

37 - MANUAL GEARBOX

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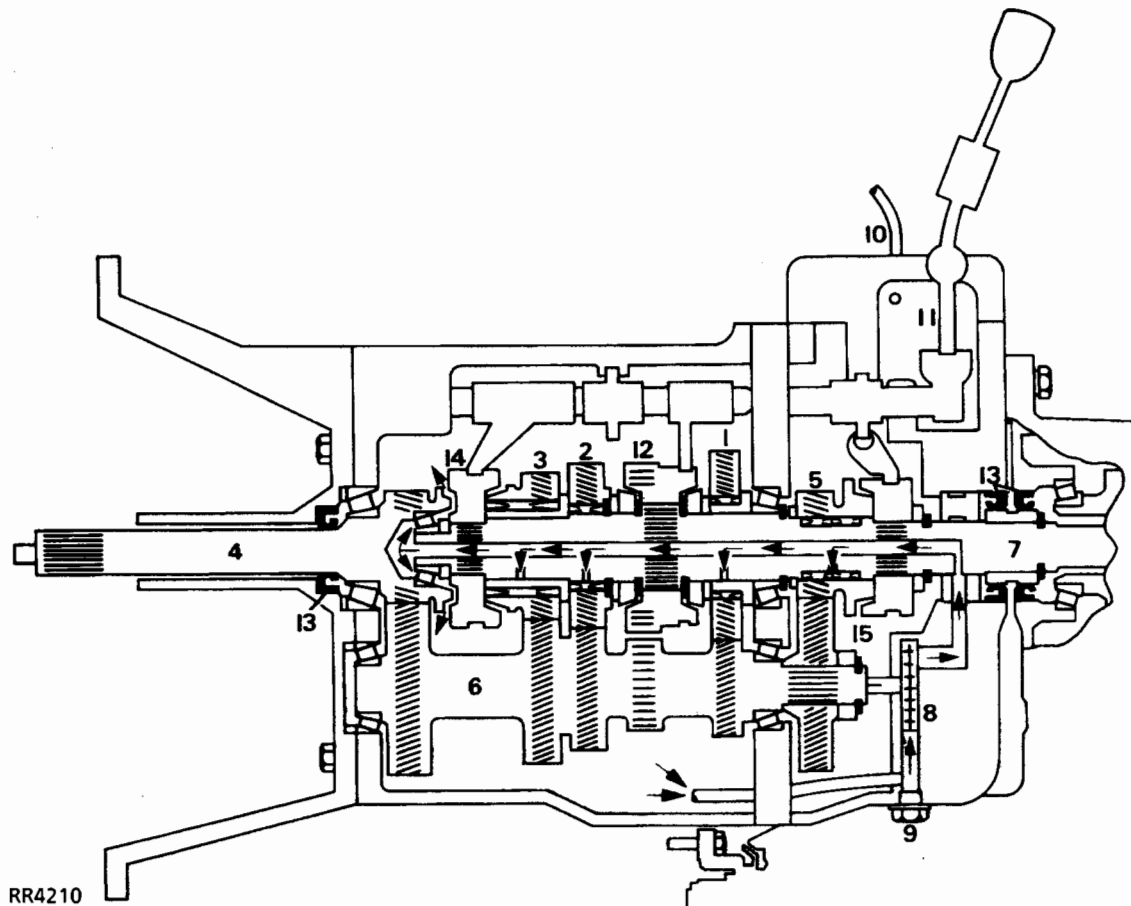
MANUAL TRANSMISSION

Description

The 77mm all synchromesh five speed manual gearbox unit, is married to a Borg Warner two speed chain drive transfer gearbox.

All the gears including reverse run on needle roller bearings and the main, layshaft and primary shafts are supported by tapered roller bearings.

The whole of the geartrain is lubricated through drillings in the shafts, supplied by a low pressure pump driven from the rear of the layshaft. The gear change has a single rail selector and spool type interlock. The main and transfer gearboxes ventilate through nylon pipes, which terminate high up in the engine compartment to prevent water entry when the vehicle is operating in adverse conditions.



