33 - CLUTCH

CONTENTS

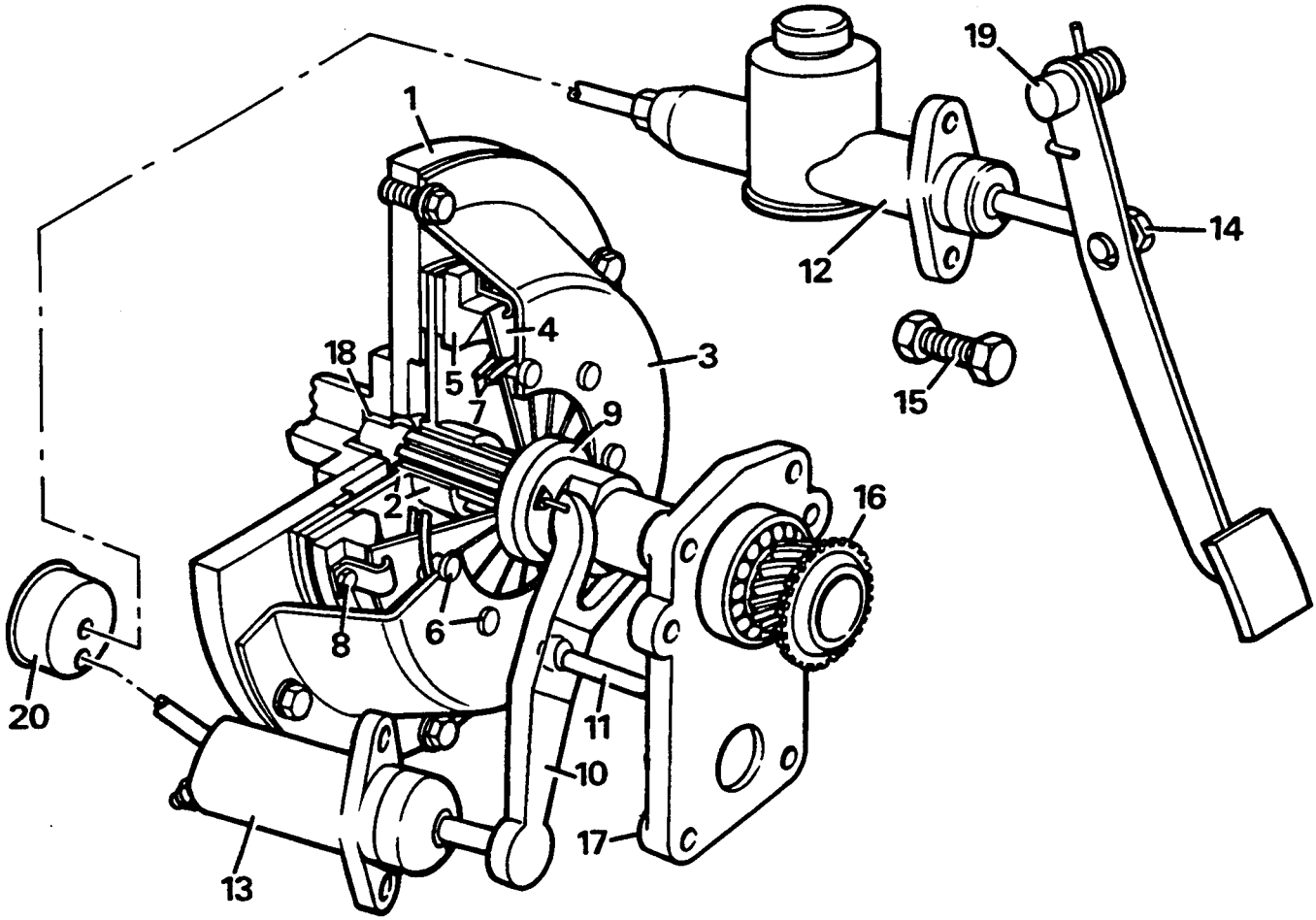
DESCRIPTION

The clutch unit fitted with the manual transmission, comprises a single dry plate friction disc and diaphragm spring clutch unit, secured to the engine flywheel.

OPERATION

The unit is operated hydraulically by the clutch master cylinder 12 and a slave cylinder 13 attached to the transmission bell housing.

With the clutch pedal released and the clutch fully engaged, a small clearance should exist between the pedal pushrod 14 and the master cylinder piston 12 also between the withdraw bearing 9 and the diaphragm spring 4.



