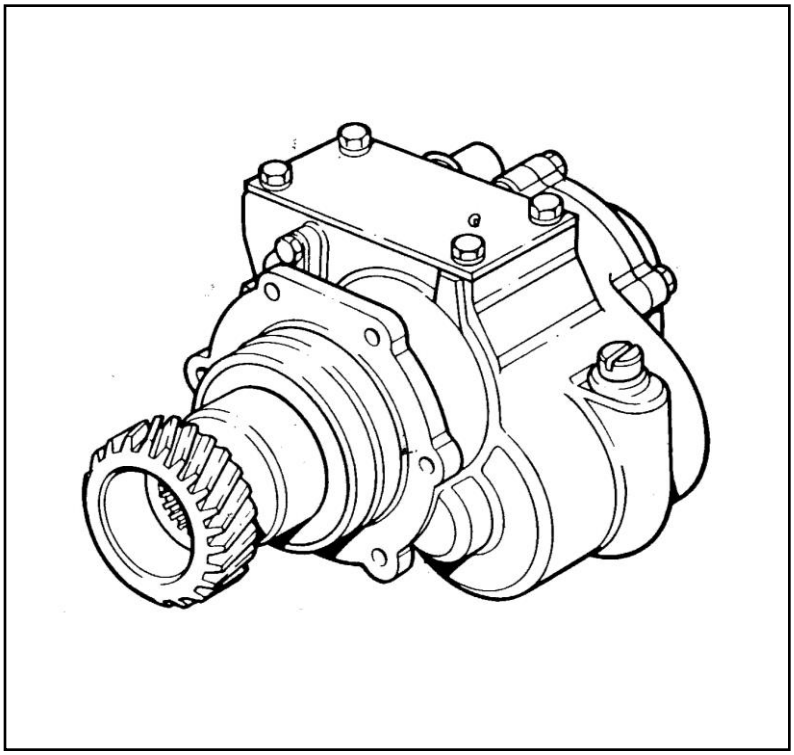


REPAIR AND SERVICE MANUAL FOR FAIREY/SUPERWINCH OVERDRIVES FOR LAND ROVER SERIES VEHICLES

To service products that were sold by:

Contents

2nd edition

Overview

- This manual covers disassembly, inspection and assembly operations for Fairey Overdrive Units to fit Land Rover Series I – III vehicles. Fairey OD units were later manufactured by Superwinch following the same design. Today overdrives are sold and manufactured by RoversDownSouth.
- It does not cover the clutch sleeve unit.
- References given for bearings and seals are according to international standard and should allow the user to source them at any bearing or industrial supply dealer.
- No special tooling is required apart from circlip pliers for external circlips. A vernier caliper and a pen to mark metallic surfaces can prove useful. Access to a press is helpful but not vital if a large vice is available. A dentist's mirror and a small torch light may also prove useful.
- This manual has been compiled with utmost care. However, it is not an official manual, but has been written out of personal interest with the rebuilding of Land Rover Series vehicles. The author is a mechanical engineer who has been involved in the automotive industry for many years.
- All explanations given have been verified on the author's overdrive units and are intended to give a guide line to an easy rebuild of the unit. Typing mistakes have been eliminated where found. However, no responsibility for any problems encountered during operations can be the liability of the author. The manual is intended as a guide line only and requires some knowledge by any user to properly execute the rebuild.
- Many thanks to Moci, who with his six years of age proved himself to be a reliable partner in holding components for taking pictures and an unerring hunter when looking for springs that had jumped. And to John Denham in correcting my english and giving a lot of advice regarding technical precision and clarity and Rik Thiel who provided the schematic drawing on overdrive operation modes. Both live in Australia.

