing. (The 5th speed selector will remain in the housing and can be removed later. File away any burrs there may be round the hole in the shaft, so that the aperture in the gear housing will not be damaged on reassembly).
19. Remove the layshaft and the layshaft gear cluster. Retain the needle bearings and thrust washer for re-use.

1. Before fitting the reverse gear to the pinion shaft, check the clearance between the mating surfaces for the primary gear bearing and the timing shaft pin. The clearance must be 0.025 to 0.031 in (0.635 to 0.787 mm). If it is less than this, the pinion shaft must be replaced. The pinion shaft and the reverse gear, which are supplied as a single unit, must be replaced together. The pinion shaft is hardened, the gear case and bearing must be replaced.

2. When fitting the pinion shaft, check the clearance between the mating surfaces for the primary gear bearing and the timing shaft pin. The clearance must be 0.025 to 0.031 in (0.635 to 0.787 mm).

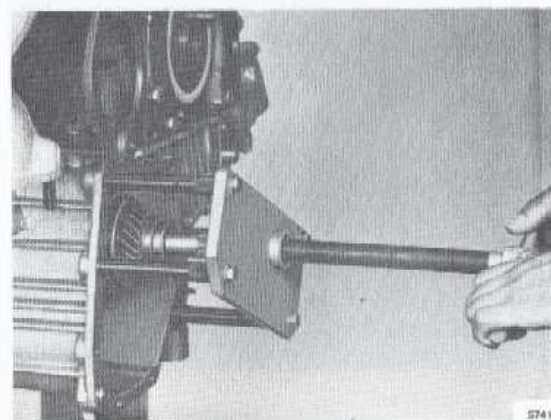
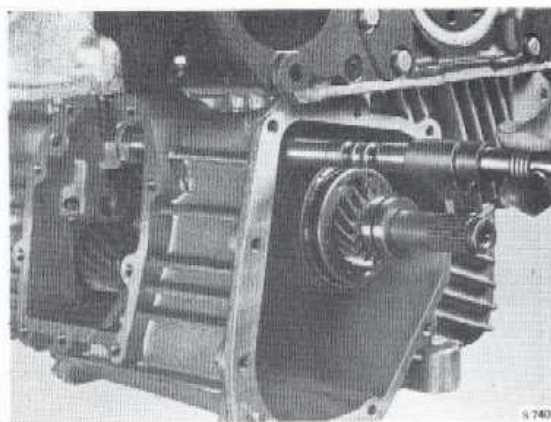
3. Fit the secondary gear to the pinion shaft, ensuring an interference fit. The secondary gear must be fitted with the aid of a brass punch. It is fitted with a thrust washer and a needle bearing.



20. Remove the selector shafts and the selectors (first, second, third and fourth speeds on the inner shaft). Remove the selectors for first and second gears together with their synchromesh units. Remove the selector for reverse together with the shaft for fifth gear and reverse gear.

21. The selector shafts should be removed from the front. The aperture for the taper pin should be filed so that it is free of burrs so that the aperture is not damaged. Remove the selector, double lockout and spring later. Retain the selector ball and guide pin

22. Remove the four bolts retaining the pinion shaft bearing housing. Install tool 87 90 909 and press out the pinion shaft. Keep the gearwheels, sleeves, washers and shims.



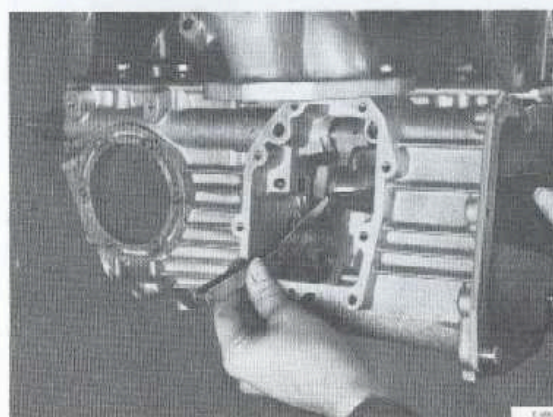
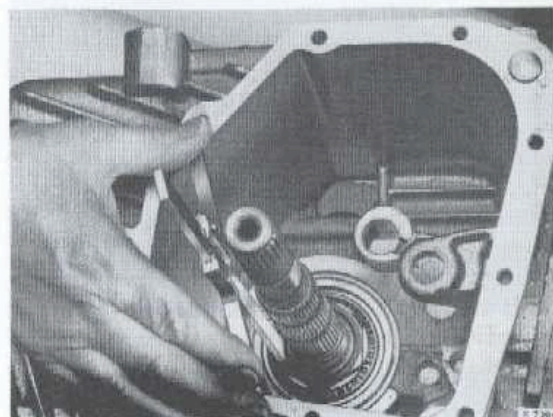
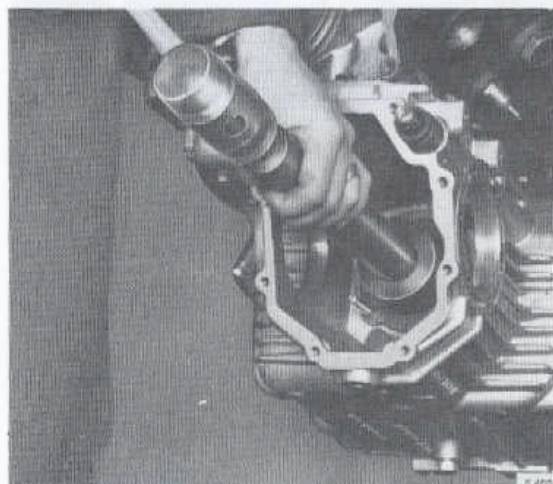
Assembly

Having removed the component that needs attention, clean all fragments of old gaskets and all traces of old sealing compound off the covers and flanges. Inspect the transmission case and all dismantled parts and wash them in kerosene or similar. Lubricate all components as detailed in the specifications section on lubricants. Reassemble the transmission, following the procedure described below:

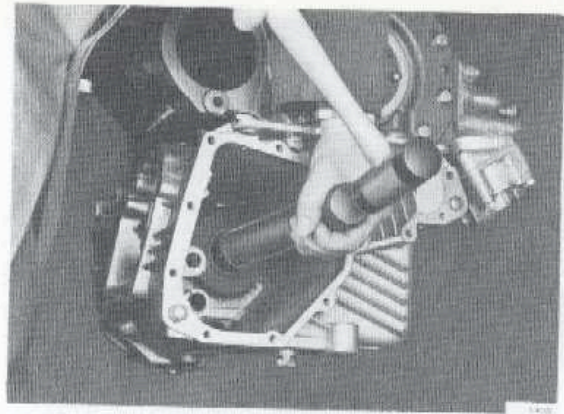
1. Adjust the differential bearings to the correct compression. See section 473.
2. Screw the two locating studs (tool 87 90 438) into the transmission case. Then shim and locate the pinion shaft assembly. Tap the assembly gently into position, using a plastic mallet, drift 83 90 114, and sleeve 83 90 148. Refit the retaining bolts for the bearing housing, tightening them to a torque of 20-25 Nm (2 - 2.5 kgfm; 15-18.5 lb ft). Finally, apply Loctite to the bolts.

- 3.a. Before fitting the reverse gear on the pinion shaft, check the distance between the mating surface for the primary gear housing and the pinion shaft nut. The distance must be 7.677 in-7.681 in (195.0-195.1 mm). If it is not, shims must be placed between the nut and the reverse gear. Shims are available in thicknesses of 0.0118 in (0.30 mm), 0.0157 in (0.40 mm) and 0.0197 in (0.050 mm). If the position of the pinion shaft is unchanged, the shims used earlier can be replaced.

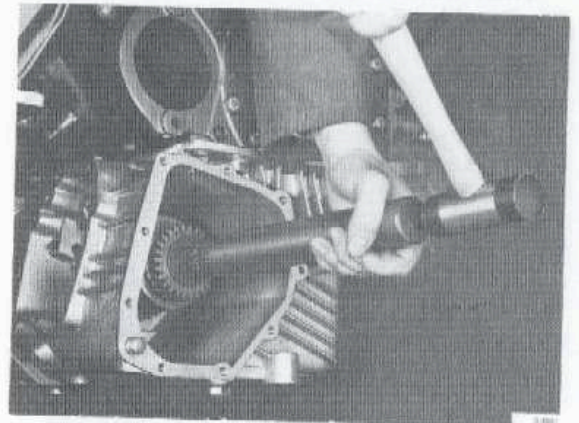
- b. When using measuring tool 87 90 552, the procedure of shimming is the following:
Fit the measuring tool in the gear-box housing as illustrated, and measure the distance between tool and nut with the aid of a feeler gauge. Fit shims with a thickness equivalent to that of the feeler gauge.



4. Fit the reverse gear using sleeve 83 90 148.
5. Fit the 1st-speed gear on the bearing sleeve of the reverse gear.
6. Fit 1st-2nd speed synchromesh hub. Fit 1st-2nd speed gear shift fork into 1st-2nd speed synchromesh sleeve and fit these on the synchromesh hub. Fit 1st-2nd speed gear shift fork into 1st-2nd speed synchromesh sleeve and fit these on the synchromesh hub.
7. Fit the 2nd speed gear sleeve with tool 83 90 148 and fit the 2nd speed gear on the sleeve.

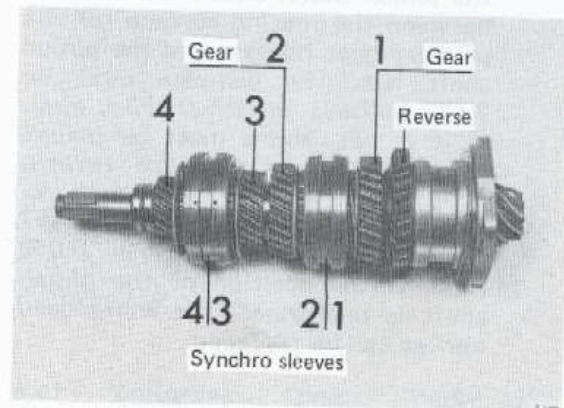


Before fitting the reverse gear, the selector shaft check the distance



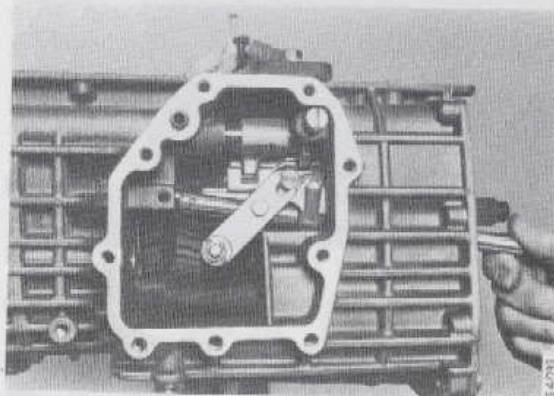
Before fitting the reverse gear, the selector shaft check the distance

8. Fit the spacer, the sleeve for 3rd gear with tool 83 90 148 and fit the 3rd speed gear on the sleeve.
9. Fit 3rd-4th gear synchromesh hub. Fit 3rd-4th speed gear shift fork into 3rd-4th gear synchromesh sleeve and fit these on the synchromesh hub. Fit the bush for the 4th speed gear and fit the gear onto the bush. Fit the ball bearing bush.
10. If the selector shaft has been removed, refit it together with the double lock-out guide pin

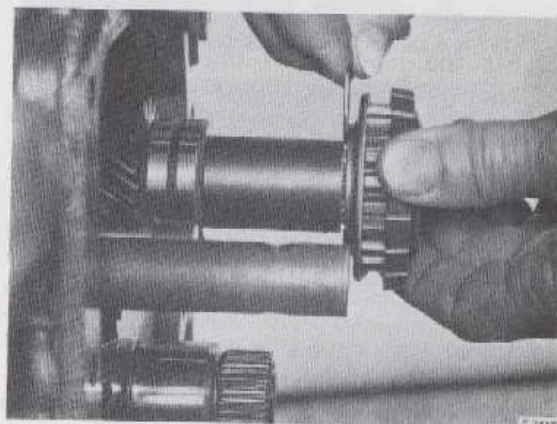


Before fitting the reverse gear, the selector shaft check the distance

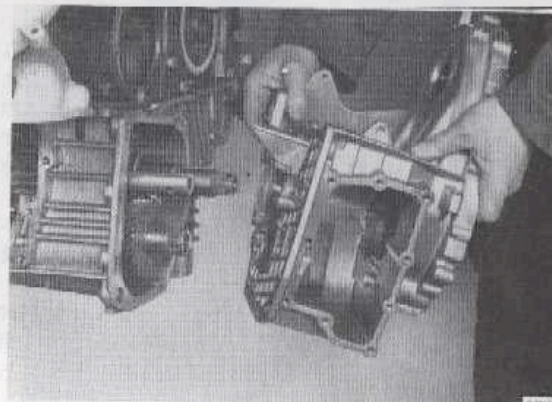
11. Ease the synchromesh sleeves onto the pinion shaft in the neutral position and fit the gear shift shaft for 1st-2nd speed and 3rd-4th speed gear-shift forks.
12. Refit the reverse selector shaft with selector. Seal the shaft stop bolt with Loctite 242 and tighten.