RR3556M

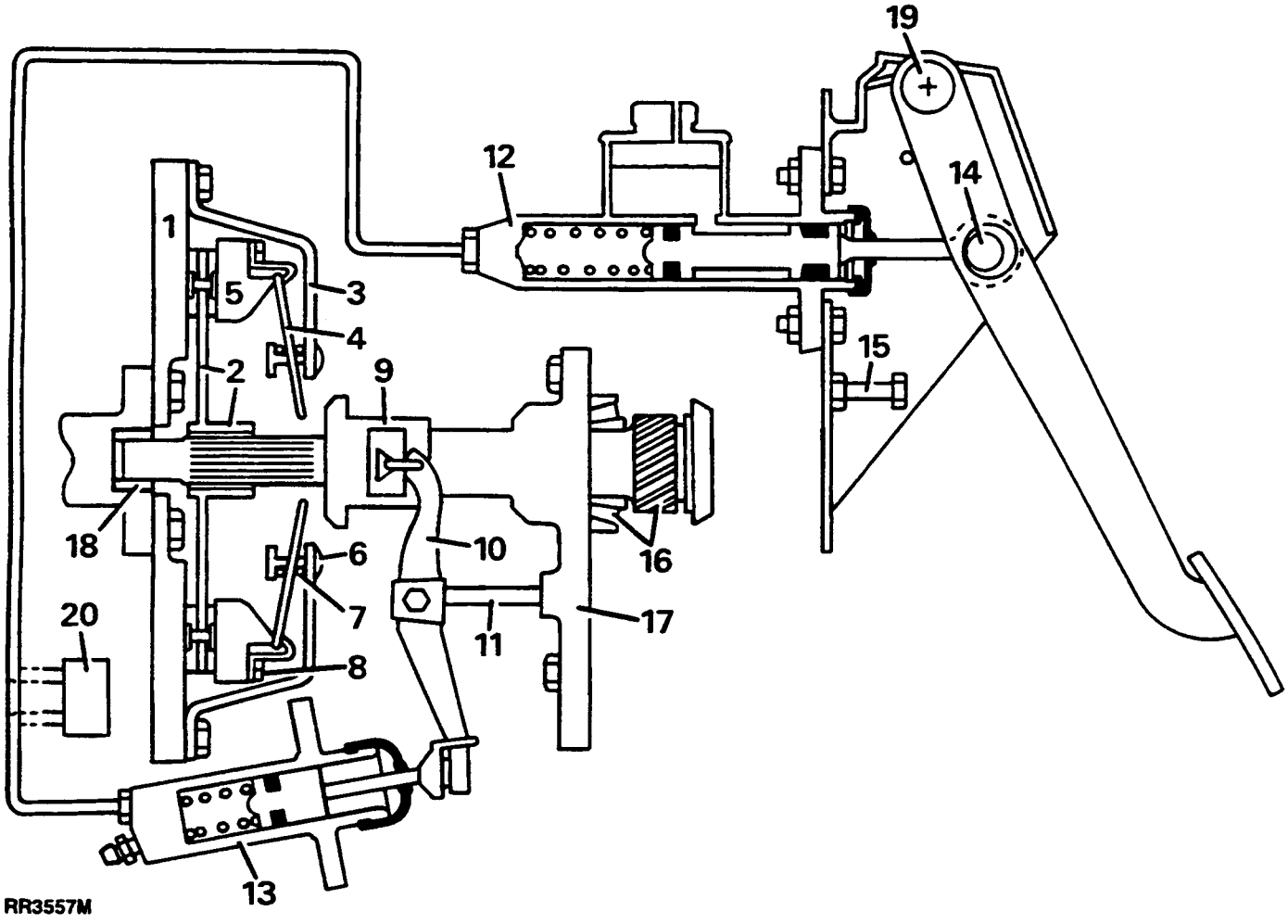
1. Crankshaft and flywheel
2. Friction plate
3. Clutch cover
4. Diaphragm spring
5. Pressure plate
6. Fulcrum posts (9) for diaphragm spring
7. Bearing rings (2) for diaphragm spring
8. Retraction links and bolts (3) for pressure plate
9. Release bearing
10. Release lever
11. Release lever pivot post
12. Master cylinder
13. Slave cylinder
14. Pivot bolt
15. Pedal limit adjustment bolt
16. Primary shaft and taper bearing (in gearbox)
17. Gearbox front cover
18. Primary shaft flywheel bush
19. Pedal pivot and return spring
20. Hydraulic damper (Diesel only)

When the clutch pedal is depressed, hydraulic fluid transmits the movement via the slave cylinder, lever 10, bearing 9, to the inner fingers of the diaphragm spring 4.