- | | |
|------------------------|----------------------------|
| 1. Mainshaft 1st gear | 9. Drain plug |
| 2. Mainshaft 2nd gear | 10. Ventilation pipe |
| 3. Mainshaft 3rd gear | 11. Single rail gear shift |
| 4. Primary input shaft | 12. 1st/2nd synchromesh |
| 5. Mainshaft 5th gear | 13. Oil seals |
| 6. Layshaft | 14. 3rd/4th synchromesh |
| 7. Mainshaft | 15. 5th gear synchromesh |
| 8. Lubrication pump | |



MANUAL GEARBOX

Symptom - Gear jumps out of engagement (any forward gear)

1. Check condition and security of transmission and engine mountings.
2. Check in situ, gear lever and selector adjustments.
3. In situ, remove gearshift and check selector rail yoke security.
Also check selector detent spring tension and both spool retainers.
Suspect internal fault
See remove and overhaul manual.
4. Check action/operation of main selector rail and forks.
5. Check condition of synchromesh and gear dog teeth.
6. Check main and layshaft end floats bearings and adjustments.
7. Check condition of all gearbox components, ensure clearances and adjustments are correct on reassembly.

Symptom - Reverse gear only jumps out of engagement

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4. Check action/operation of main selector rail and reverse lever.
5. Check condition of reverse gear, angled bearings and shaft.
6. Check condition of all gearbox components, ensure clearances and adjustments are correct on reassembly.

Symptom - Excessive force required to engage or change gear, vehicle stationary or moving.

1. Check lubricant specification and level, if low do not top up at this stage.
2. In situ, lubricate gear mechanism, and check selector adjustments.
3. In situ, remove gearshift and check selector rail is free and that the yoke is secure. Also check selector detent spring tension and both spool retainers.
4. Drain lubricant and check for contamination or metal particles.
Suspect worn synchromesh unit or baulk rings on affected gears. See remove and overhaul manual.

Symptom - Noisy gear engagement, vehicle stationary. See *CLUTCH, Fault diagnosis, Clutch Noise - Mechanical Faults*

Symptom - Noisy gear selection, vehicle moving.

1. Confirm that clutch operation is satisfactory.
2. Establish which gear/gears is causing noise.
3. Check lubricant specification and level, if low do not top up at this stage.
4. Drain lubricant and check for contamination or metal particles.
Suspect worn synchromesh. See remove and overhaul manual.
5. Check condition of synchromesh unit, springs and cones for distortion and wear. Also check dog teeth for damage and cone mating surface on gear for signs of overheating.
6. Check condition of all gearbox components, ensure clearances and adjustments are correct on reassembly.

Symptom - Noise from gearbox in neutral, which changes tone or becomes worse when clutch is depressed. See *CLUTCH, Fault diagnosis, Clutch Noise - Mechanical Faults*

Symptom - Noise from gearbox in neutral, which disappears when clutch is depressed.

1. Check lubricant specification and level, if low do not top up at this stage.
2. Drain lubricant and check for contamination or metal particles.
Suspect worn bearings on layshaft, primary shaft or front of main shaft. See remove and overhaul manual.

Symptom - Noise from gearbox in one or more gears when being driven.

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R380 GEARBOX

Service repair no - 37.20.02

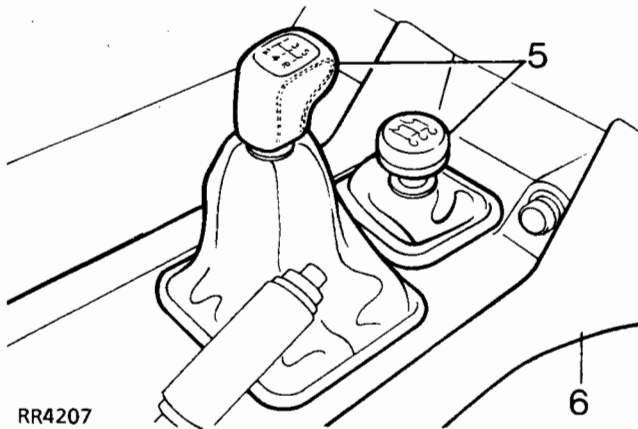
Remove

1. Site vehicle on ramp and chock wheels.
2. Disconnect battery negative lead.
3. Remove fan blade assembly.



NOTE: The nut securing viscous unit has left hand thread.