13. Fit the 5th speed selector on the reverse selector shaft.
14. Fit the needle bearing to the layshaft gear cluster and place the latter inside the gearbox housing.
15. Fit the layshaft and raise the layshaft gear cluster to line it up with the shaft. Insert the shaft far enough to hold the gears in position. Fit the thrust washer later.
16. Fit the spacer the 5th speed synchro hub and the circlip on the pinion shaft. Fit the requisite shims between the hub and sleeve so that there is no play between the parts on the pinion shaft. The shim thicknesses available are 0.30 mm and 0.40 mm. The circlip, the hub and the spacer should then be removed.



17. Apply Loctite 510 sealing compound to the flange of the primary drive casing and bolt the casing to the gearbox housing. Knock in the locating studs before fitting the bolts. Fit the spacer to the pinion shaft. Fit the 5th speed synchro hub.

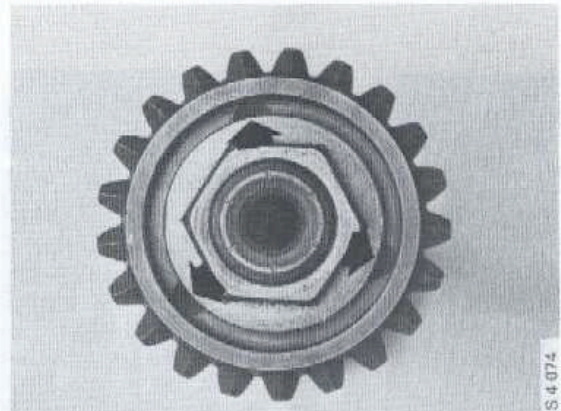
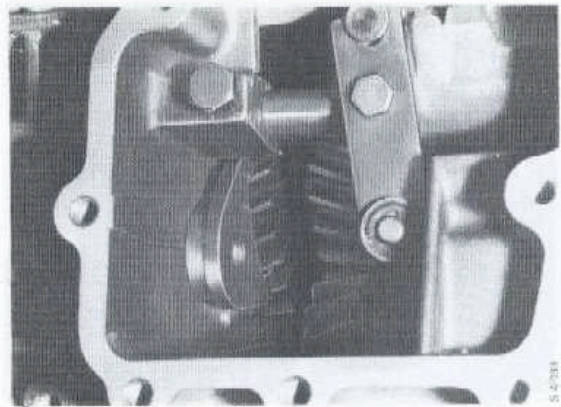


18. Fit the shims which were previously tested to the hub so that there is no axial play once the circlip has been fitted.

Fit locking tool 87 90 503 to the reverse gearwheel. Tighten the nut to a torque of 50 ± 10 Nm (5 ± 1 kgfm; 37 ± 7 lbft).

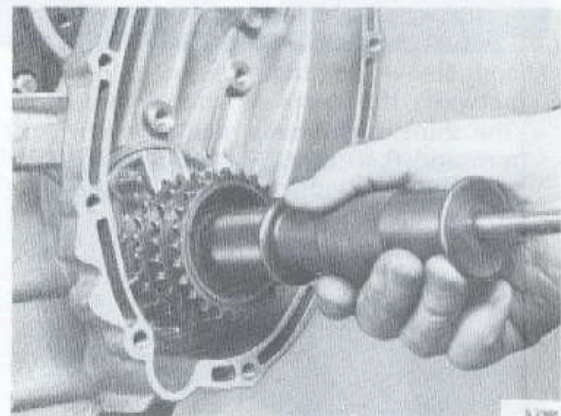
Upset the flange of the nut in the groove in the hub, using a drift with a rounded nose.

19. Fit the synchro sleeve for 5th gear and the gear shift fork.



20. Fit the input shaft together with the bearing housing, oil catcher and connecting pipes. Use three guide pins 87 90 438 for alignment and the sprocket as a spacer between the adapter 87 90 917 and bearing housing.

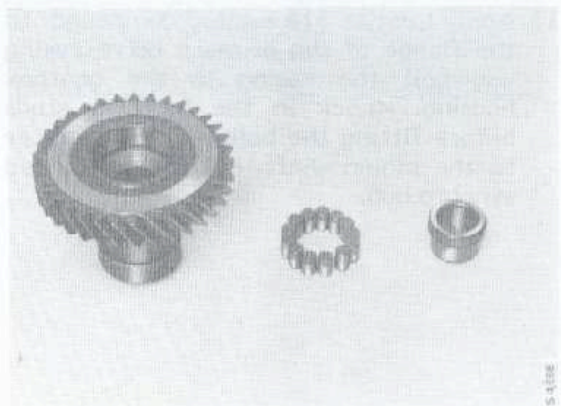
Insert the bearing housing far enough for the shaft to meet the synchro sleeve. The bearing housing should then be driven into place using slide hammer 83 90 270. Check the compression of the bearing before installation. (See input shaft and bearing housing, section 471).



21. Up to and including gearbox No. 437802, 1982 models: Fit the thrust washer for the constant mesh gear on the input layshaft. Grease the washer and fit it with the tab located in the special recess.

As from gearbox No. 437803, 1982 models: A new bearing without a thrust washer supersedes the earlier one.

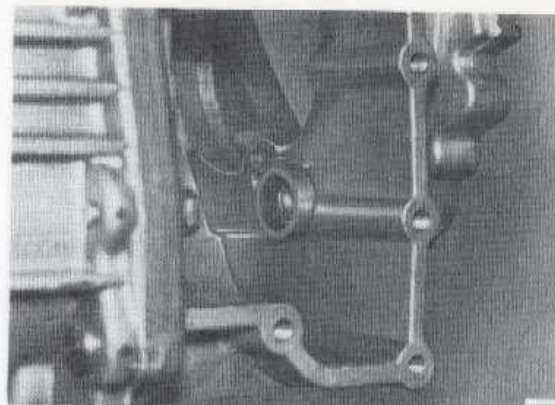
22. Fit the roller bearings and inner bearing track in the constant mesh gear.



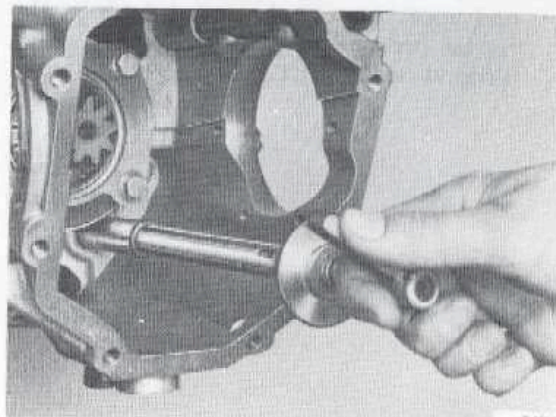
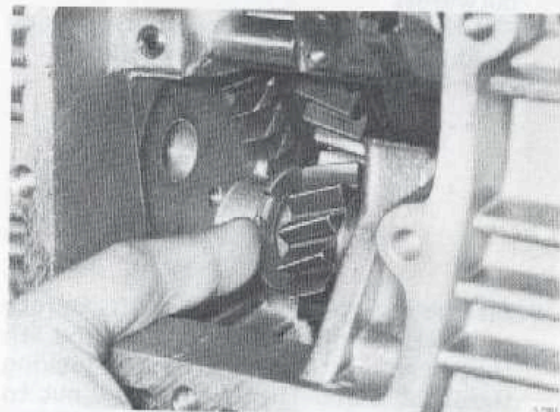
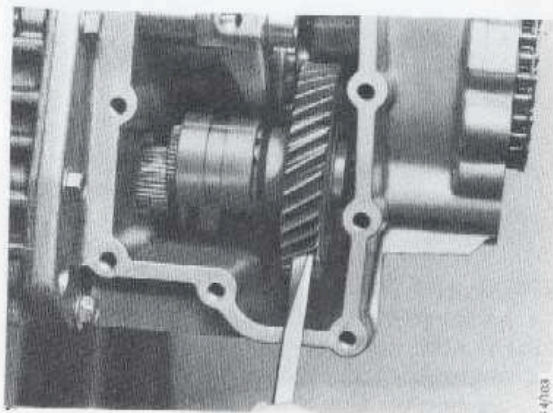
23. Fit the constant mesh gear complete with sleeve, circlip and bearing rollers. Slide the layshaft gear cluster back to enable the gear to be fitted.

24. Slide the synchro sleeve onto the layshaft and fit the circlip in the groove.

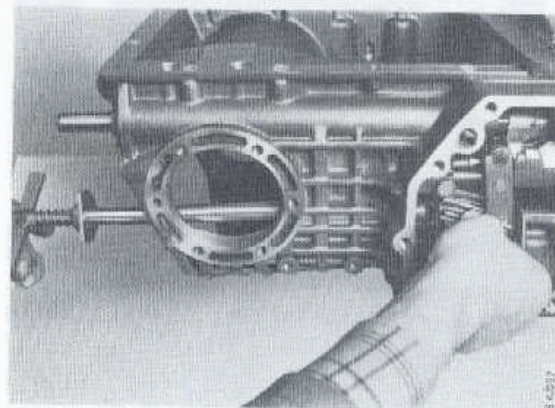
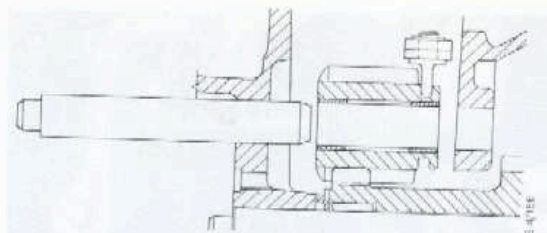
25. To fit the layshaft thrust washer, withdraw the layshaft and slide the washer into position. Then use tool 83 90 049 to insert the shaft so that it locks in position.



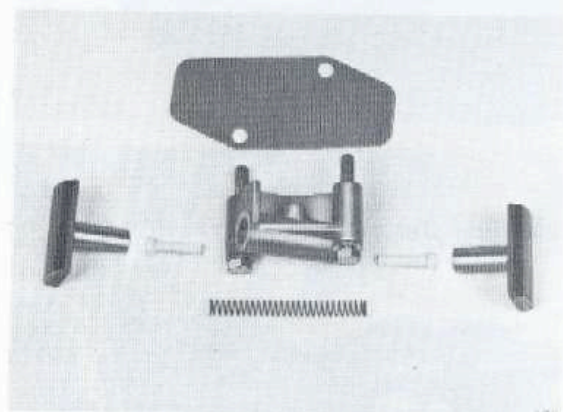
Thrust washer, up to and including gearbox No. 437800



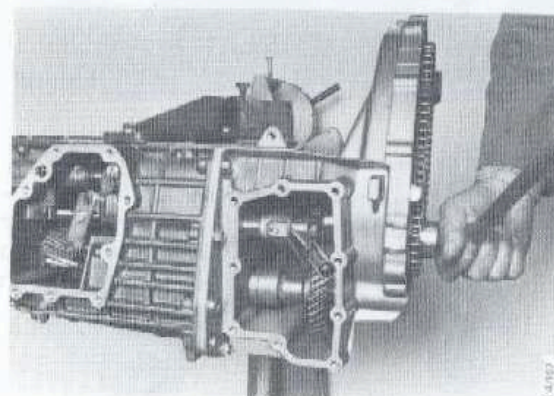
26. Fit the reverse gearwheel and shaft. Make sure that the reverse lever engages the groove in the reverse gear. Adjust the shaft using tool 83 90 049 until it locks in position.



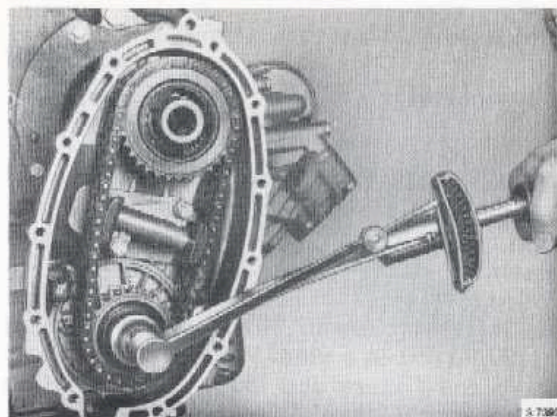
27. Fit the locking plate over the shaft ends and seal the bolt with Loctite 242.
28. Fit the primary gear sprockets and chains. Ensure that the hole for the tab washer on the lower sprocket is facing outwards.
29. Fit the chain tensioner. Apply locking fluid to the bolts prior to installation.



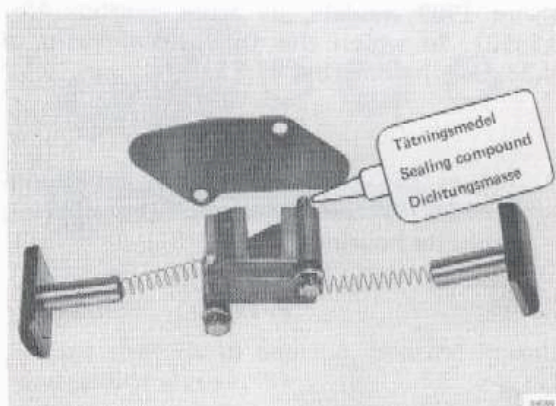
30. Fit the nut onto the input shaft. Before torque tightening select reverse and 5th speed gears at the same time so locking to the input shaft. Then tighten the nut to the prescribed torque of 100 ± 10 Nm and upset one of the nut tabs into the recess provided in the gearwheel, using a round-nosed drift.