The diaphragm spring 4 pivots on the bearing rings 7 and fulcrum posts 6 causing the pressure plate 5 to release the clamping force on the friction plate and linings 2.

As the the clamping force is removed from the friction plate 2, the plate slides on the splines of the primary shaft 16 and takes up a neutral position between the flywheel 1 and the pressure plate 5 , thus breaking the drive between the engine and the gearbox.

△ **NOTE: Diesel engined vehicles have an hydraulic damper 20 fitted into the system. The damper contains a steel diaphragm which absorbs slight hydraulic pulses caused by cyclic variations of the diesel engine crankshaft at low rpm.**



CLUTCH ASSEMBLY CONDITIONS

For the clutch to operate correctly as described and illustrated in the "Description and Operation", it is important the following conditions are satisfied:-

A. The primary shaft 16 must be free in the crankshaft spigot bush 18.

B. The friction plate 2 must be able to slide easily on the splines on the primary shaft 16, to a position where it does not contact either the flywheel or the pressure plate.

C. The friction plate must not be distorted or the linings contaminated with oil, which may cause it to stick or continue to run in contact with the flywheel or pressure plate.

D. Master cylinder to pedal free play and the pedal stop adjustment must be correct.

A number of faults can develop in the operation of the clutch for a variety of reasons and although most faults are due to normal wear at high mileage, problems can also occur if the unit has been renewed by an unskilled operator.

Recognising and diagnosing a particular clutch fault is therefore of paramount importance in ensuring, that the problem is rectified at the first attempt.

Problems which develop in the clutch are as follows:-

A. Clutch spin/drag

B. Clutch slip

C. Clutch judder/fierce

CLUTCH SPIN - DRAG

Symptoms

Clutch spin is that, with engine running and clutch pedal depressed, the gears cannot be immediately engaged without making a grinding noise. This indicates the clutch is not making a clean break.

However, if the clutch pedal is held depressed for several seconds the friction plate will eventually break free from the engine and the gear will engage silently.

Clutch spin as it becomes more severe develops into clutch drag, making the silent engagement of a gear impossible, regardless of how long the pedal is held depressed.

CLUTCH SLIP

Symptoms

Clutch slip is most evident climbing a hill or when the vehicle is moving off from stationary with a heavy load. As the clutch is released slip occurs between the engine and the transmission, allowing the engine speed to increase without a corresponding increase in vehicle speed.

Clutch slip can develop to the stage where no power is transmitted through the clutch as the pedal is released.

CLUTCH JUDDER - FIERCE

Symptoms

Clutch judder or fierce engagement, like slip, is most likely to occur when the vehicle is moving off from stationary. As the clutch pedal is released the vehicle will move rapidly or in a series of jerks, which can not be controlled even by careful operation of the clutch by the driver.

It should be noted that a vehicle may display all the symptoms or any combination of the symptoms described, depending on the driving conditions vehicle load and operating temperatures.

FAULT/SYMPTOM CHART

Symptoms				
Slip	Spin/Drag	Judder/Fierce	Fault	Item
*	*	*	Worn or oil on clutch linings	2
*	*	*	Mechanical damage	4 5 6 7 8
	*	*	Distorted clutch plate	2
	*		Failed or air in hydraulic system	12 13
	*	*	Primary shaft tight fit in crankshaft bush	16 18
	*		Clutch splines sticking	2 16
	*		Limited pedal travel	14 15
		*	Weak clutch plate springs or insecure/worn engine/gearbox mountings	6
		*	Insecure/worn propeller shafts	
		*	Insecure/worn suspension components/rubber bushes	

For items refered to in this chart. ***See Description and operation, Description***

CLUTCH NOISE - MECHANICAL FAULTS

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

Suspect gearbox input/primary shaft bearings. ***See MANUAL GEARBOX, Fault diagnosis, LT77 manual gearbox*** Noise from gearbox in neutral, which disappears when clutch is depressed

Noise from clutch or gearbox in neutral, which changes tone or becomes worse when the clutch is depressed.

Suspect worn release bearing.