Schematic drawing and references

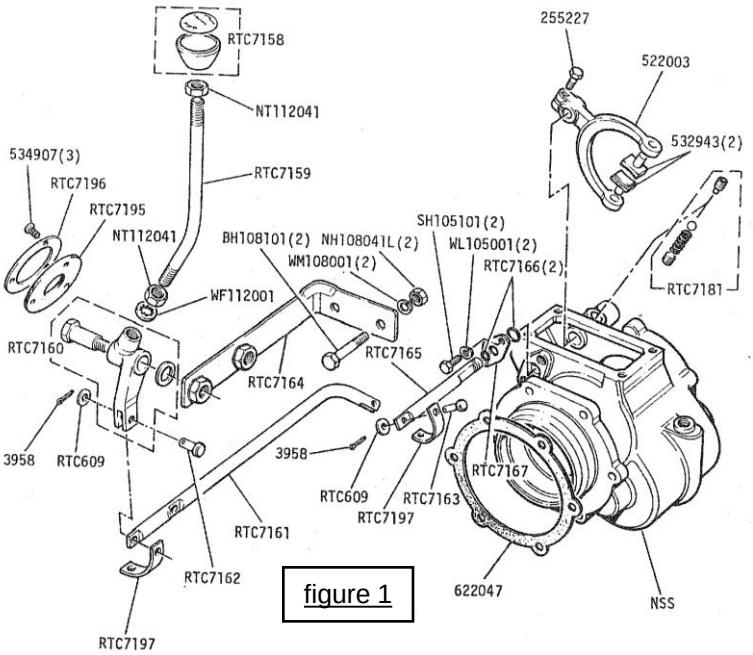


figure 1

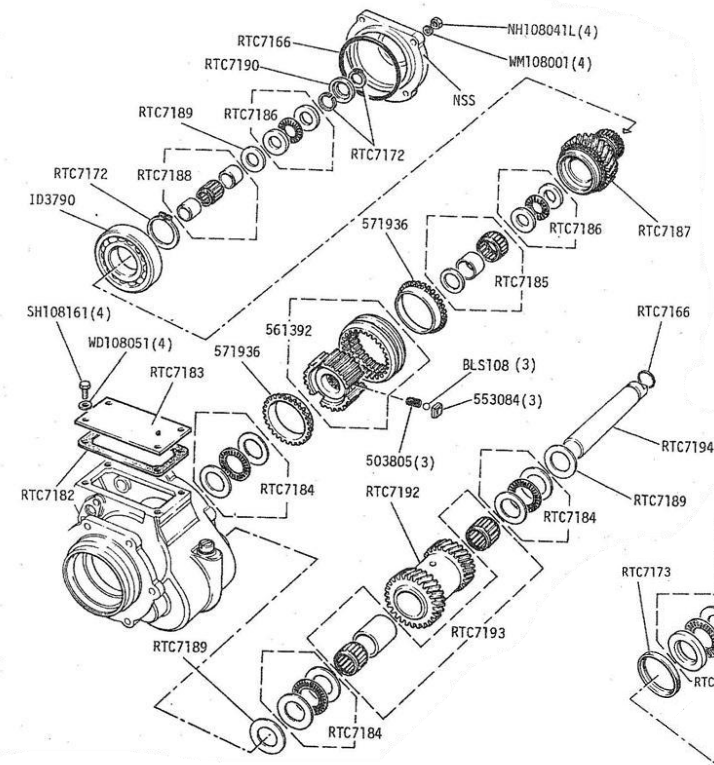


figure 2

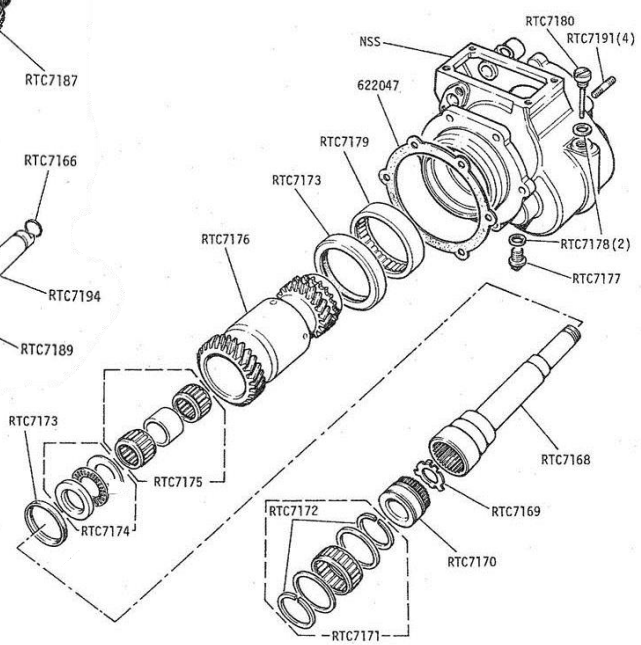
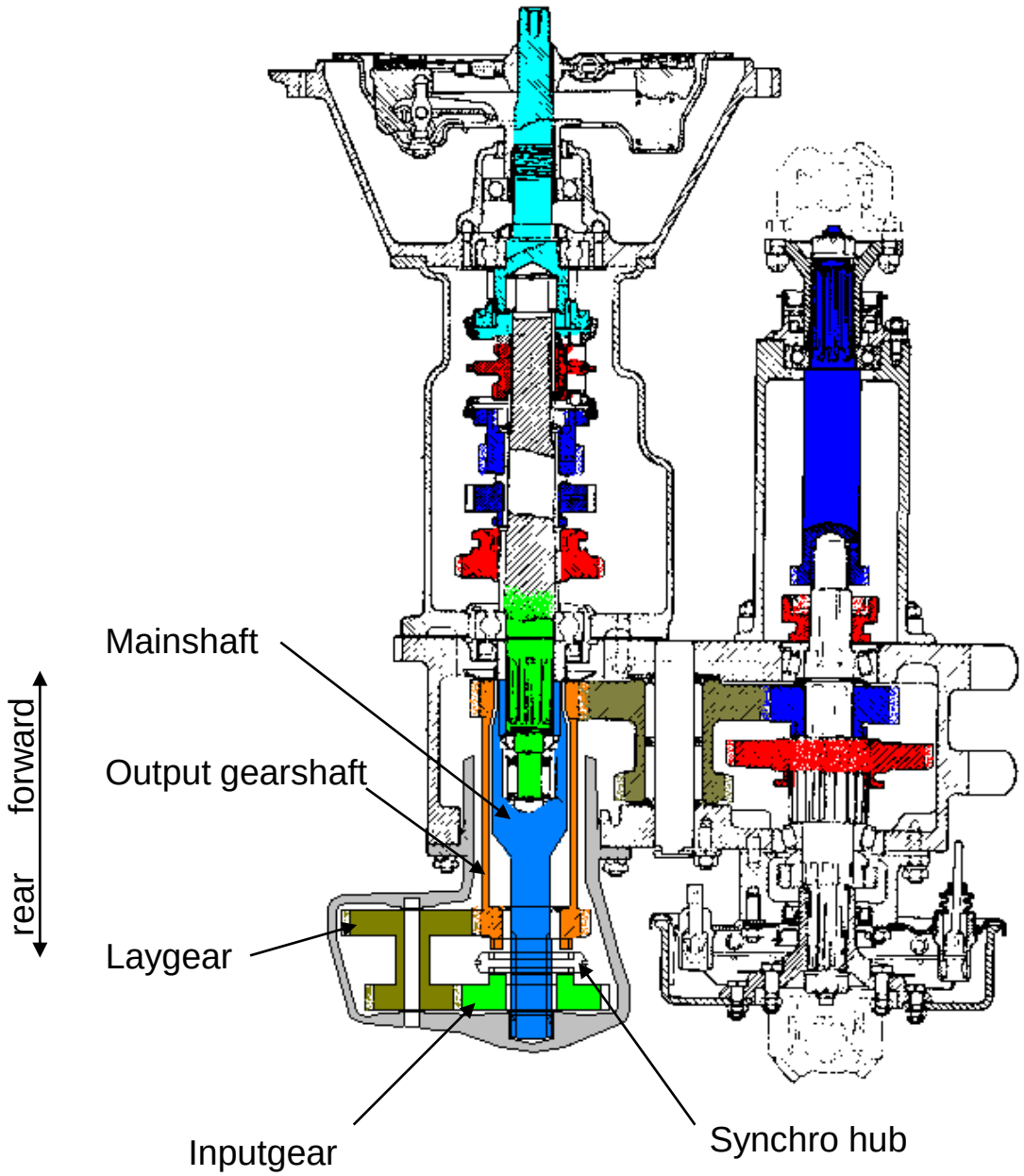