31. Fit the dowel in the gear selector fork selector for 5th gear.



32. Fit the differential unit. See section 473.
33. Check the shaft seals in the bearing retaining housings and replace if necessary. Adjust the crownwheel backlash if necessary. See section 473. Then fit the two drive shafts and inner universal joints. Ensure that the seals are not damaged. Fit the selector ball and spring and fit the gearbox top cover assembly and gasket.
34. Fit the final drive unit, cover and gasket, the primary gear housing and the chain cover with gaskets.
35. Refill with oil: 0.3 l in the primary drive and 2.7 l in the gearbox.



Pinion shaft, 5-speed transmission

Dismantling

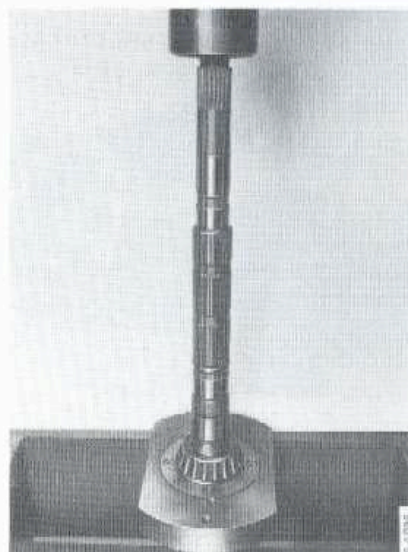
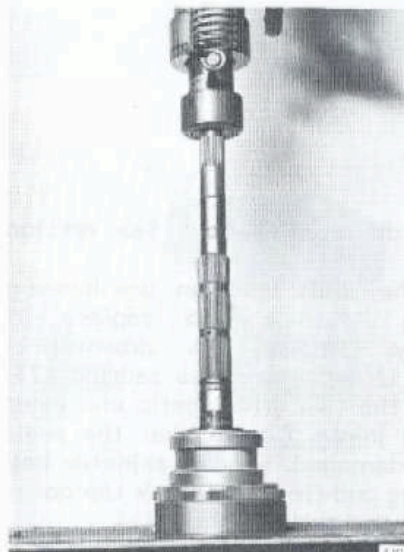
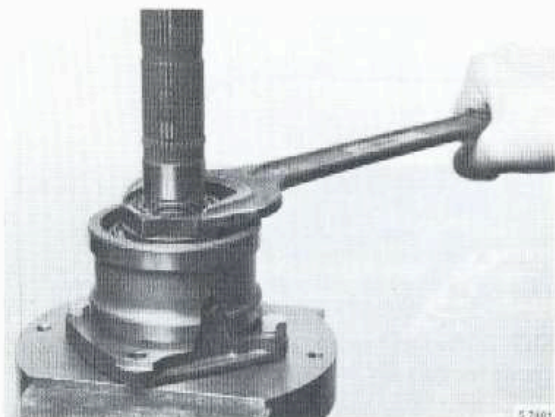
To dismantle the pinion shaft, follow the instructions for dismantling the transmission up to the point where the pinion shaft assembly is removed. Then continue as follows:

1. Secure fixture 87 90 636 and holder ring 87 90 651 in a vice. Put the pinion shaft in the fixture and loosen the nut using spanner 87 90 453.

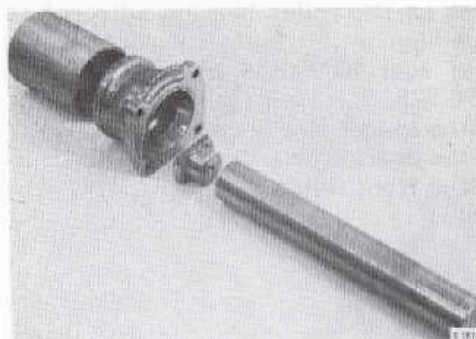
From 1982 models, as from gearbox No. 436501, in which the final drive ratio is 9.33, use holder ring 87 91 097.

2. Mount the bearing assembly on sleeve 83 90 098, and press out the bearing from its housing.

3. Press off the rear roller bearing with the aid of tools 87 90 636 and 87 90 651. From 1982 models, as from gearbox No. 436501, in which the final drive ratio is 9.33, use holder ring 87 91 097.



4. Press the outer rings of the taper roller bearings out of the bearing housing using tools 83 90 098, 83 90 106 and 83 90 148 (see illustration).



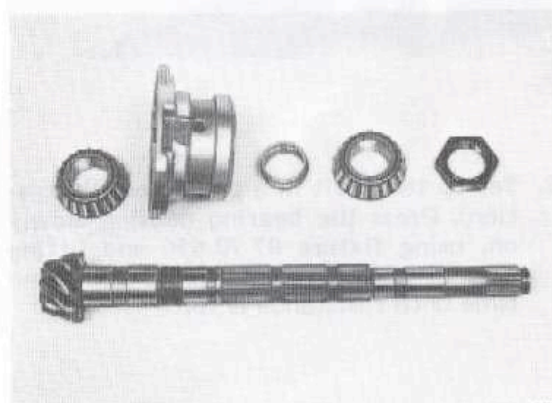
Fitting the pinion shaft

Having removed the part that needs attention, inspect all the dismantled parts and wash them in kerosene or similar. Then reassemble and fit, proceeding as follows:

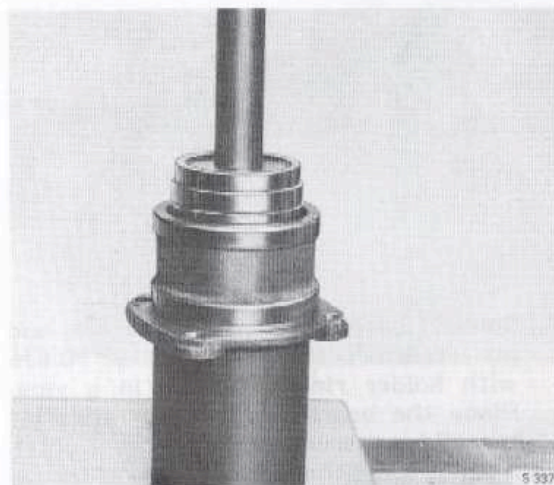
Note

Lubricate the bearings before assembly.

1. Press the outer races of the taper roller bearings into the bearing housing, using tools 83 90 189 and 87 90 461.



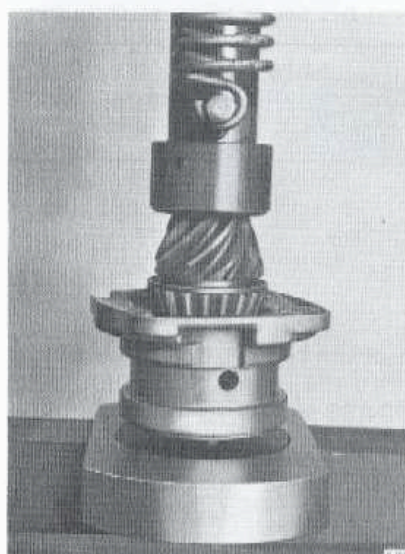
Pinion shaft with bearing, bearing housing and spacer sleeve.



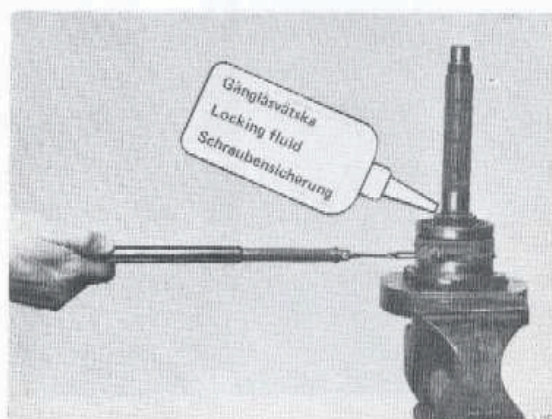
2. Press on the roller bearing adjacent to the pinion until it butts against its stop, using tool 87 90 636 and fitting ring 87 90 925.
3. Fit the spacer sleeve on the shaft.
4. Fit the bearing housing.
5. Fit the front roller bearing.



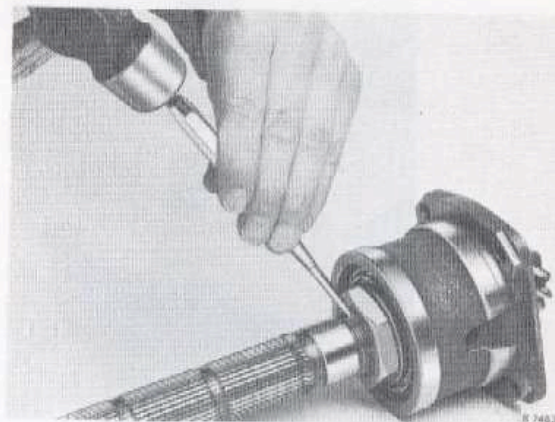
6. Set up the shaft in a press (see illustration). Press the bearing housing slowly on, using fixture 87 90 636 and fitting ring 87 90 925. Rotate it at the same time until resistance is felt.



7. Smear Loctite 270 on the threads and put on the nut. Fit fixture 87 90 636 with holder ring 87 91 097 in a vice. Place the bearing housing on the fixture. Using spanner 87 90 453, tighten the nut until the correct rolling torque is obtained. To determine the rolling torque, wind a line around the bearing housing and attach the other end to a spring balance. Lightly oil the bearings and tighten to the following rolling torque: New bearings 47-71 N (10-15 lb, 4.7-7.0 kg) on the spring balance which corresponds to a torque of 2.5 ± 0.5 Nm (1 ± 0.5 lbft, 25 ± 5 kgfcm). After the correct value has been obtained, upset the flange of the nut using a drift.



8. Fit two locating pins, tool 87 90 438, in the gearbox housing. Then fit on the shims and fit the pinion shaft with bearing housing. Knock the bearing housing carefully into place using a plastic mallet or hammer together with drift 83 90 114 and sleeve 83 90 148. Apply Loctite to the four bolts and then tighten them to a torque of 20-25 Nm (2.2-2.5 kgfm, 15-18.5 lb ft).

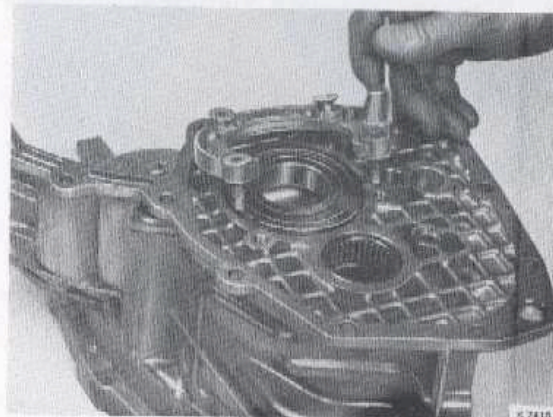


Primary gear case

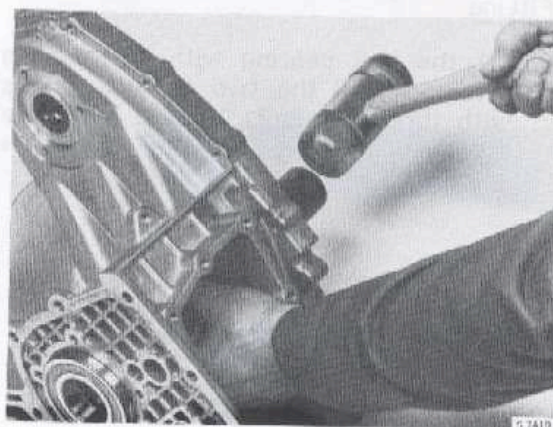
The primary gear case should be removed when dismantling the gearbox. Separate the primary gear case complete with the following components from the gearbox: A. Ball bearing, B. Needle bearing, C. Clutch shaft seal, D. Level control ball valve. Dismantle the parts as follows:

Dismantling

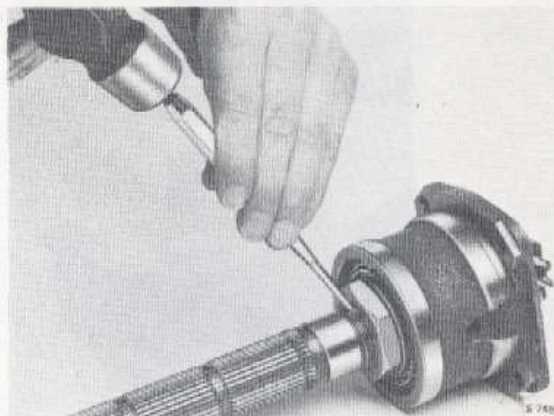
1. Remove the four countersunk socket-head cap screws and remove the ball bearing retainer.



2. Drift out the ball bearing. Use drift 83 90 106 and sleeve 83 90 148.



8. Fit two locating pins, tool 87 90 438, in the gearbox housing. Then fit on the shims and fit the pinion shaft with bearing housing. Knock the bearing housing carefully into place using a plastic mallet or hammer together with drift 83 90 114 and sleeve 83 90 148. Apply Loctite to the four bolts and then tighten them to a torque of 20-25 Nm (2.2-2.5 kgfm, 15-18.5 lb ft).