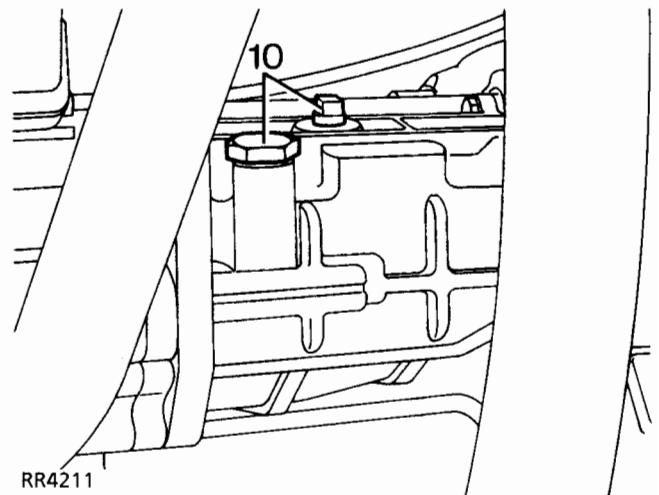
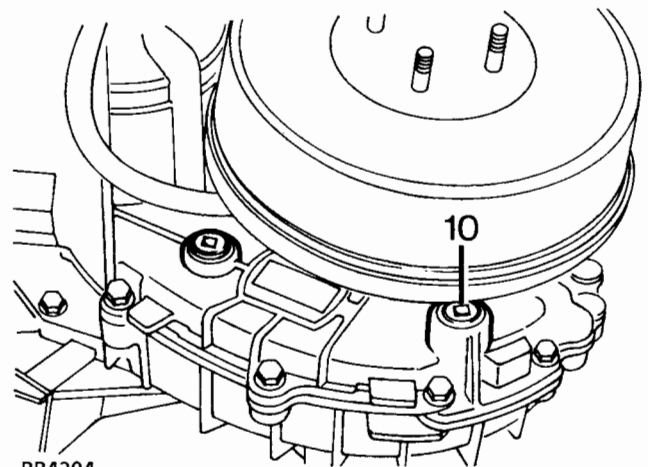
4. Disconnect airflow meter to plenum chamber hose. (V8i only)
5. Remove two gear lever knobs.



6. Remove floor mounted console assembly. See **CHASSIS AND BODY, Repair, Centre Console**
7. Remove padding from top of transmission tunnel.
8. Loosen pinch bolt and remove upper gear lever.
9. Remove screws and detach high low lever and main gear lever retaining plates.

Underneath vehicle

10. Drain oil from transfer gearbox, main gearbox and extension housing.
11. Refit plugs.

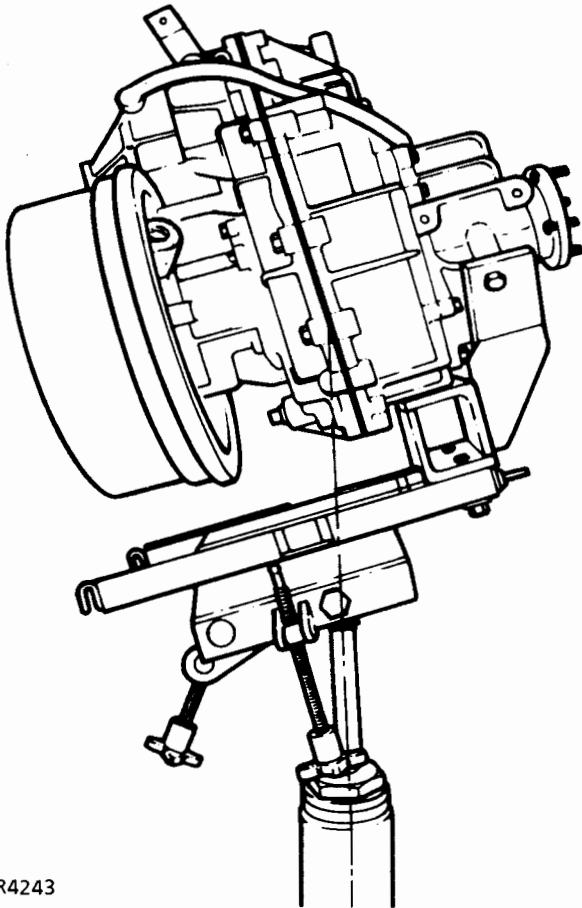


12. Disconnect heated oxygen sensor and remove front section of exhausts. (V8i only)
13. Remove chassis cross member secured by eight nuts and bolts. (V8i only)

14. Mark each drive flange for reassembly and disconnect front and rear propeller shafts from transfer box. Tie the shafts to one side.
15. Disconnect multiplug from speed transducer.
16. Release breather pipe and electrical cables from 'P' clip on right hand side of gearbox.
17. Remove two bolts and withdraw clutch slave cylinder from bell housing.
18. Remove transmission brake drum. Remove four bolts securing back plate to transfer box, and tie assembly aside complete with handbrake cable.