figure 3

Parts description

Description	Qty	Part No.
Knob for operating lever	1	RTC7158
Locknut (M12)	2	NT112041
Operating lever	1	RTC7159
Shakeproof washer (M12)	1	WF112001
Pivot kit	1	RTC7160
Sealing plate) Transmission	1	RTC7196
Rubber grommet) tunnel	1	RTC7195
Self-tapping screws)	3	534907
Split pin (1/16" x 1/2")	2	3958
Plain washer (1/4")	2	RTC609
Link rod	1	RTC7161
Clevis pin, pivot to link rod	1	RTC7162
Clevis pin, link rod to selector shaft	1	RTC7163
Insulator for clevis pins	2	RTC7197
Bracket, supporting pivot	1	RTC7164
Spring washer (M8)) Securing	2	WM108001
Nut (M8)) bracket to	2	GHF213
Bolt (M8 x 50 mm)) gearbox	2	BH108101
Selector shaft	1	RTC7165
'O' ring service kit (comprising 4 items)	1	RTC7166
Sealing plate for selector shaft	1	RTC7167
Screw (M5 x 10 mm)) Securing sealing	2	SH105101
Spring washer (M5)) plate to casing	2	WL105001
Selector fork	1	522003
Swivel pads for selector fork	2	532943
Pinch bolt (fork to shaft (5/16" UNF x 7/8"))	1	255227
Oil seal service kit (comprising 2 items)	1	RTC7173
Thrust bearing service kit	1	RTC7174
Needle bearing service kit	1	RTC7175
Output gearshaft	1	RTC7176
Drain plug	1	RTC7177
Washer for drain plug or dipstick	2	RTC7178
Roller bearing	1	RTC7179
Gasket, overdrive to transfer box	1	622047
Dipstick	1	RTC7180
Detent service kit	1	RTC7181
Stud, rear cover to main casing	4	RTC7191
Mainshaft	1	RTC7168
Lockwasher, securing clutch sleeve	1	RTC7169
Clutch sleeve	1	RTC7170
Needle bearing service kit	1	RTC7171
Circlip service kit (comprising 5 items)	1	RTC7172
Ball bearing	1	1D3790
Circlip service kit (comprising 5 items)	1	RTC7172
Needle bearing service kit	1	RTC7188
Shim pack (comprising 8 assorted shims for laygear and mainshaft)	A/R	RTC7189
Thrust bearing service kit	2	RTC7186
Collar	1	RTC7190
'O' ring service kit	1	RTC7166
Spring washer (M8)) Rear cover to	4	WM108001
Nut) main casing	4	GHF213
Gasket for top cover plate	1	RTC7182
Top cover plate	1	RTC7183
Plain washer (M8)	4	WD108051
Screw (M8 x 16 mm)	4	SH108161
Thrust bearing service kit	3	RTC7184
Synchromesh cone	2	571936
Inner and outer synchro hub	1	561392
Spring	3	503805
Ball	3	52459
Sliding block	3	553084
Needle bearing service kit	1	RTC7185
Input gear assembly	1	RTC7187
Needle bearing service kit	1	RTC7193
Laygear	1	RTC7192
Layshaft	1	RTC7194

Schematic operations of an overdrive unit



- In position “out” the synchro hub is in its forward position and couples the blue mainshaft directly to the orange output gearshaft. The laygear idles.
- In position “in” the synchro hub is in its rear position and couples the blue mainshaft to the green input gear. Torque is then transmitted via the olive laygear to the orange output gearshaft.

Picture compiled by Rik Thiel

2nd edition

Preparation for removal of main components

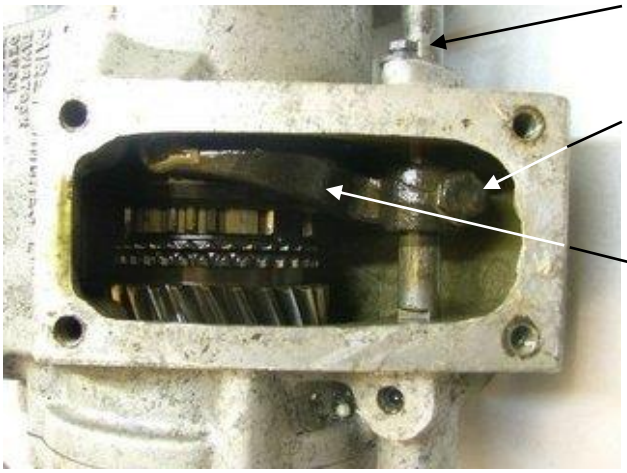
Removal from the vehicle

1. Disconnect the link rod (RTC7161, fig. 1) from the selector shaft.
2. Remove the six nuts holding the OD in place and pull it out of the gearbox. Two nuts can only be completely removed once the unit is pulled back by about 10mm.
3. Drain the oil by removing the drain plug (RTC7177, fig. 3). The unit contains 0.4l of EP90 type oil.
   It is advisable to drain the oil through a fine meshed strainer to retain any metallic components for analysis.

Preparation for disassembly of the main components

1. Wash and clean the unit from the outside to avoid mud and particles to contaminate your working surface.
2. Remove the top cover plate (RTC7183, fig. 2).
3. Remove the detent grub screws (RTC7181, fig. 1), starting with the one on the top side. This serves to limit maximum travel of the selector shaft. Care needs to be taken with the one on the bottom side. It compresses the selector spring to press a ball onto the selector shaft. This fits into three recesses on the shaft, marking the positions “low”, “neutral” and “high”.

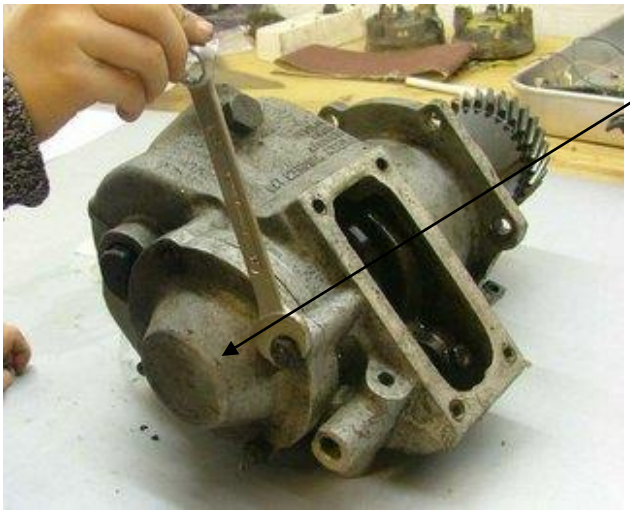
Preparation for removal of main components



4. Remove the sealing plate for the selector shaft (RTC7167, fig. 1)

5. Remove the pinch bolt (255227, fig. 1)

6. Pull the selector shaft out of the housing and carefully remove the selector fork (522003, fig. 1) together with the swivel pads (532943, fig. 1). Should they fall into the housing during the procedure retrieve them once the main and lay shaft have been removed.