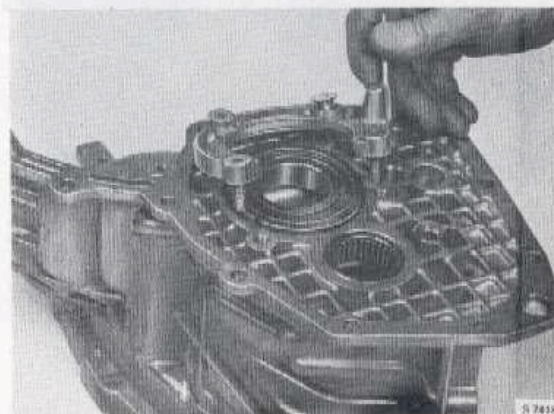


Primary gear case

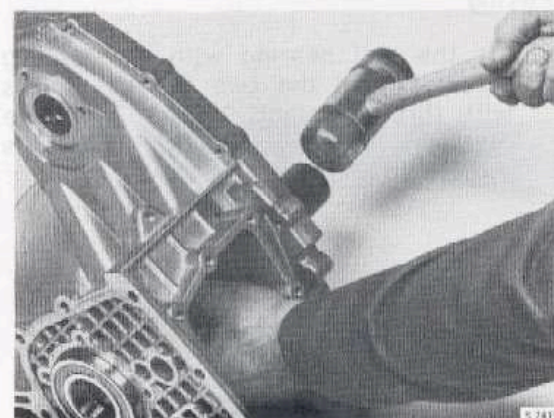
The primary gear case should be removed when dismantling the gearbox. Separate the primary gear case complete with the following components from the gearbox: A. Ball bearing, B. Needle bearing, C. Clutch shaft seal, D. Level control ball valve. Dismantle the parts as follows:

Dismantling

1. Remove the four countersunk socket-head cap screws and remove the ball bearing retainer.



2. Drift out the ball bearing. Use drift 83 90 106 and sleeve 83 90 148.

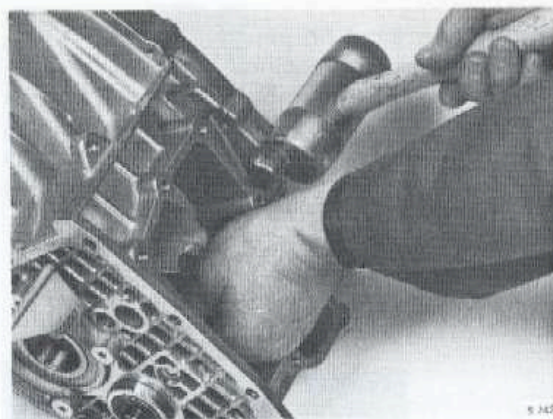


3. Remove the needle bearing sleeve in the primary gear case by means of drift 83 91 997 and 83 90 577.

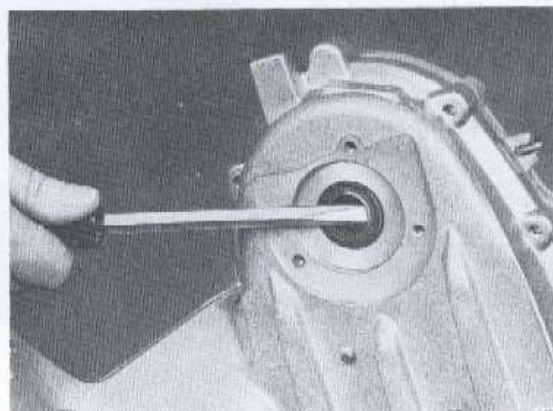
Do not remove the level control ball valve. Just check that the ball moves freely and sits securely on its seat.

The ball valve acts at low speeds downhill to prevent the oil from running out of the gearbox and into the primary gear case, so ensuring proper lubrication of the differential and final drive units.

4. Remove the clutch shaft seal by means of a screwdriver.

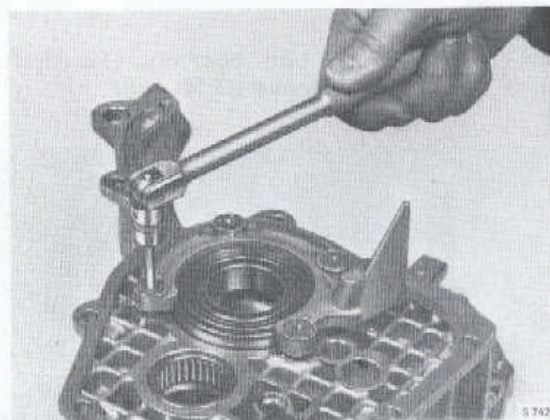


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Fitting

1. Fit the ball bearing with the bearing retainer. Seal the two through-screws with thread sealant. Tighten down the screws alternately until the bearing is in position.

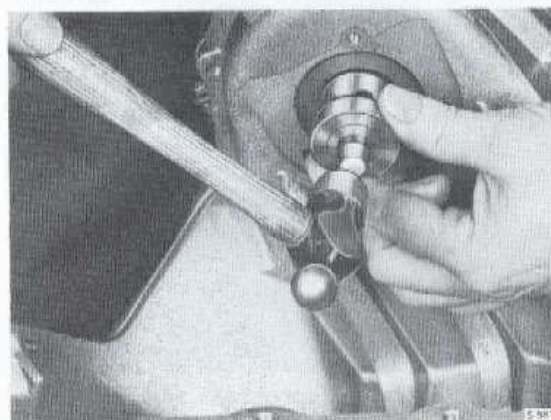


8 7420

2. Fit the needle bearing race with the numbered end pointing out towards the primary gear case. Use drift 83 91 997 and sleeve 78 41 067.



3. Fit a new clutch shaft seal, using drift 83 91 997. Grease the lips of the seal after it has been fitted. See Lubricant Specification.



Primary drive

Dismantling

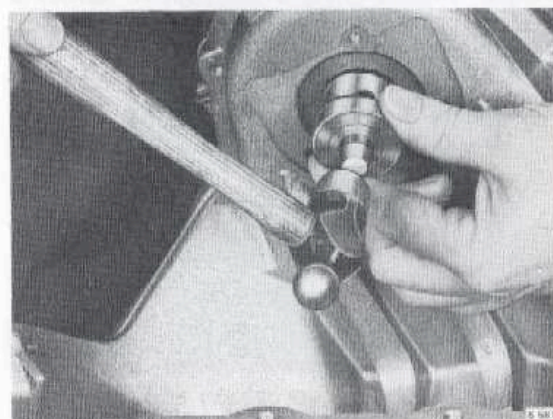
1. To dismantle the primary drive separately, remove the front cover from the primary drive case. Otherwise follow the instructions under "Removal and installation, manual transmission, 5-speed".
2. Remove the circlip from the upper sprocket.



2. Fit the needle bearing race with the numbered end pointing out towards the primary gear case. Use drift 83 91 997 and sleeve 78 41 067.



3. Fit a new clutch shaft seal, using drift 83 91 997. Grease the lips of the seal after it has been fitted. See Lubricant Specification.



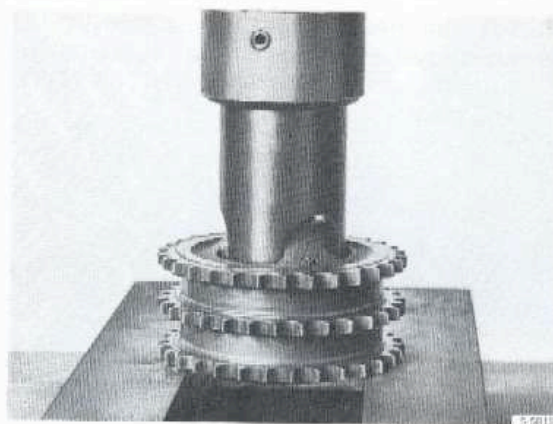
Primary drive

Dismantling

1. To dismantle the primary drive separately, remove the front cover from the primary drive case. Otherwise follow the instructions under "Removal and installation, manual transmission, 5-speed".
2. Remove the circlip from the upper sprocket.

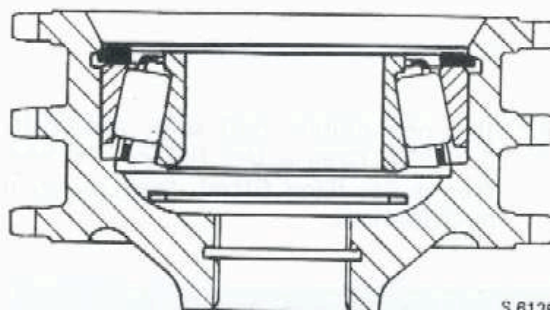


3. Use hollow drift 87 90 891 to press out the bearing from the sprocket.



Assembly

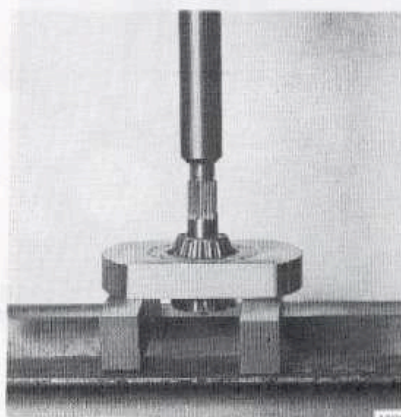
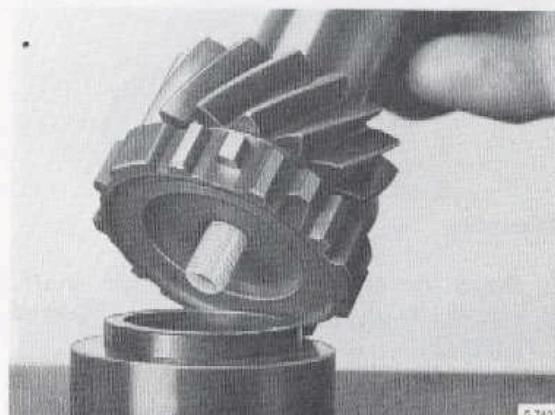
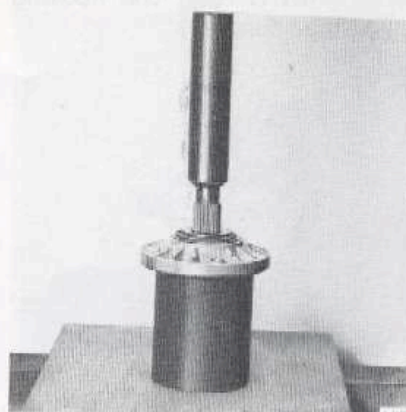
1. Fit the circlip to the upper sprocket and press the bearing into the sprocket, see illustration. Tool, hollow drift 87 90 859. Fit the circlip for the bearing's outer race with the chamfer facing outwards.
2. Fit the chains, sprockets and chain tensioner as described in the section on transmission assembly.
3. Top up with oil.



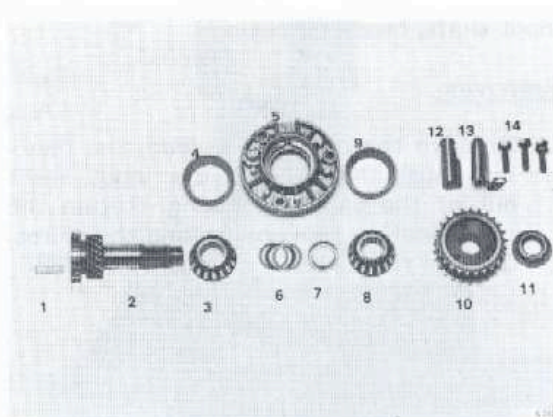
Input shaft, bearing housing

Removing

1. Remove the oil catcher from the bearing housing and press the input shaft out of the bearing housing. Retain the front bearing, the spacer and the shims. Use the ring-shaped support 83 90 098.
2. Take care that the connection pipe is not damaged when pressing out the shaft.
3. Press the rear bearing off the input shaft. Use support 87 90 636 and ring 87 90 933.



4. Remove the bearing races from the housing with a drift. Rest the housing on the ring-shaped support.

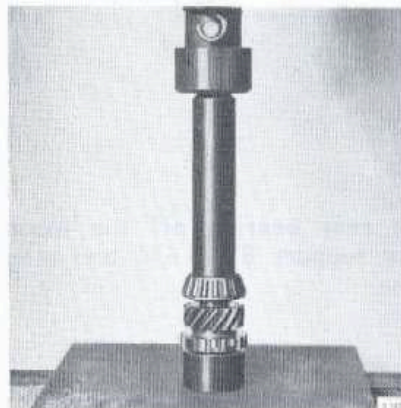


Input shaft and bearing housing

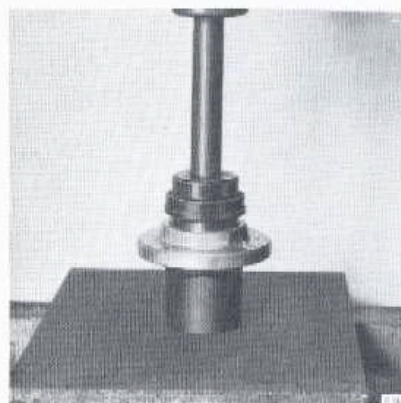
- | | |
|---------------------|-----------------------|
| 1. Connecting pipe, | 8. Ball bearing |
| lubrication | 9. Race |
| 2. Input shaft | 10. Sprocket |
| 3. Ball bearing | 11. Nut |
| 4. Race | 12. Rear oil catcher |
| 5. Bearing housing | 13. Front oil catcher |
| 6. Shims | 14. Bolts |
| 7. Spacer | |

Assembly

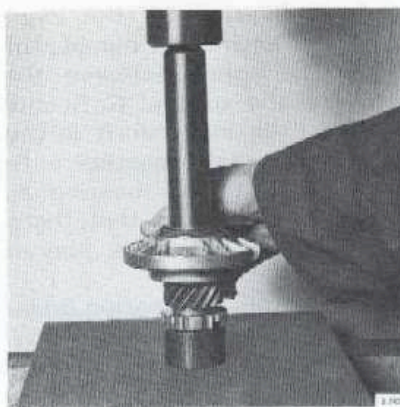
1. Press the rear bearing onto the shaft. Use drift 78 41 075 and the ring-shaped support.