Knocking/rattling from clutch or gearbox in neutral, which is reduced or disappears when the clutch is depressed.

Suspect worn/weak release lever retainer or clutch unit.

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

Suspect gearbox fault.
See MANUAL GEARBOX, Fault diagnosis, LT77 manual gearbox
- Noise from gearbox in neutral, which disappears when clutch is depressed.

HYDRAULIC FAULTS

Unable to dis-engage clutch, little or no pedal resistance.

1. Check condition, specification and level of fluid.
2. Check pipes and cylinders for leaks.
3. Check that air vent in reservoir lid is clear. Suspect faulty master cylinder if no fluid leaks present. ***See Repair, Master cylinder***

Spongy pedal operation

1. Check condition, specification and level of fluid.
2. Check that air vent in reservoir lid is clear. Suspect air in fluid. ***See Repair, Bleed hydraulic system***

Clutch is difficult to dis-engage and/or does not immediately re-engage when pedal is released.

1. Check condition, specification and level of fluid.
2. Check that air vent in reservoir lid is clear. Suspect pedal pivot, master cylinder or slave cylinder seizure. ***See Repair, Master cylinder***

CLUTCH ASSEMBLY

Service repair no - 33.10.01

Remove and refit

Clutch pressure plate

Renew pressure plate if diaphragm spring fingers are worn or if pressure plate shows signs of wear, cracks or burning.

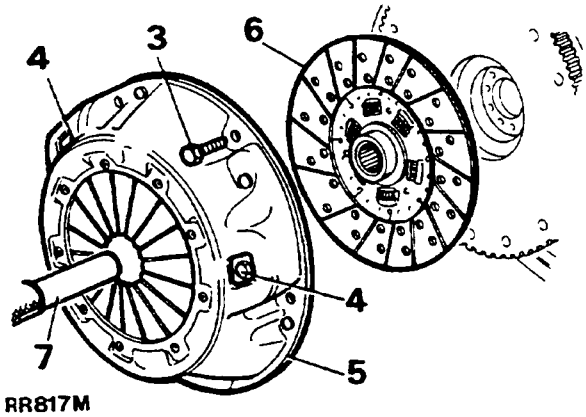
Clutch driven plate

Renew driven plate if centre hub splines are worn or if lining is contaminated, burned or unevenly worn.

Service tools:
LRT-12-001 clutch centralising tool

Remove

1. Remove engine. ***See ENGINE, Overhaul, Engine removal***
2. Mark position of clutch cover to flywheel for reassembly.
3. Remove clutch cover securing bolts, working evenly and diagonally.
4. Do not disturb three bolts in clutch cover.
5. Remove clutch assembly.
6. Withdraw clutch driven plate.



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Refit

NOTE: To prevent clutch plate sticking, lubricate splines using Rocol MV 3 or Rocol MTS 1000 grease.

7. Reverse removal procedure. 5 and 6, aligning assembly marks. Centralising tool LRT-12-001.
8. Secure cover fixings evenly, working in a diagonal sequence. Tighten to ***28 Nm.***
9. Fit engine.

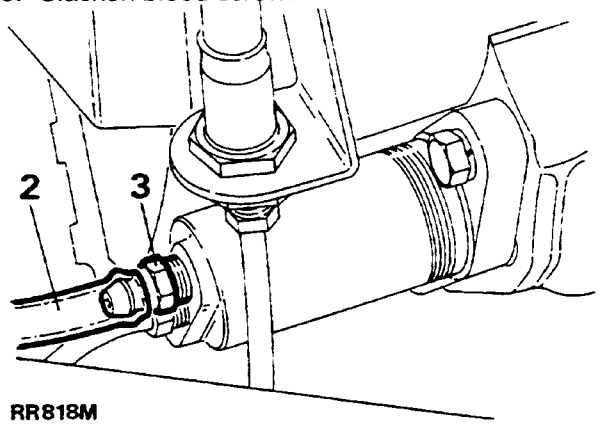
BLEED HYDRAULIC SYSTEM

Service repair no - 33.15.01

Procedure

NOTE: During bleed procedure, keep fluid reservoir topped up to avoid introducing air to system. For hydraulic fluid recommendations. *See LUBRICANTS, FLUIDS AND CAPACITIES, Information, Recommended lubricants, fluids and capacities*

1. Attach suitable tubing to slave cylinder bleed screw.
2. Place free end of tube in a glass jar containing clutch fluid.
3. Slacken bleed screw.