7. Remove the rear cover plate. It is recommended to have the unit in a vertical position for the next operations. Place it on the bench, resting on the output gearshaft, and support it by suitably sized pieces of timber.

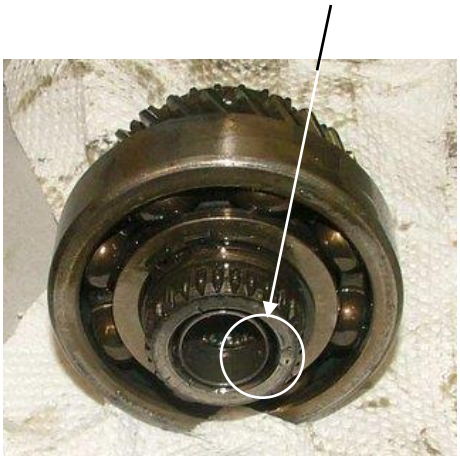
Removal of the main shaft

Removal of the main shaft

1. Remove circlip and collar (RTC7172 and RTC7190, fig. 2)

2. Remove the next circlip, then the axial bearing group (RTC7186, fig. 2) consisting of two hardened races and the bearing cage, and finally the pack of shims (RTC7189, fig. 2). These serve to adjust the end float of the whole main-/outputshaft assembly.

3. Remove the input gear assembly (RTC7187, fig. 2) together with the ball bearing (ID3790, fig. 2). It should come out easily as it is designed to be a loose fit. Should problems be experienced however, warming the housing with a blow torch will normally free it.
If no such tool at hand, leave it in until the output gear shaft has been taken out, then tap it out from inside the housing. Take care not to lose the needle bearing and the two distance sleeves inside (RTC7188, fig. 2)



Removal of the main shaft

4. Remove the second axial needle bearing group and the radial needle bearing (RTC7186 and RTC7185, fig. 2). Take the synchromesh cone out (571936, fig. 2)

   The inner race (RTC7185, fig. 2) is a light press fit on the mainshaft and holds the mainshaft in its position inside the output gear shaft.

5. With a soft mallet tap the mainshaft forward until the inner race is freed. As the main shaft will drop free it is important to have the OD unit in vertical position and place a piece of timber underneath to soften its fall (5 cm only).

6. Lift the overdrive unit to free the mainshaft. Be careful not to hit the synchro hub assembly. If this falls out it may spring apart and the three balls and springs between inner and outer hub may get lost.
   The main shaft disassembly is now completed.

Removal of output gear shaft, lay gear and lay shaft

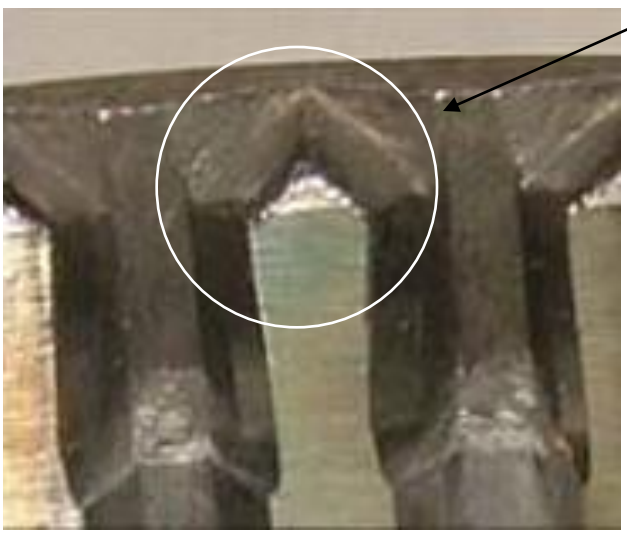
Removal of output gear shaft

1. Place the overdrive unit in a vertical position again.
2. Remove the inner race of the needle bearing and the axial thrust washer (both belong to RTC7185, fig. 2). After removal of the main shaft they will be laying loose on top of the synchro hub.
3. Carefully remove the synchro hub assembly (561392, fig. 2) through the top cover opening. Avoid actuating the hub as this may let the springs and balls jump out. Should this however happen, the world will still continue to turn... Assembly and disassembly of this group will be treated later.
4. The laygear (RTC7192, fig. 2) needs to be moved out of its position to allow withdrawal of the output gearshaft (RTC7176, fig. 3). Pull the layshaft (RTC7194, fig. 2) out of the housing and push the laygear away from the output gearshaft deeper into the housing.
5. If not yet done so, remove the second synchromesh cone (571936, fig. 2).
6. The output gearshaft will now slide out easily
7. Inside the output gearshaft is an oil seal (part of RTC7173, fig. 3) that runs on the main shaft. Remove this by pushing it down on one side. It will pivot and can then be easily pulled out.

Removal of output gear shaft, lay gear and lay shaft

1. Remove the laygear, the axial and radial needle bearings and the shims to control the end float (RTC7189, RTC7184, RTC7193 and RTC7192, all fig. 2)
2. Tap the oil seal between output gear shaft and housing (part of RTC7173, fig. 3) and the roller bearing (RTC7179, fig. 3) out using a suitable drift. Carefully tap the bearing only. This will then also push the seal out.
3. The disassembly of the unit is now completed.