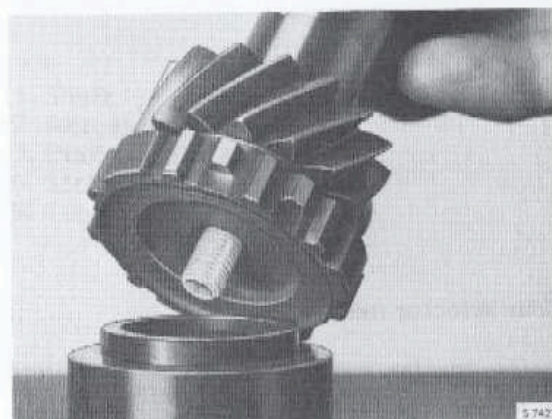
2. Press the bearing races into the bearing housing. Use tool 83 90 312, 83 90 189 and the ring-shaped support.



3. Fit the input shaft, shims, spacer and bearing in the bearing housing. Select shims and spacer of known size to deliberately give axial play. Place the shims between the rear bearing and the spacer.



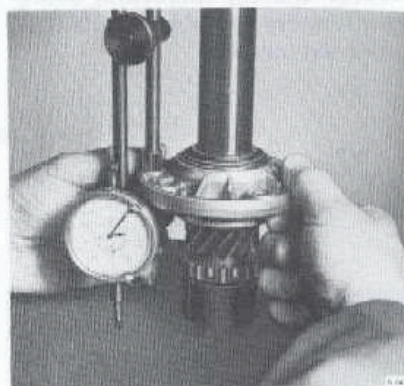
4. Lubricate the bearings and press them together until they meet the distance stop with a 3 tonne force applied. While the bearings are being pressed together rotate the bearing housing, against both the upper and lower bearings, 40 times in both directions so that the balls become properly positioned. Use drift 78 41 075 and the ring-shaped support to avoid damaging the connecting pipe. Maintain the 3-tonne force.



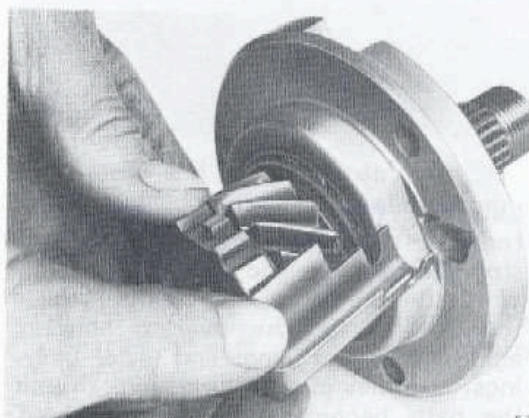
5. Fit the gauge in the bearing housing bolt hole. First put the bearing housing under load on the upper bearing and then on the lower bearing, reading off the axial play.

Shims of sizes 0.10, 0.15, 0.25 and 0.50 mm are available for eliminating the axial play.

When correctly shimmed, there should be no resistance to movement nor any play in the bearings. If the play cannot be eliminated by the available shims sizes, change the spacer. Spacers are available in thicknesses of 8.08, 8.09, 8.10 and 8.11 mm.



6. Press the front bearing off the input shaft and fit the estimated number of shims. Place the shims between the rear bearing and the spacer. Refit the front bearing on the input shaft in the bearing housing and press together with 3-tonne force. Rotate the bearing as described in point 4. Ensure that there is no resistance to movement or play in the bearing.
7. Fit the oil catcher in the bearing housing.

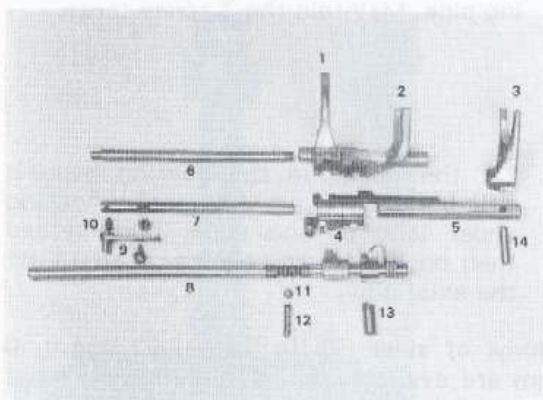


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Gear selector mechanism

Refer to the section on dismantling and refitting.

The gear selector mechanism consists of a system of selector shafts, selectors, selector forks with plungers, selector balls, ball springs and taper setscrew.

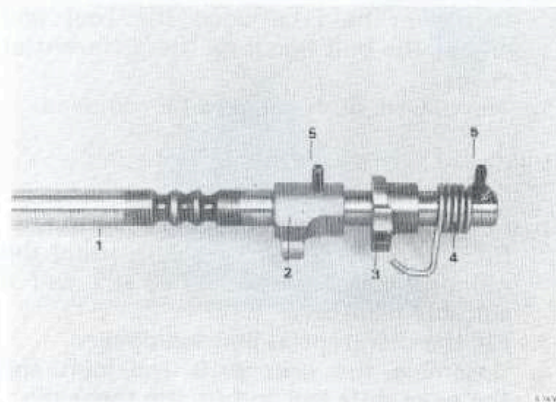


1. Selector fork, 1st and 2nd speeds
2. Selector fork, 3rd and 4th speeds
3. Selector fork, 5th gear
4. Actuator, reverse gear
5. Actuator, 5th gear
6. Shaft, 1st and 2nd speed, 3rd and 4th speed selector forks
7. Shaft, reverse actuator and 5th speed selector
8. Selector shaft
9. Reverse operating lever
10. Taper setscrew, shaft item 7
11. Ball, selector
12. Spring, ball
13. Plunger
14. Cylindric pin

Selector shafts

Dismantling

Knock out the dowl with a 4 mm drift. Remove the spring, double lockout and actuator.



1. Shaft
2. Actuator
3. Double lockout
4. Spring
5. Tubular dowel

Assembly

Assembly is in the reverse order. For positioning of parts see illustration. Fit new dowels.

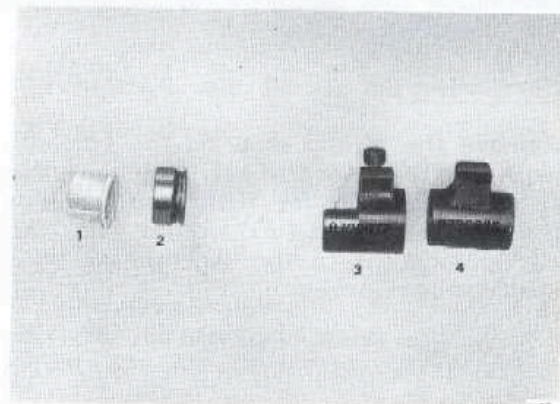
The reverse lever need not be detached from the gear shift shaft when the shaft is removed. The bolt is liable to shear because of the locking of the threads.

Replacing the seal and plastic bearing on the gear selector rod

(Can be done with the gearbox in situ)

Removal

1. Knock off the front taper pin from the gear shift joint and separate the joint from the rod.
2. Drain the transmission oil and remove the differential housing cover.



1. Plastic bush
2. Sealing ring
3. Dismantling tool
4. Assembly tool

3. Put the dismantling tool 87 90 677 over the collar on the sealing ring and bolt in the bolt of the tool against the shaft.
4. Pry off the sealing ring using of a boltdriver held between the tool and one of the bolt heads on the differential cover.
5. The plastic bush can now be removed.

Fitting

1. Fit the plastic bush.
2. Fit the new sealing ring with using the aid of assembly tool 87 90 685 and a suitable hammer.
3. Fit the differential housing cover.
4. Assemble the gear shift rod joint and the gear shift rod and fit the taper pin.
5. Fill the transmission with oil.

Note

Before refitting remove any burrs or marks on the gear selector rod.

Synchromesh

Synchromesh rings

When changing the synchromesh rings, follow the instructions for the dismantling of the gearbox. The differential unit must be removed and the layshaft gear cluster dismantled so that the primary gear housing can be removed. When changing the synchromesh ring for top gear, no further dismantling is necessary.

When changing the synchromesh ring for 1st and 2nd speed gear, the pinion shaft must be taken out of the transmission housing, so that the gears can be removed from the shaft.

Dismantling

Remove the circlip securing the synchromesh ring to the gearwheel. To remove the synchromesh ring for fifth gear, remove the circlip adjacent to the guide ring. The circlip adjacent to the synchromesh ring need not be removed.



Fitting

First fit the guide rings for the retaining springs, and the circlips for the guide rings on 3rd and 4th gears. There are no circlips on the guide rings for first and second gears. Fit the retaining spring with the longer end adjacent to the guide ring and with the ends spanning 11 teeth.

There are no circlips on the guide rings for first and second gears. Fit the retaining spring with the longer end adjacent to the guide ring and with the ends spanning 11 teeth.

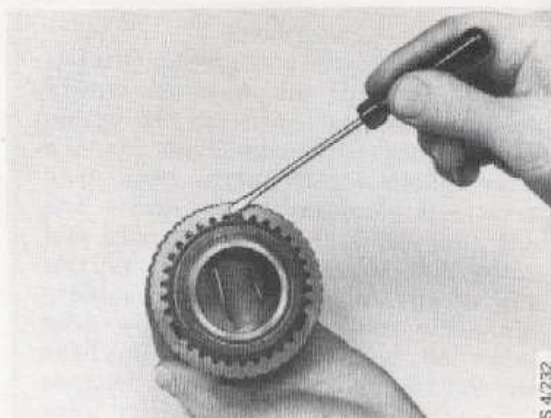
The guide rings on the third and fourth gears are factory-fitted and peened in position by a special tool after the circlip has been fitted. The guide rings supplied as spare parts should not be peened.

Guide 87 02 730, which is available as a spare part, should be used in conjunction with a pear-shaped circlip, 87 02 722.

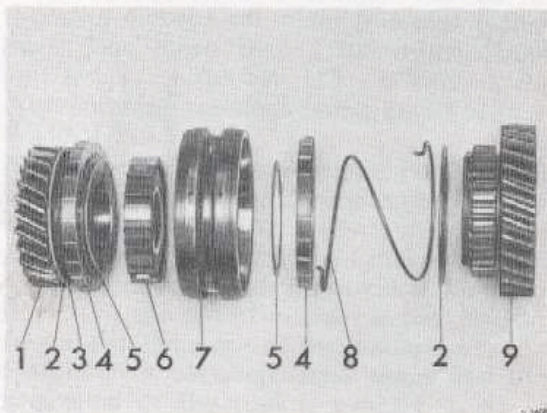
Alternatively, a complete synchromesh unit comprising the gear and factory-fitted synchromesh is available as a spare part, No. 87 11 632.

Fit the 5th speed synchro ring. The retaining spring should be positioned so that there are 5 teeth between the ends of the spring. Then fit the guide ring and the circlip.

The synchro ring for 2nd and 3rd gears has a molybdenum-coated cone; the same type may also be used for 1st and 4th gears.

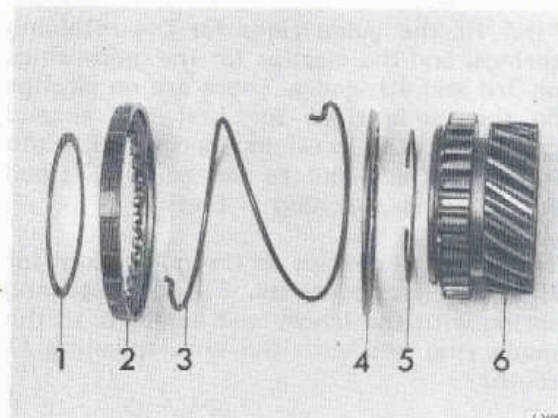


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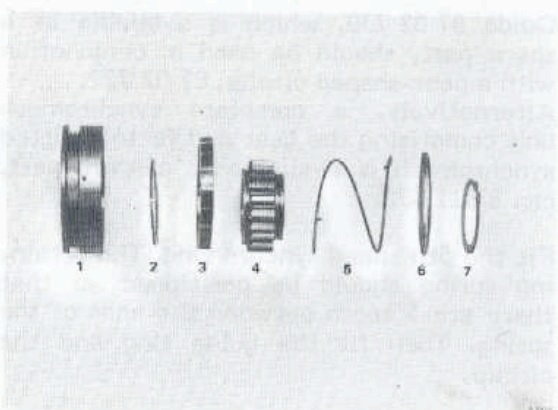
Synchromesh unit, 1st and 2nd speed gear

1. 2nd speed gear
2. Guide ring
3. Retaining spring, 2nd speed gear
4. Synchromesh ring
5. Circlip
6. Synchromesh hub
7. Synchromesh sleeve
8. Retaining spring, 1st gear
9. 1st gear



Synchromesh, 3rd gear

1. Lock ring
2. Synchromesh ring
3. Retaining spring, 3rd gear
4. Guide ring
5. Guide-ring circlip
6. 3rd gear

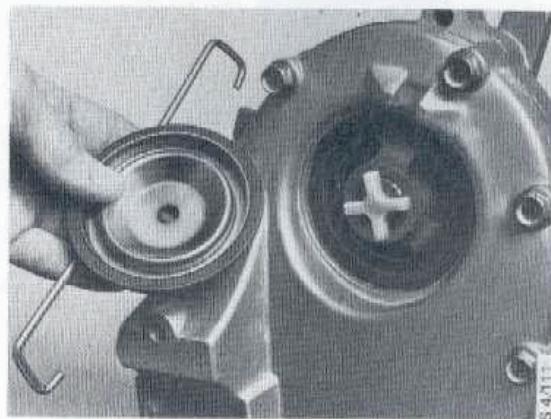


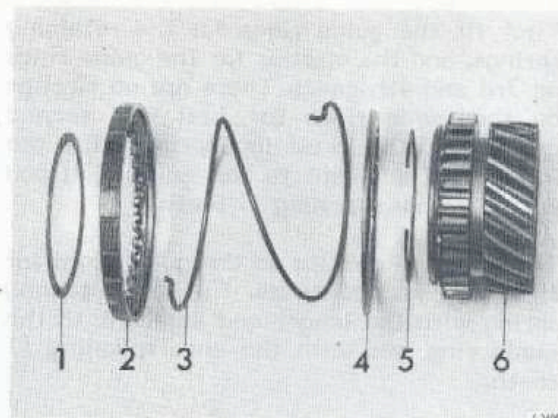
1. Synchromesh sleeve
2. Circlip
3. Synchro cup
4. Synchro hub
5. Retaining spring
6. Guide ring
7. Circlip

Ventilation

Ventilation of the transmission is by means of a hole through the top cover in the primary gear housing. The hole emerges at the centre of a plastic propeller which is screwed to the clutch shaft.