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4. Pump clutch pedal, pausing at end of each stroke, until fluid from tubing is free of air. Keeping free end of tube below surface of fluid.
5. Hold clutch pedal down, tighten bleed screw.
6. Top up fluid reservoir.

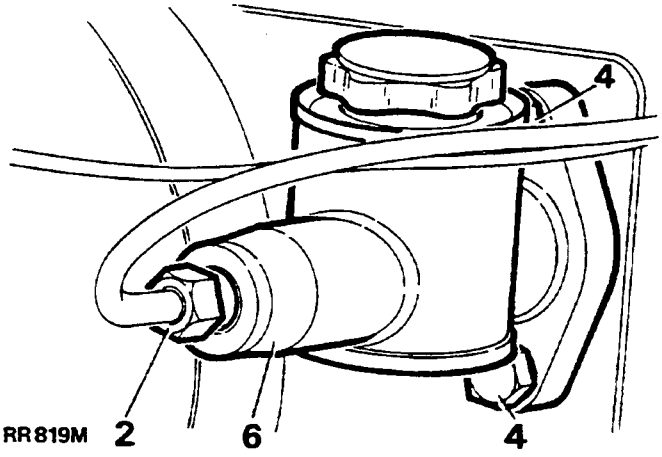
MASTER CYLINDER

Service repair no - 33.20.01/03

Remove and refit

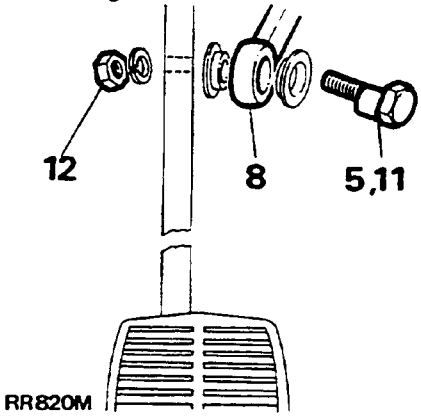
Remove

1. Evacuate hydraulic fluid from system.
2. Disconnect fluid pipe at master cylinder. Plug master cylinder fluid port and seal end of hydraulic pipe to prevent ingress of foreign matter.
3. Remove lower fascia panel. ***See CHASSIS AND BODY, Repair, lower dash panel***
4. Remove master cylinder fixings.
5. Remove pivot bolt and sleeves from push rod and clutch pedal.
6. Remove master cylinder.

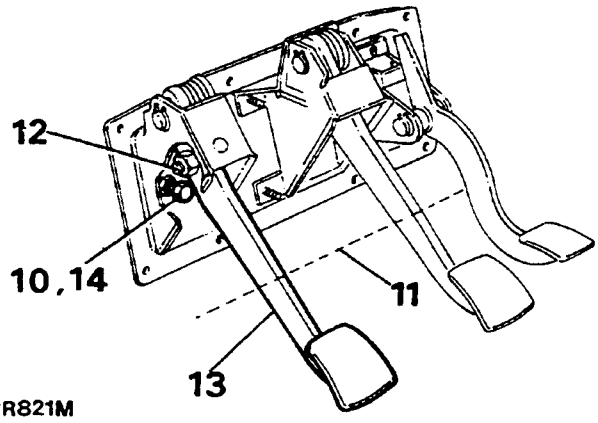


Refit

7. Fit the master cylinder and fixings.
8. Fit push-rod to pedal. Do not tighten pivot bolt nut at this stage.



9. Check brake pedal setting.
10. Back off lower stop bolt.
11. Align clutch pedal to align with brake pedal by turning pivot bolt.
12. Tighten pivot bolt securing nut.
13. Fully depress pedal.
14. Adjust lower stop bolt to touch pedal then continue a further turn.