Disassembly, inspection and assembly of the synchro hub



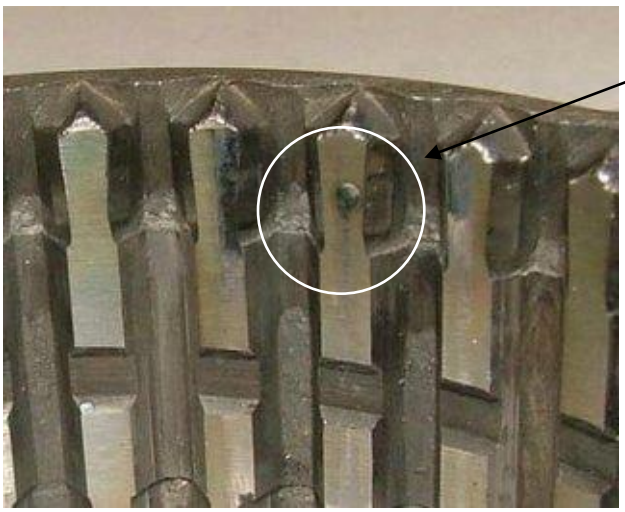
1. The unit can be easily separated by just pushing the inner or outer hub beyond the holding point of the balls. Just hold it with both hands and push the inner hub out with your thumbs. It is best done inside a cardboard box covered with a towel to avoid springs and balls to fly away. Wash all components.

2. The teeth of the outer hub show marks similar to wear marks. They are machined on purpose to prevent the gears from jumping out when under load.
   The splines of the inner hub did not show any marks on the unit assembled here.
   It is unlikely for there to be strong wear marks on the splines of the bore and the corresponding splines on the main shaft. If there are, some play can be tolerated. Too much play may affect the gear selection.

3. The teeth should be sharp and only a little rounded. The unit shown here shows some wear but will still work well for many miles. Their function is to guide the outer hub when gliding over the synchromesh cone onto the teeth of output shaft or input gear. If the teeth are well rounded, gear selection will be more difficult. It is best to replace the hub then.

   The same criteria are valid for the teeth of the synchromesh cones and the teeth on the output gearshaft

Disassembly, inspection and assembly of the synchro hub



4. If all components are found satisfactory, prepare assembly. It is advised to assemble inner and outer hub in a similar radial position against each other as they were found in. These three possible positions are defined by the marks left by the balls. Place inner and outer hub into each other and verify that the parts can slide easily against each other (Both parts should be oily when doing this to avoid binding. This could happen if they are completely dry although there is no problem). Mark the selected position.

5. The sliding blocks (553084, fig. 2) are not symmetrical. The curved side has to show outwards.

Disassembly, inspection and assembly of the synchro hub

6. No information could be obtained on the nominal free length of the springs (503805, fig. 2). If they were not broken or twisted the author has used them again. When assembled they should firmly hold the outer hub in a neutral position. Their reason for being is to prevent the hub from wandering and wearing down the swivel pads. The hub could then inadvertently crash into input gear or output gearshaft.

7. The assembly of the springs, sliding blocks and balls is less complicated than one would expect. Take only one set and wedge the spring in between inner and outer hub as shown. Then place the ball onto the spring and press it with your thumb nail in its position under the outer hub. Alternatively a fine blade can be used. To repeat it for the next set, move the inner hub out as far as possible without releasing the set assembled previously and tilt it. Even if this can be done only by a small amount it will be sufficient to allow assembly of the second set in the manner described above. The third set obviously requires more force to press the ball under the outer hub because the amount of tilt is now very much reduced with two sets already in place.

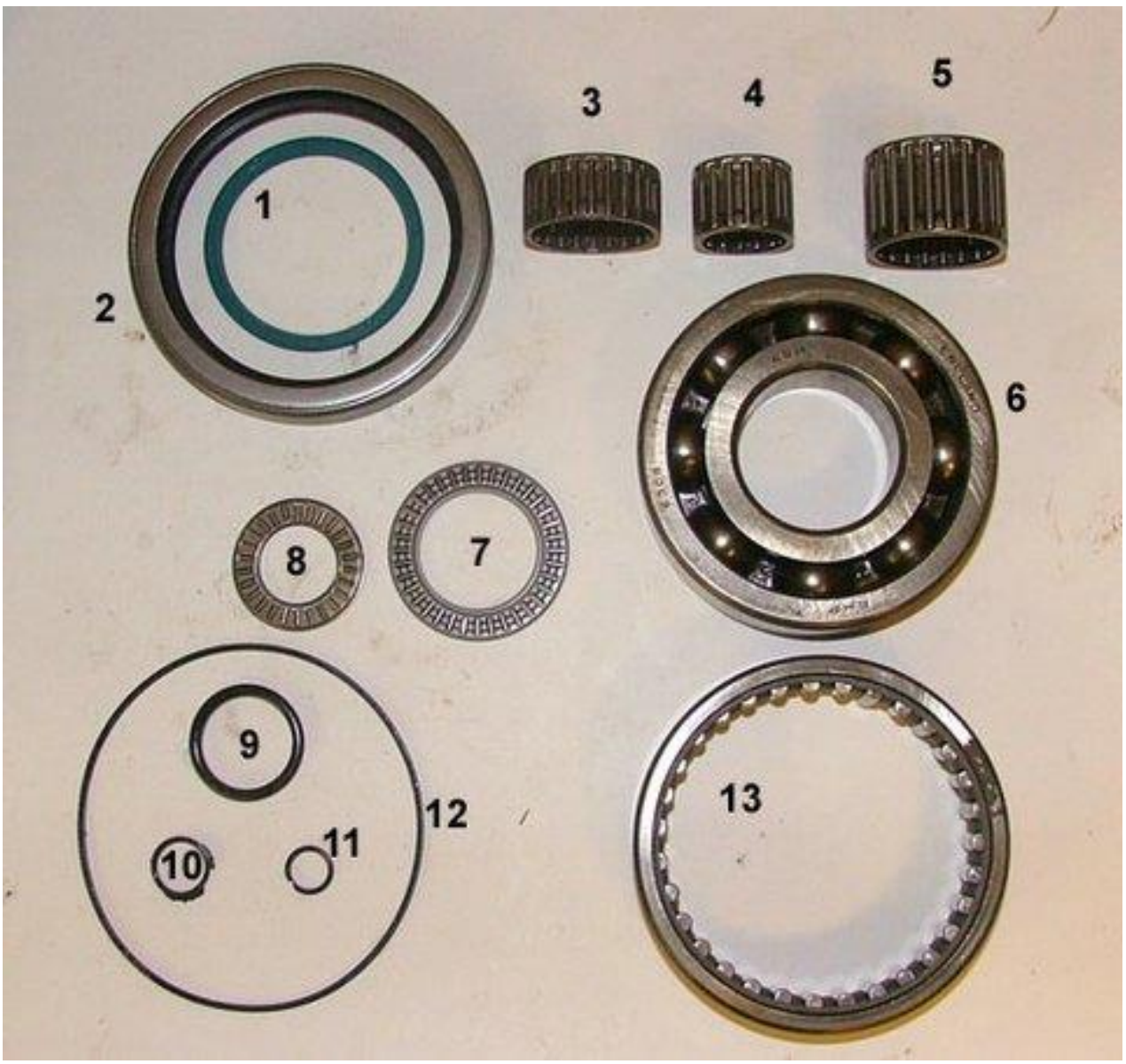
   It is strongly recommended to do this in a protected environment (large card-board box or room where everything can be found again [If you have one, but who has one?]) because the springs fly far when they fly.