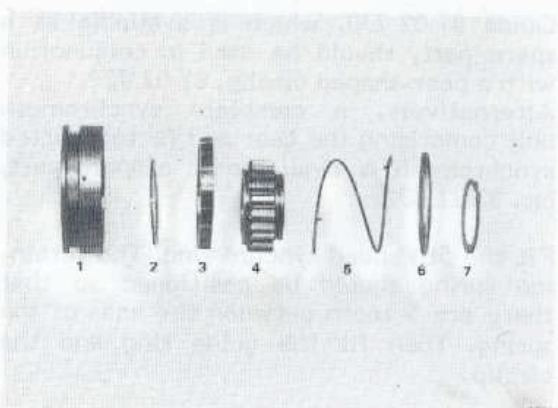
As the clutch shaft rotates, the oil is flung away from the hole by the propeller. When the shaft is stationary, the oil level in the primary gear is well below the hole.





Synchromesh, 3rd gear

1. Lock ring
2. Synchromesh ring
3. Retaining spring, 3rd gear
4. Guide ring
5. Guide-ring circlip
6. 3rd gear



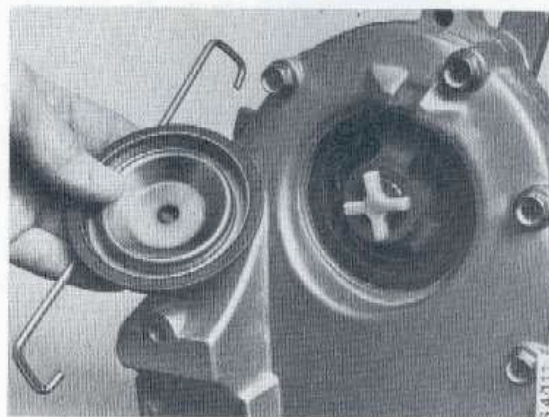
1. Synchromesh sleeve
2. Circlip
3. Synchro cup
4. Synchro hub
5. Retaining spring
6. Guide ring
7. Circlip

Ventilation

Ventilation of the transmission is by means of a hole through the top cover in the primary gear housing. The hole emerges at the centre of a plastic propeller which is screwed to the clutch shaft.

As the clutch shaft rotates, the oil is flung away from the hole by the propeller.

When the shaft is stationary, the oil level in the primary gear is well below the hole.



Differential and pinion/crown wheel gear

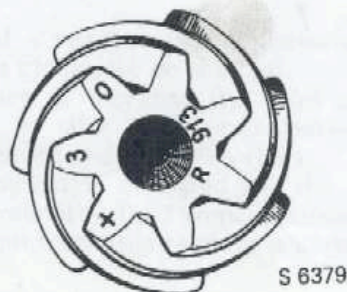
General

The crown wheel and pinion are a matched pair, so if one is exchanged the other must be exchanged too. The parts are tested together for noise and the optimum setting for minimum noise output is measured. The key measurements for pinion and crown wheel are the distance from the end face of the pinion to the centre of the crown wheel, and the backlash between the teeth. These measurements and the mating number are stamped on both parts at the time of noise testing. When the pinion and crown wheel are installed, these measurements must be accurately adjusted with shims and a special measuring instrument. The pinion gear shims are placed next to the bearing housing of the pinion shaft bearings, and the crown wheel (differential) shims are distributed between the two differential bearing seats.

Adjusting the position of the pinion gear

General

Data for adjustment of the distance from the pinion gear to the centre of the crown wheel are stamped into the end face of the pinion (an example is illustrated below).



End face of pinion

- + 3 = measurement for pinion setting
- R913 = mating number, also stamped on crown wheel
- 0 = pinion not offset - shaft centre-line intersects crown wheel centreline (all pinions are marked 0 and this datum has no relevance to the adjustment)

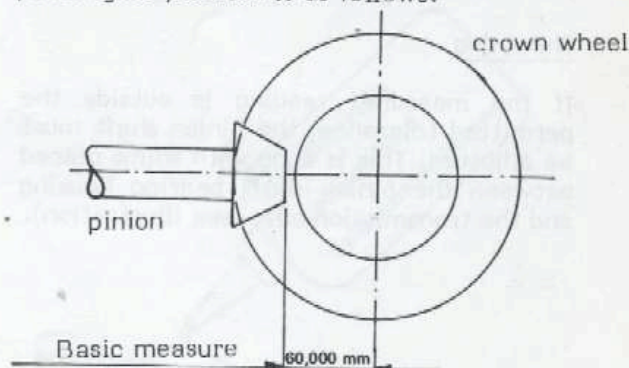
Important

Before dismantling the transmission, always measure the positions of the pinion and crown wheel. This provides a check on whether the setting may have been wrong. If the pinion shaft and crown wheel assembly has done less than 6,000 miles (10,000 km), the setting can be adjusted, but after greater mileage, when the gears will have worn themselves into a certain position, the parts should be reassembled with the same settings as were measured prior to dismantling.

Before measuring

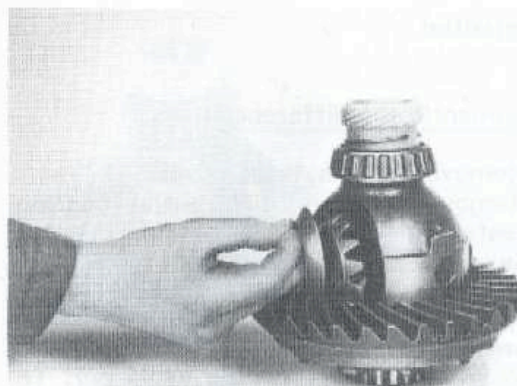
The following preparations must be made prior to measuring the pinion gear setting: The following applies to manual transmissions: The pinion shaft bearings must be compressed until the torque required to rotate the pinion shaft in the housing is 2.5 ± 0.5 Nm (25 ± 5 kgfcm), corresponding to a dynamometer reading of 47-71 N (10.4-15.4 lb, 4.7-7.0 kgf). These figures apply to new, lightly oiled bearings. The corresponding figures for older bearings (which have done more than 1,200 miles (2,000 km) are 1.3 ± 0.5 Nm (13 ± 5 kgfcm), the dynamometer readings being 19-43 N (4.2-9.5 lb, 1.9-4.3 kgf).

The differential unit must be removed to permit installation of the measuring instrument (tool 83 90 155), which consists of a measuring jig with attached dial indicator. A ground gauge block is provided for calibration of the dial; the block is laid against the calibration stops of the instrument, and the distance between these stops and the centreline of the tool is exactly 2.362 in (60.000 mm), equal to the distance from the end face of the pinion shaft to the centre of the crown wheel (see illustration). The procedure for measuring the pinion gear position is as follows.



S 4 075

6. Fit the gears and wear washers and insert the differential shaft. Fit the locking pin.
7. Mount the differential and differential bearing seats in the transmission case.
8. Check the crown wheel backlash and adjust as necessary (see the section on the inner driver with differential bearing seats.)

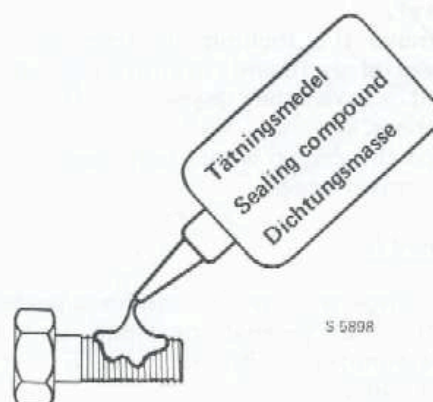


S 4 7237

9. When finally fitting the differential bearing seats, apply sealing compound to the 12 bolts.

Tightening torque:
20 - 25 Nm (2 - 2.5 kfg m)

10. Refit the final drive cover.

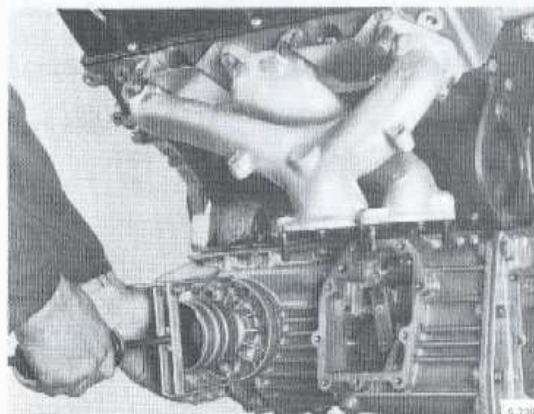


S 5898

Inner driver with differential bearing seats

Removal

Remove the differential bearing cap retaining bolts and remove the cap and inner driver using tool 87 90 776 and tool 83 90 270. Save the shims.



S 7283

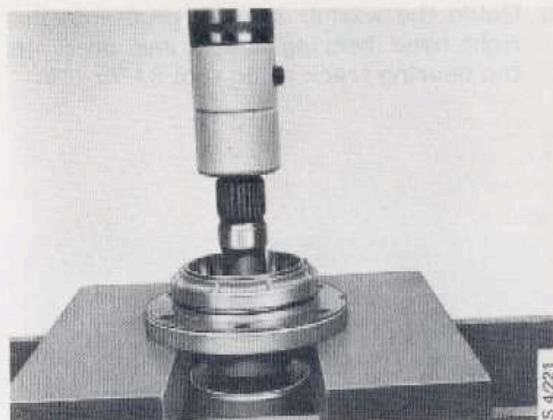
Dismantling

1. Remove the circlip from the driver.

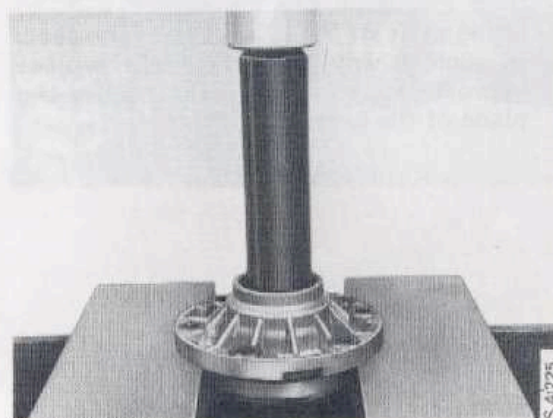


S 4 235

2. Press out the driver from the differential bearing seat.
3. Using a screwdriver, remove the seal ring taking care not to damage the bearing seat.
4. Remove the speedometer drive from the left bearing seat.
5. Press out the ball bearing using tool 78 41 067.

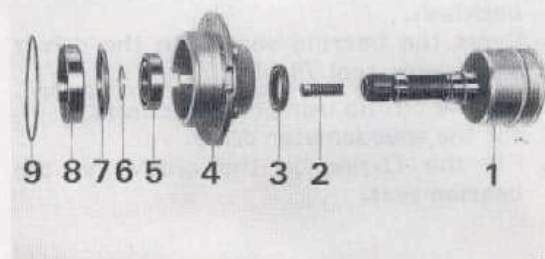


6. Remove the bearing tracks for the differential bearings by means of a suitable drift. A washer is located inside the bearing track for the right-hand differential bearing seat (seat without speedometer drive) and the purpose of this is to improve the bearing lubrication.
7. Remove the O-ring from the groove in the bearing seat.