Remove transmission assembly

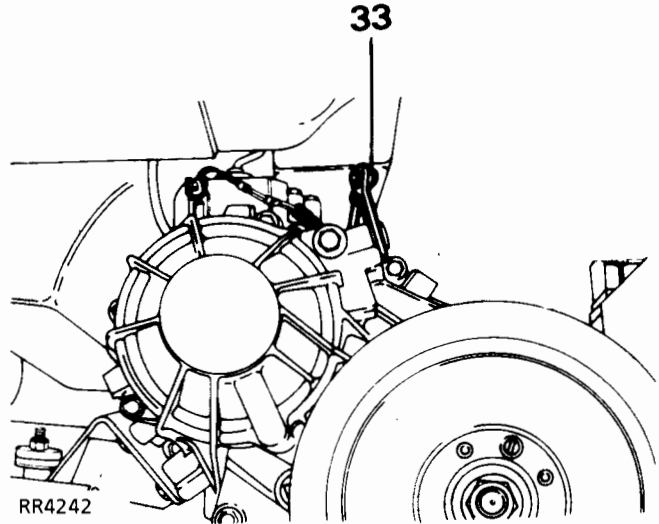
19. Position a suitable transmission hoist on rear output housing to support weight of assembly.
20. Remove fixings and withdraw transfer gearbox mountings.



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21. Remove Chassis Cross member (Tdi only)
22. Remove front exhaust section. (Tdi only)
23. Fit adaptor plate to transmission hoist. Raise hoist and position under transfer box. **See TRANSFER BOX, Service tools, Adapter Plate Transfer Box**

24. Secure fixture to transfer box mounting points.
25. Remove hoist from rear of transfer box.
26. Lower transmission until top of transfer gearbox clears rear floor.
27. Position hoist under engine to support weight.
28. Remove bolts from bell housing.
29. Ensuring all fixings are released, withdraw transmission.



Separating transfer box from gearbox

30. Remove transmission assembly from hoist and cradle.
31. Place sling round transfer box and attach to hoist.
32. Detach high low link from transfer gearbox selector lever and remove breather pipe.
33. Remove bolts and two nuts retaining transfer box to extension housing and separate.



Assembling transfer box to main gearbox

34. Stand gearbox bell housing face on two pieces of wood.
35. Lower transfer gearbox onto main gearbox. Secure with bolts and two nuts tighten to **40Nm**
36. Refit breather pipe and selector link.

Transfer gearbox high/low link adjustment

37. Ensure transfer gearbox is in neutral position.
38. Set transfer gearbox lever in a vertical position. Rotate fork end of rod until holes align with hole in selector lever.
39. Fit clevis pin and retaining clip. Select high and low transfer to ensure full engagement is obtained. Repeat adjustment procedure if full engagement is not evident.

Refit

40. Fit cradle to transmission hoist and transmission to cradle. Apply Hylomar on bell housing mating face with engine.
41. Select any gear in main and transfer gearbox to facilitate entry of the input shaft. Ensure that the clutch centre plate is in alignment.
42. Position and raise hoist to line up with engine, feed handbrake cable through aperture in tunnel, ensure that any pipes or electrical leads do not become trapped.
43. Fit transmission assembly to engine and tighten bolts to **40Nm**
44. Reverse removal procedure noting following points.
45. Tighten all fixings to the correct torque. **See Specifications, torque, Torque Values**
46. Fill both main and transfer gearboxes with recommended oil up to level of filler hole. Apply Hylomar sealant to threads and fit level plugs. **See LUBRICANTS, FLUIDS AND CAPACITIES, Information, Recommended Lubricants and Fluids**



TORQUE VALUES



NOTE: Torque wrenches should be regularly checked for accuracy to ensure that all fixings are tightened to the correct torque.

	Nm
Bottom cover to clutch housing	8
Extension case to gearcase	25
Slave cylinder to bell housing	25
Bell housing to gearbox	70
Oil drain plug	50
Breather	15
Oil level plug	30
Gear change housing to extension case	25
Cover to gear change housing	10
Bell housing to cylinder block	40



NOTE: Torque values below apply to all screws and bolts used unless otherwise specified.

METRIC	Nm
M5	6
M6	9
M8	25
M10	45
M12	90
M14	105
M16	180

UNC / UNF	
1/4	9
5/16	24
3/8	39
7/16	78
1/2	90
5/8	136