Inspection of components

- Inspection of components should be done taking into account the possibility of replacing worn or damaged parts. Gear boxes can still have a long life in them even if gears and other parts are quite worn.
- Components with chipped teeth should be replaced. Even if the tooth isn't completely gone yet this is an indicator to a problem that will only become worse if not cured.
- Gears with signs of pitting may still make many miles but will be noisy.
- If the effort has been spent to dismantle an overdrive unit and the history of this unit is unknown all bearings and seals should be replaced.
- If seals have left a groove on the shaft, go with housing and shaft to a specialist dealer and look for either a seal with a different position of the lip or for shims that will move the seal's lip onto another part of the shaft. Speedy sleeves may also be an option.
- The races for axial needle roller bearings (components starting with AS in the table on page 17) have to be replaced if any signs of wear apart from shiny surfaces can be noticed.
- Bearing surfaces with signs of wear should be replaced. Needle bearings will not last long if running on pitted or otherwise damaged surfaces. If this surface is on a costly component like the output gear shaft the whole shaft should be replaced. Alternatively, on bores and shafts, a machine shop can shrink a hardened bush into or onto these components which is then ground to size and surface requirements. This is however only viable for people with a "close" contact to such a facility. Otherwise this can be more expensive than replacing the part.
- Synchromesh cones (571936, fig. 2) show an array of elevated lines on the inside. These serve to build oil pockets which help preventing the brass cone to stick on the steel cone on gears or shafts and maintain controlled friction conditions which are essential for smooth gear changes. If these lines are worn to the degree of nearly having disappeared the cone has to be replaced.
- The swivel pads (532943, fig. 1) should present an even wear pattern and show no strongly asymmetrical shape. If they have too much play in the fork (522003, fig. 1) it is advisable to replace them.

References of bearings and seals

Apart from one all bearings and seals conform to common industrial standards and are available via specialist dealers or industrial supply companies. The table given below is a compilation of all bearings and seals but the needle bearing of the clutch sleeve. This is to assist local sourcing of these components.



References of bearings and seals

No.	Qty	LR Ref	Commercial Reference	Description	Comment
1	1	RTC7173	G 50x58x4	Oil seal Input shaft, sits inside the output shaft	Standard item, easily sourced; G refers to a standard type seal
2	1	RTC7173	75x95x13 B2	Oil seal output shaft, sits in the housing	Easily sourced; B2 refers to a seal with reinforced steel cage
3	1	RTC7185	K 20x26x20	Needle roller bearing	Standard item, easily sourced; K refers to a simple needle roller bearing
4	1	RTC7188	K 30x35x17	Needle roller bearing	Standard item, easily sourced; K refers to a simple needle roller bearing
5	4	RTC7175	K 30x36x25	Needle roller bearing	Specific part for overdrives. The dimension is very rare and should be sourced via one of the Land Rover sources. Alternatively a search via a specialist dealer may prove helpful
		RTC7193			One of the original references is NLA, but this doesn't matter as they differ only in the length of the distance sleeve. Alternatively a bearing K 30x36x20 can be used, but it is recommended to then shorten the distance sleeves and use two wherever one of K 30x36x25 would be used. Don't use 3 together with two distance sleeves as the middle bearing will not be really loaded.
6	1	1D3790	6308	Ball bearing	Standard item
7	4	RTC7184	AXK 3047	Needle roller thrust bearing	Standard item; The LR reference includes a set of hardened races.
	8		AS 3047	Hardened race	
8	2	RTC7186	AXK 2035	Needle roller thrust bearing	Standard item; The LR reference includes a set of hardened races.
			AS 2035	Hardened race	
9	1	RTC7166	O23,0 x 3,5	O-Ring at end of layshaft	
10	1	RTC7166	O12,42 x 1,78	O-Ring (for sealing plate selector shaft)	
11	1	RTC7166	O9,53 x 1,78	O-Ring (selector shaft)	
12	1	RTC7166	O90x2	O-Ring (Housing cover)	Standard item
13	1	RTC7179	NK 75/25	Needle Roller Bearing	Standard item

Some sources for spare parts

■ LEGS	Shropshire, UK	http://www.legs.co.uk
■ Rovers Down South	New Orleans, USA	http://www.faireyoverdrive.com
■ PG Winches	Cornwall, UK	http://www.winchrepairs.co.uk/
■ John Craddock	Derbyshire, UK	http://www.johncraddockltd.co.uk

There may of course be some more, like the specialist gear manufacturers or the companies that produce synchromesh cones for the automotive industry. Above addresses however should provide some first assistance when looking for replacement parts. The whole range only seems available from Rovers Down South. It is understood that they have bought the rights of Superwinch for these products. During the rebuild of the unit shown they have been very helpful.

Pre-assembly of housing, laygear, mainshaft and output gearshaft before final assembly

1. The mainshaft is an ideal tool to position the oil seal inside the output gear shaft. Mark it at about 70 mm from the input end. High precision is not required for positioning of the oil seal. Basically all of the shiny circumference can serve as a running surface for the seals' lip.

   The author has been informed that some OD units have a slight groove machined on the inside of the output gear shaft to locate the seal. This unit here however did not show this groove.

2. Lubricate the inside of the output gear-shaft to allow the seal to slide easily into its position. Grease the lip of the seal to avoid it running dry when putting the unit back into operation.

   Present the seal to the output gear shaft and push it in with your hand. Turn it into horizontal position.