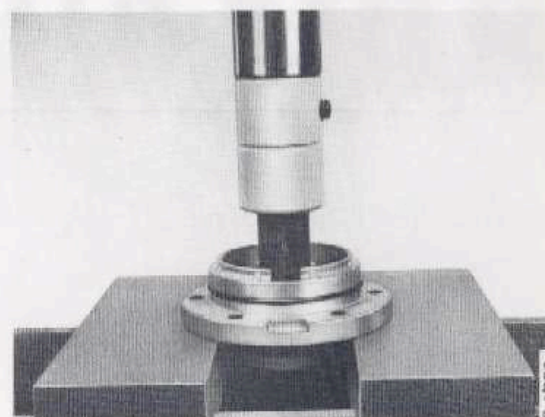
Inner driver and bearings

1. Inner driver
2. Spring with plunger
3. Sealing ring
4. Seat
5. Ball bearing
6. Circlip
7. Oil level washer
8. Bearing track
9. O-ring

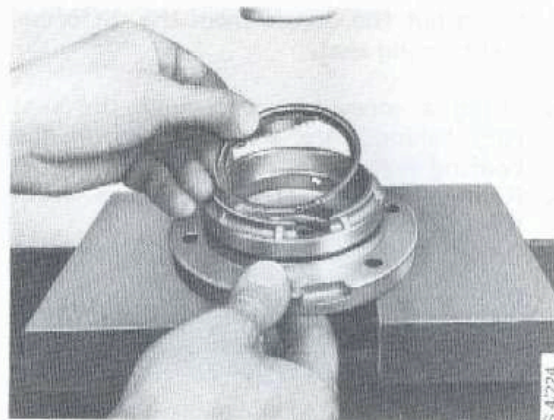


Assembly

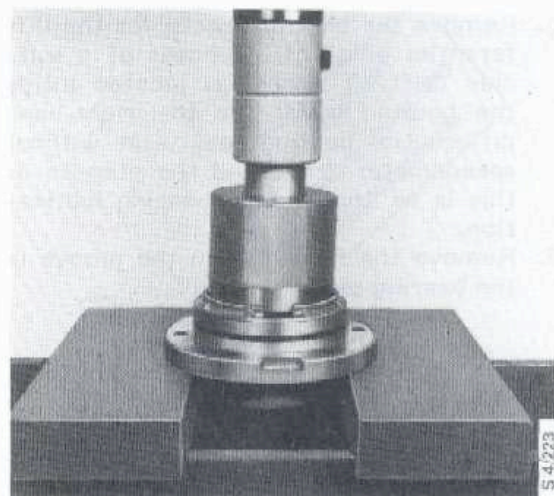
1. Press the ball bearing into the bearing seat using tool 78 41 141.



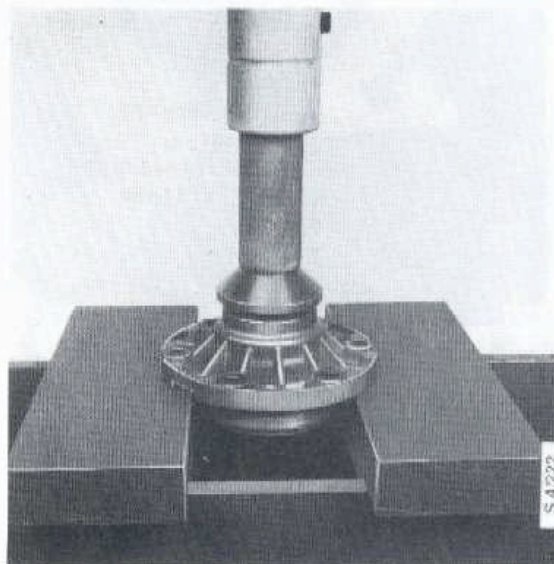
2. Guide the washer into its groove in the right-hand bearing seat and press in the bearing track using tool 83 90 114.



3. Using drift 87 90 800, press in the seals in such a way that they will project approximately 0.08 in (2 mm) above the plane of the bearing seat.



4. Adjust the bearing compression and the backlash.
5. Press the bearing seat onto the driver shaft using tool 78 41 067.
6. Fit the circlip using circlip pliers.
7. Fit the speedometer drive.
8. Fit the O-ring in the groove in the bearing seat.



Installation

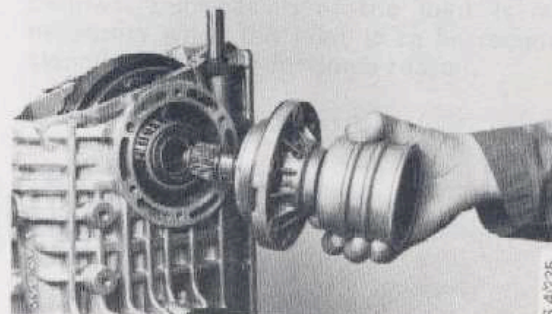
See adjustment of the differential bearing compression and adjustment of backlash.

1. Check that the O-ring is mounted on the bearing seat and place the spring and plunger in the hole in the end of the driver shaft.
2. Fit a suitable combination of shims to the two bearing seats and mount the seats, together with inner driver, to the transmission.
3. When securing the bearing seat, check that there is backlash. Tighten the retaining bolts to the prescribed torque. Use sealing compound on the threads of the 12 bolts.

Tightening torque, differential bearing seat:

20-25 Nm (15-18.5 lb ft, 2.0-2.5 kgfm)

4. Check the backlash by measuring in four places.



Only the new carrier must be fitted on the new drive shaft.

The new carrier must be fitted on the new drive shaft.

On all versions for introduction the new carrier is introduced on the new drive shaft.

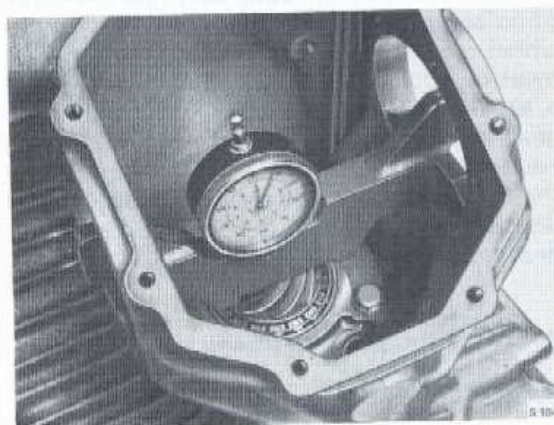
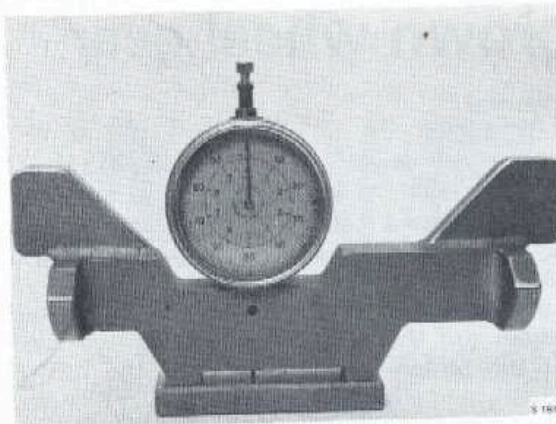
On all versions for introduction the new carrier is introduced on the new drive shaft.

On other versions:

AC 198706, AC 200706, AC 200706, AC 200706

Measuring

1. Check that the pointers of the instrument are zeroed when the measuring point touches the gauge block (see illustration).
2. Place the instrument in the differential housing with the point applied to the flat end of the pinion gear and take a reading (see illustration).
3. When the pinion gear is correctly positioned, the dial should show the same reading (in hundredths of a millimeter (+ or -) as that stamped on the pinion (with a permitted tolerance of ± 0.05 mm).

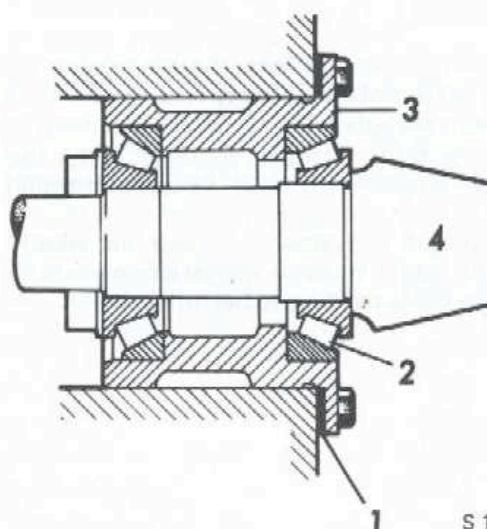


Shimming

If the measured reading is outside the permitted tolerance, the pinion shaft must be adjusted. This is done with shims placed between the pinion shaft bearing housing and the transmission case (see illustration).

Shim table

Location	Shims	
	Thickness mm	Spare part No.
Pinion shaft between bearing housing and trans- mission case	0.10	83 41 752
	0.15	83 41 760
	0.30	83 41 778
	0.50	83 44 723



S 1845

Adjusting the pinion gear

1. Shim
2. Roller bearing
3. Bearing housing
4. Pinion

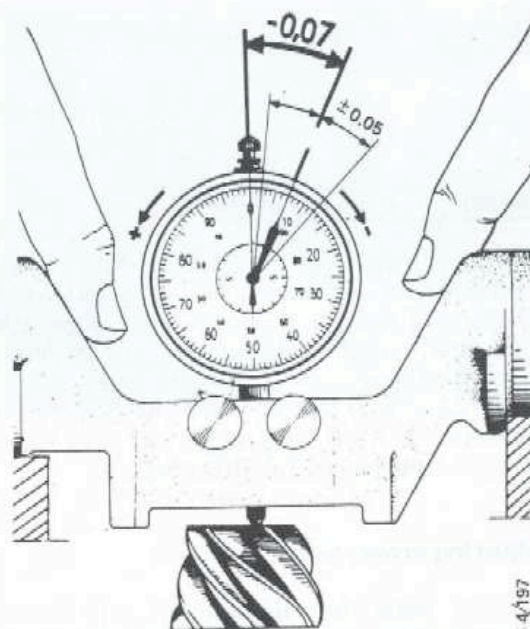
Procedure for shimming is as follows:

1. Undo the four bolts from the pinion shaft bearing housing and tap the pinion shaft gently out of the transmission case.
2. Change the shimming according to the following rules:
 - a) If the dial reading is higher than the correct value, increase the shim combination.
 - b) If the dial reading is lower than the correct value, reduce the shim combination.

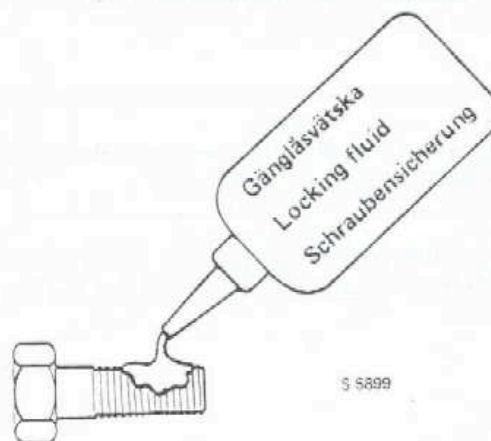
Note! + reads counter-clockwise and - reads clockwise on the dial. Reduce or increase the shim combination by the difference between the measured and correct values.

If the pinion is stamped -7, the pointers should indicate -0.07 mm. A deviation of ± 0.05 mm from this reading is permitted.

3. Having selected the correct combination of shims, place them in the transmission case with aid of the locating pins. Mount the pinion shaft to the transmission case using sleeve 83 90 148 and arbor 83 90 114. Remove the locating pins, apply Loctite to the bolts and then tighten them to the prescribed torque.



S 4197

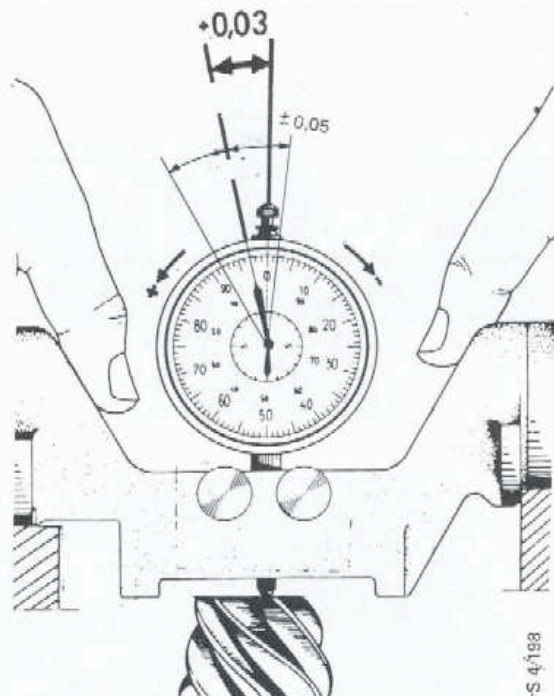


S 5899

Rechecking

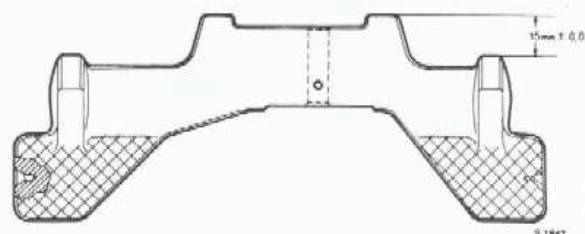
After shimming, replace the measuring jig in the differential housing and check that the dial now gives the correct reading to within ± 0.05 mm. If it does not, the shimming procedure must be gone through again.

If the pinion is stamped +3, the dial should indicate +0.03 mm. A deviation of ± 0.05 mm from this reading is permitted.



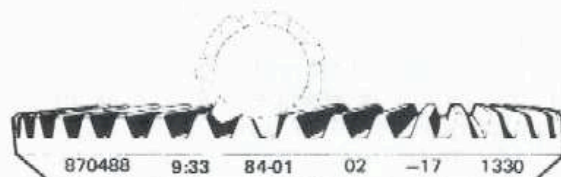
Checking the measuring jig

The measuring jig is a precision-made tool. It should be handled with care to avoid knocks and deformation. If there is reason to suspect that the jig may have been damaged in such a way that it gives wrong readings, it can be checked. The dimension indicated in the illustration on the right should be measured for this purpose.