3. Use the main shaft as a "ram" and push the seal into the output gear shaft until the mark is level with it's top or the seal settles inside the groove.

Pre-assembly of housing, laygear, main shaft and output gear shaft before final assembly

4. Slide the bearing race and the bearing (RTC7174, fig. 3) onto the main shaft and lubricate it with EP 90.

5. Take care to place the lower race (the thicker one) in its correct position. It is chamfered on one side and this chamfer needs to face towards the input end of the main shaft.

6. Slide the two radial bearings and the distance sleeve (RTC7175, fig. 3) over the main shaft and lubricate the bearings with EP 90.

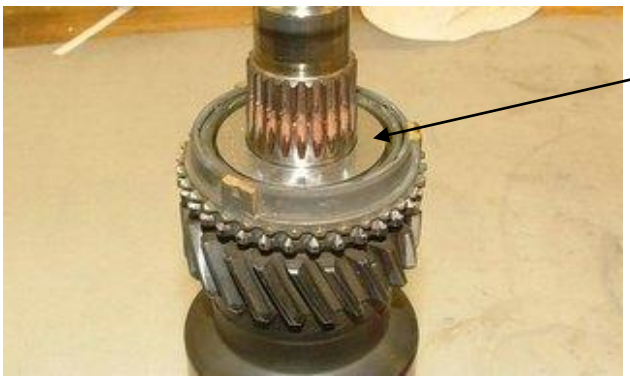
   Place the main shaft on a round support of at least 50 mm height and smaller in diameter than the main shaft. This is needed to allow the output gearshaft to be placed on the mainshaft.

Pre-assembly of housing, laygear, main shaft and output gear shaft before final assembly

7. Slide the output gearshaft over the main shaft. Take care not to damage the seal inside the output gearshaft.

8. Drip some more EP 90 onto the radial needle roller bearings.

Pre-assembly of housing, laygear, main shaft and output gear shaft before final assembly



9. Place the needle roller bearing and the races (RTC7184, fig. 2)into the recess in the output gear shaft. Drip some oil onto the inner diameter of the synchromesh cone and position it onto the output gear shaft.

10. Place the roller bearing (RTC7173, fig. 3) on top of the housing and carefully tap it home. This can be done with a hammer and a suitable drift, tapping always on opposite sides and after a few taps changing between the positions 12 and 6 and 3 and 9 o'clock. Lubricate the bearing seat before presenting the bearing.

11. Do the same then with the oil seal (part of RTC7173, fig. 3), taking care not to deform the seal during the tapping home.

Pre-assembly of housing, laygear, main shaft and output gear shaft before final assembly

12. Lubricate the bearing and grease the seal.

13. Put the housing into a vertical position and insert the laygear. Lubricate the bearings. Slide the bearing packages (RTC7184, fig. 2) in as shown, starting with the bottom one. The shims (RTC7189, fig. 2) coming out from disassembly should be used again. Their purpose is to limit the end float of the lay gear and they have been selected according to interference of laygear and housing tolerances. Bearings and races are standardized and replacements will be fully interchangeable. In the unit shown shims were found at the front end of the lay gear and will be inserted there again.

14. Put a drift, chisel or comparable tool into the lay gear bore to avoid shims, bearings and races to move beyond the bore diameter. Move bearings, races and shims to the inside, away from the gears' teeth.

15. Mainshaft / output gearshaft assembly and housing are now ready to be joined.

Final assembly

1. Select two suitable supports for the housing which will keep it roughly in its definite position after being joined with the shaft assembly.

2. Carefully slide the housing over the mainshaft / output gearshaft assembly until it rests on the supports.

Final assembly

3. Carefully present the synchro hub assembly to the shaft assembly making sure the broad flat shoulder is pointing towards the output gearshaft.

4. Take the tool used to prevent movement of the laygear bearings out and move the laygear to be in mesh with the output shaft gears. Centre the bearings with a screw driver or piece of round tubing.

5. Fit a new O-ring(RTC7166, fig. 2) to the lay shaft.

6. Insert the lay shaft and drive it home. This will probably require some two or three attempts before the shims and bearings are well centred. Do not apply force as very thin shims may get bent when pushed into the bore

7. Fit the thrust washer (part of RTC7185, fig. 2)

Final assembly

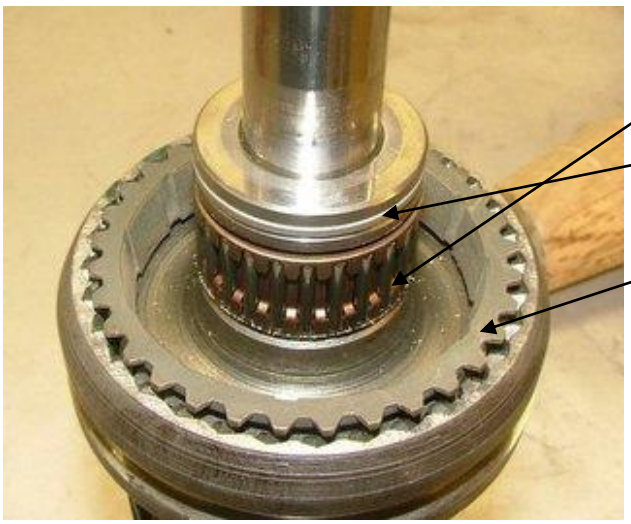
8. Lubricate the inner surface of the inner bearing race (part of RTC7185, fig. 2)

9. Slide it over the main shaft

10. Use a suitable drift, in this case a piece of tubing, to drive the race home. It is a light press fit and holds the synchro hub in place on the main shaft. One of the axial bearing races has been used to bridge the gap in diameter between tubing and inner race. It is important for the output gear shaft to be resting only on the axial bearings on the main shaft. Make sure this is the case and the output gear shaft is not being supported by anything else.

Final assembly

For reasons not known the inner bearing race protrudes a little bit from the main shaft. This is normal and no reason for concern.



11. Slide the needle bearing (part of RTC7185, fig. 2) over the inner race.

12. Fit the axial needle roller bearing (RTC7186, fig. 2)

13. Fit the second synchromesh cone.

14. The roller bearing (ID3790, fig. 2) is best fitted onto the input gear (RTC7187, fig.2) using a press. Alternatively it can be done in a vice.