Adjusting crown wheel backlash

Certain data for adjustment of crown wheel backlash are stamped on the crown wheel as illustrated.



S 4568

Note

With new details the backlash should be adjusted to 0.1 ± 0.05 mm.

Details with less mileage than 6,000 miles (10,000 km) should be adjusted to 0.17 ± 0.05 mm.

Crown wheel markings

- 870488 = Item number (not part number)
- 9:33 = Ratio
- 84-01 = Date of manufacture and identification code
- 02 = Material code
- 17 = Backlash of 0.17 mm. Unless otherwise stated, this has a tolerance of 0.05 mm.
- 1330 = Mating number, which is also stamped on the pinion

The backlash should be checked at four points round the circumference of the crown wheel and must not deviate by more than ± 0.05 mm from the stated measurement. Crown wheel backlash is adjusted with shims. Up to four shims in suitable combinations may be used.

Measuring and shimming

Adjustment of differential bearings

Adjustment must be carried out before the pinion shaft is mounted. (If only the final drive has been dismantled for the replacement of the differential bearings, the crown wheel must also be dismantled before the bearings can be adjusted.)

1. Place the differential assembly complete with crown wheel in the transmission case.
2. Mount the left bearing seat (with the speedometer drive) without shims and tighten the bolts to the prescribed torque.

Tightening torque, left-hand bearing seat

20-25 Nm (2.0-2.5 kgfm, 14-18 lbft,)

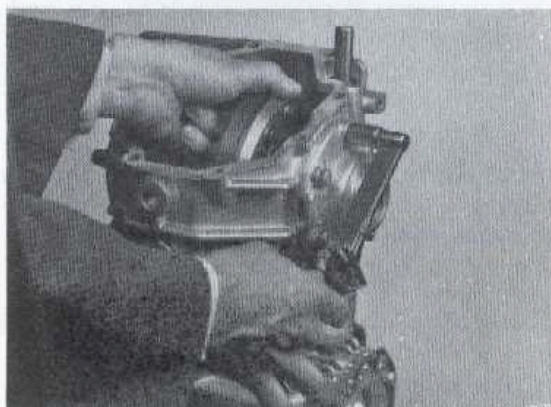
3. Oil the differential bearings and mount the right bearing seat. If the inner drive is mounted in the bearing seat, remove the spring and plunger before mounting the seat. Tighten the bolts, in two or three stages, to the prescribed torque. Rotate the differential while tightening the bolts.

Tightening torque, right-hand bearing seat

2.2 Nm (22 kgfcm; 19 lbin)

Table of shims

Location	Shims	Spare part No.
	Thickness mm	
Between differential bearing seat and transmission case	0.10	83 41 604
	0.15	83 41 612
	0.30	83 41 620
	0.50	83 44 638



4. Measure the gap between the transmission case and bearing seat with a feeler gauge at two points opposite each other and take an average of the two measurements. Then select shims corresponding to this result plus an increment of 0.20 mm to obtain the correct bearing compression.

The method described above applies to both new and old bearings.

The torque obtained in this way can be measured by means of a torque wrench and driver 87 90 818.

Ensure that you adjust to the correct values. The following values apply for the rolling torque.

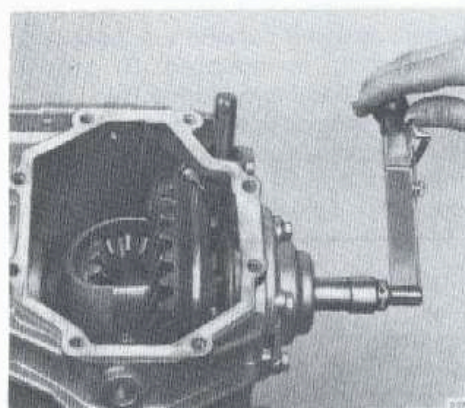
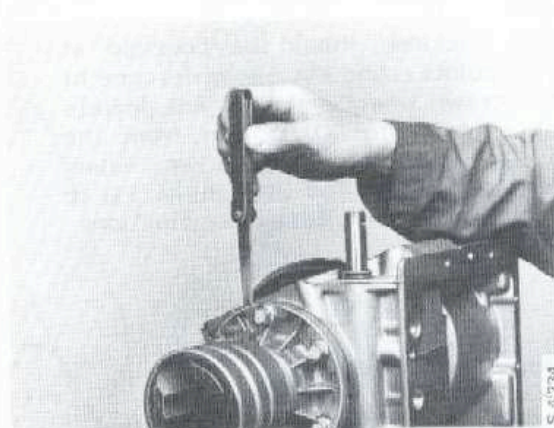
New, lightly oiled bearings:
1.8-2.8 Nm (16-24 lbin, 18-28 kgfcm)

Bearings having run more than 1 200 miles (2 000 km) 0.8-1.3 Nm (7-11 lbin, 8-13 kgfcm)

Shims of four different thicknesses can be suitably combined. The available thicknesses are shown in the table below.

Note

The resulting set of shims should then be distributed between the right and left sides to give the correct backlash.



Location	Shims Thickness mm	Spare part No.
Between differential bearing seat and transmission case	0.10	83 41 604
	0.15	83 41 612
	0.30	83 41 620
	0.50	83 44 638

Adjusting crown wheel gear backlash

1. Place the differential assembly complete with crown wheel in the transmission case.
2. Mount the left bearing seat (with the speedometer drive) without shims and the right bearing seat with the selected set of shims, tightening the bolts to the prescribed torque.

Tightening torque,
LH and RH bearing seat:
20-25 Nm (2.0-2.5 kgfm; 18 lbft.)

3. Mount the dial indicator, see illustration, and measure the backlash.
4. Calculate the difference between the measure backlash and the desired backlash, and then move shims of suitable thickness over to the left bearing seat. Check the measurement once again.

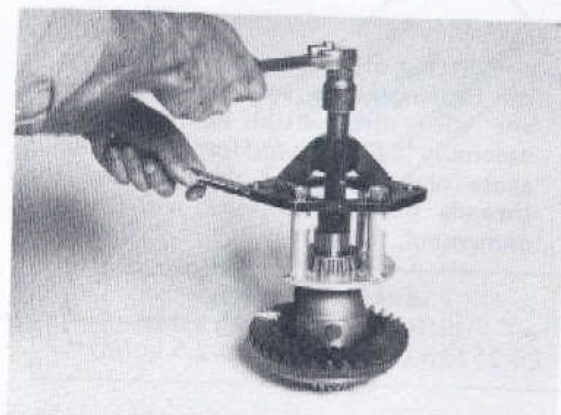
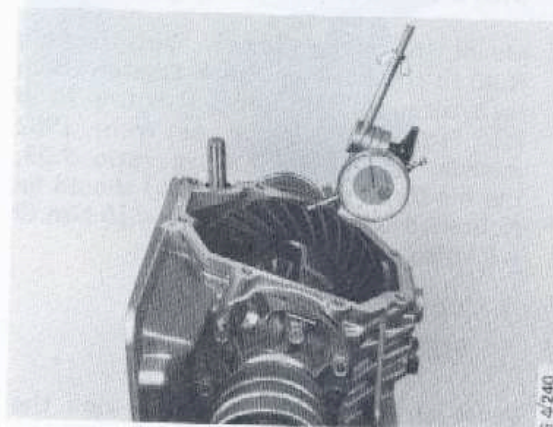
The preselected set of shims must be used for adjusting the backlash. The total thickness of the set must not be altered.

Differential

Removing (Earlier versions)

To replace parts inside the differential, remove one of the circlips on the differential drive shaft. The shaft, drive and wear washers can be removed without the crown wheel having to be dismantled.

1. Remove the differential housing cover.
2. Remove the two differential bearing seats together with inner drivers. Save any shims and remove the differential.
3. If necessary, press the outer bearing rings out of the bearing seats (see Dismantling of the inner driver with differential bearing cap). Remove the speedometer drive and press both journal bearings off the differential housing using tools 89 96 084, 87 90 768 and 89 95 177.
4. Remove the crown wheel bolts and take off the crown wheel.
5. Push out the differential gear shaft. The hole marked by a white dot is slightly smaller - the shaft should therefore be pressed out from this side.
6. Remove the gears and the wear washers from the differential casing.



Assembling

Important

If the crown wheel is exchanged, the pinion gear must be exchanged with it, as these two parts constitute a matching pair.

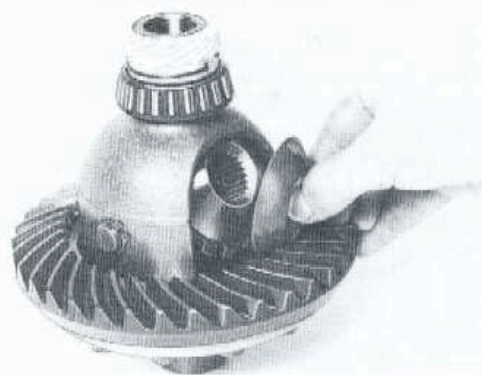
1. Exchange any worn or damaged parts.
2. Locate the gears and wear washers in the differential casing and slide in the differential drive shaft. The shaft should be inserted from the side marked with a white dot.
3. Mount the crown wheel, apply locking fluid to the bolts and then tighten them to a torque of 50 Nm (5.0 kgfm; 36 lb ft). Tightening torque as from 1982 models, with a final drive ratio 9.33, the modified bolts (10 x 1.25) should be tightened to a torque of 90 ± 10 Nm (9 ± 1 kgfm, 63 ± 7 lb ft).

4. Press on the journal bearings and the speedometer drive, if these have been removed, using tool 87 90 487.
5. Locate the differential assembly in the transmission case. If any part affecting the overall width of the differential assembly - e.g. the bearings - has been exchanged, the crown wheel backlash must be adjusted. This is done by alteration of the combination of shims. See section "Adjusting crown wheel backlash".

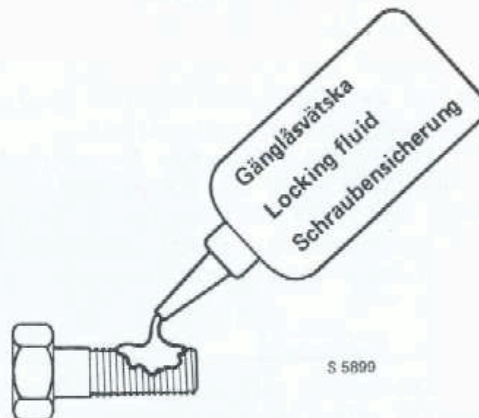
6. For fitting of the outer bearing rings in the bearing seats, see under "Inner driver with differential bearing seats - assembly". Fit the differential bearing seats and the inner driver. Coat the threads of the 12 bolts with sealing compound.

Tightening torque,
differential bearing seat:
20-25 Nm (15-19 lbft, 2.0-2.5 kgfm)

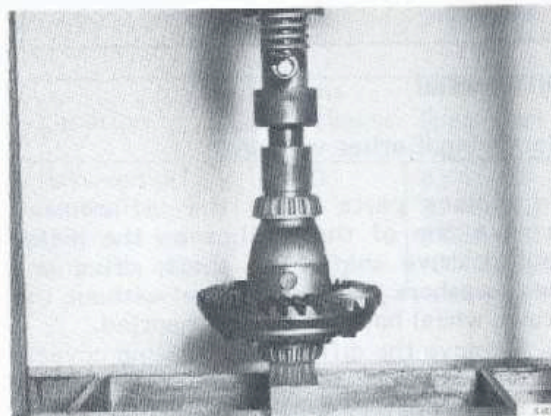
7. Fit the rear cover of the differential housing.



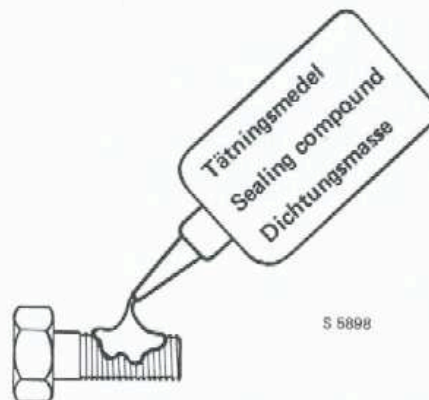
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S 5899



© 3002



S 5898

Differential (New version)

To dismantle the differential

1. Remove the final drive cover.
2. Remove the two differential bearing seats together with the inner drivers. Save the shims and remove the differential.
3. Remove the speedometer drive and press off the journal bearing using tools 89 96 084, 87 90 768 and 89 95 177. To change the outer bearing races, refer to the section on dismantling of the inner driver.
4. Remove the locking pin from the differential shaft and carefully tap out the shaft. Save the gears and the wear washers.
5. Undo the crown wheel bolts and remove the crown wheel.

To assemble

1. Exchange any worn or damaged parts.
2. Refit the journal bearings and the speedometer drive, using tool 87 90 487.
3. Mount the differential and differential bearing seats inside the transmission case. Check the bearing preload and adjust the shims as necessary (refer to "Inner driver with differential bearing seats").
4. Remove the differential and bearing seats from the transmission case.
5. Fit the crown wheel, tighten the bolts to the specified torque and apply locking fluid to them.

Tightening torque:
 $90 \pm 10 \text{ Nm}$ ($9 \pm 1 \text{ kgf m}$)