Final assembly

15. Fit the large circlip (RTC7172, fig. 2) to secure the roller bearing

16. Slide the input gear assembly over the main shaft and press it into the housing. As it is a loose fit it will slide in easily. No problems should be encountered bringing it into mesh with the laygear.

17. Insert the first distance sleeve, then the radial needle roller bearing and last the second distance sleeve (all RTC7188, fig. 2)

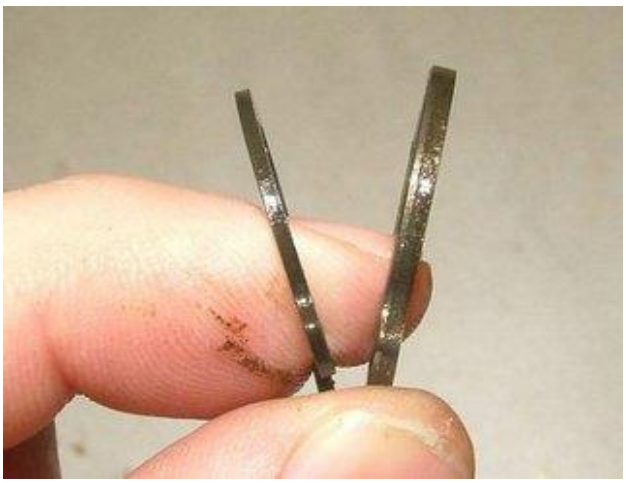
Final assembly

18. Fit the shims (RTC7189, fig. 2) and then the second axial bearing group (RTC7186, fig. 2).

    The shims control the end float of the main shaft. This is only measurable once the rear cover has been bolted to the housing. It can be checked by rocking the output gearshaft forwards and backwards. The output gearshaft is held on the mainshaft via the inner racing (part of RTC7185, fig. 2) and shows no end float. The main shaft requires a definite end float. Its amount however is not critical as long as it is clearly identifiable. The unit shown has an end float of around 1,5 mm. Rovers Down South say that all end floats in the unit should be between 0,05 and 0,1 mm. None of the authors units however has ever shown such a small value.

19. Fit the first circlip (part of RTC7172, fig. 2). Note that the two circlips are of different thickness. They must not be interchanged as the thicker one has to withstand the unit's axial operating loads

20. Fit the collar (RTC7190, fig. 2) and the second circlip.



Final assembly

21. Fit the o-ring (RTC7166, fig. 2) onto the cover and bolt the cover onto the housing. Check that end float is noticeable.
22. Slide the selector fork (522003, fig. 1) with swivel pads in place onto the grove in the synchro hub. Take care not to loose the swivel pads as retrieval at this stage is more difficult.
23. Fit a new o-ring to the selector shaft
24. Slide the selector shaft (RTC7165, fig. 1) through housing and selector fork. The milled flat surface needs to point upwards.
25. Fit the grub screw (RTC7181, fig. 1) with the little pin from the top and the ball, spring and smaller grub screw from the bottom. Fully tighten the smaller one and then turn back 2 - 3 turns. This will allow for sufficient room for the ball to be pushed out of the recess in the selector shaft when changing gears. If, after assembly of the unit to the vehicle, changing overdrive gears appears to be too stiff, the bottom grub screw can be turned out a little bit to reduce pressure on the ball.
26. Place the selector shaft in the neutral position, engaging the ball in the middle position.
27. Fit the pinch bolt (255227, fig.1). This will only go in if the selector shaft is correctly positioned and turned in a way that the slot in the middle will be in line with the bolt hole in the selector fork.

    Attention: Make sure the synchro hub is exactly in the middle between the two synchro cones before tightening the pinch bolt. The slot in the selector shaft allows for some variation in positioning the fork. If this is not done properly the gear towards which the synchro hub has the longer travel may jump out. Check equal travel and central position in neutral after tightening the pinch bolt. The more the swivel pads (532943, fig. 2) are worn, the more this becomes important.
28. Fit the sealing plate for the selector shaft together with a new o-ring (RTC7167, fig. 1).
29. Try the gears out and check that everything works the way it should by moving the selector fork into the different positions.
30. Put a new seal to the cover plate (RTC7182, fig. 2), silicone serves well or cut one from cork or paper, and fit it to the housing.

Assembly to the vehicle

1. Fill the unit with 0.4 litres of EP90

2. Turn the output gear shaft to allow the oil to reach all areas.

3. Use a special grease to lubricate the rectangular splines inside the main shaft. This grease should maintain a constant viscosity over a large temperature range. MoS_2 or something similar will do a good job. Bearing suppliers stock a range of suitable greases.

4. To assemble the overdrive unit back to the vehicle, unless you have a comfortable way to reach it from underneath, the safest way is as follows:
   a) Place the unit on some sort of support (box, reversed bucket, jack etc.) and push it under the vehicle roughly to the position where it is fitted and oriented in the way it will be inserted.
   b) From above, after lifting the seat box lid, take a rope or sling and sling it once around the output gear shaft.
   c) Coming from the right side of the vehicle, lift the unit with your left hand and pull the sling up with your right hand. The unit can thus be easily presented to the gearbox.

   Laying under the vehicle, trying to lift it with both hands requires some strength and only gives bad leverage. The risk of letting the unit fall onto whatever or whoever is underneath it must not be disregarded.

5. Slide the unit into the gearbox. It should go in nearly all the way, but sometimes getting it into mesh does not work at first trial. There are two options to achieve this: pull the unit out again until you can turn the output gear shaft by hand. Turn it a little bit and try again. Alternatively jack the vehicle up at the rear and turn the gears moving the hand brake drum. The main gearbox must be in neutral. The overdrive can be pushed in over the last 10 mm by tightening the six nuts. Note that two of the nuts can only be started, before the unit is right in. Do not forget to fit the clip for the speedo cable under one of the two top nuts.
   Sometimes the teeth of the main shaft do not slide over the corresponding teeth of the drive dog and prevent the unit to be pushed in the last 10mm. In these cases put the transferbox into neutral and the gearbox in third or fourth gear. Crank the engine with the starter motor for one or two seconds and try again. Repeat this procedure until the overdrive slides in or can be pulled in by tightening the nuts.

6. Tighten the nuts and reconnect the lever linkage