15. Fit fluid pipe to master cylinder.
16. Bleed system. ***See bleed hydraulic system***
17. Fit lower fascia panel

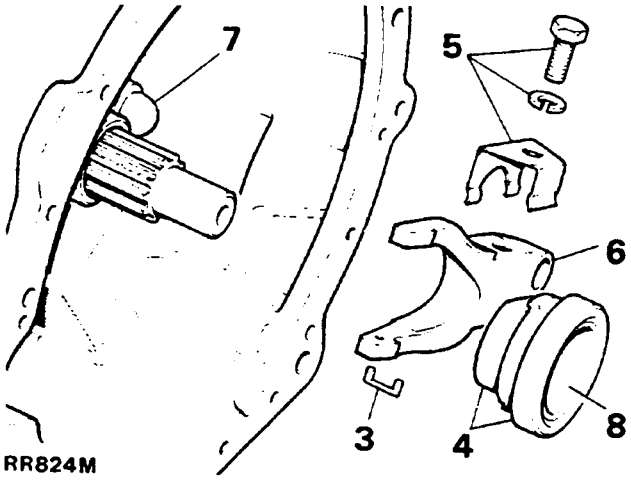
RELEASE BEARING ASSEMBLY

Service repair no - 33.10.07

Remove and refit

Remove

1. Remove engine.
2. Remove clutch slave cylinder.
3. Withdraw retainer staple.



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4. Withdraw bearing and sleeve. If required, press bearing off sleeve. Fit replacement bearing with domed face outwards from sleeve.
5. Remove spring clip and fixings.
6. Withdraw release lever assembly.

Refit

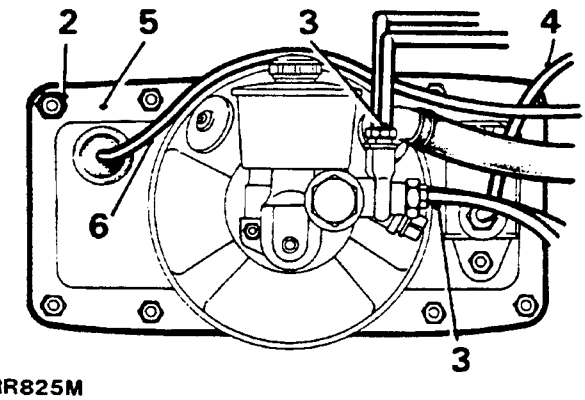
7. Smear pivot with grease and fit release lever and retain with spring clip and bolt.
8. Smear release bearing sleeve inner diameter with molybdenum disulphide base grease.
9. Reverse removal procedure. 1 to 4.

CLUTCH PEDAL

Remove and refit

Remove

1. Remove lower fascia panel. ***See CHASSIS AND BODY, Repair, Lower dash panel***
2. Remove pedal bracket fixings at dash panel.
3. Disconnect brake fluid pipes and electrical connection at brake master cylinder.
4. Disconnect fluid pipe at clutch master cylinder.
5. Withdraw pedal bracket assembly into engine compartment.



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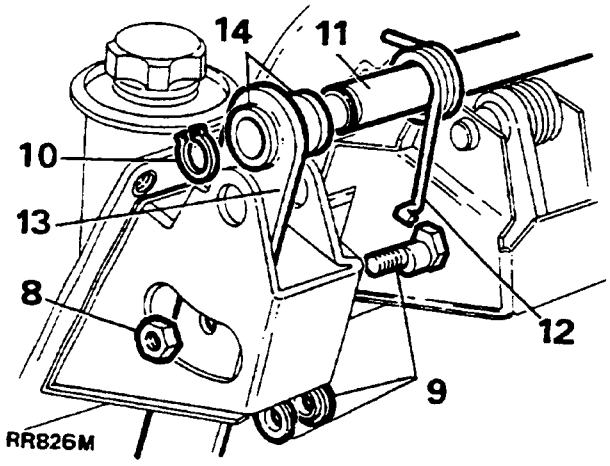
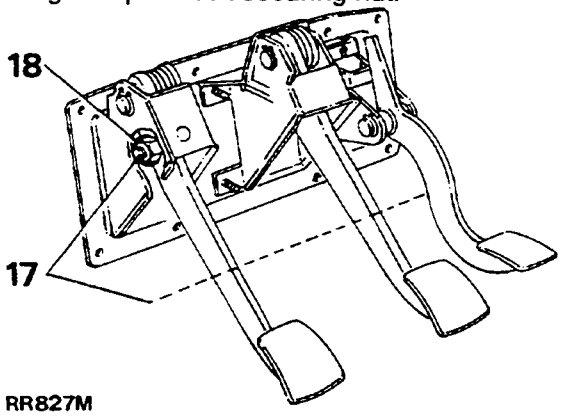
6. Disconnect accelerator control cable at pedal.
7. Withdraw pedal bracket assembly from vehicle.
8. Remove pivot bolt nut.
9. Withdraw pivot bolt and bearing sleeves which retain master cylinder push-rod.
10. Remove pedal spindle circlip.
11. Withdraw spindle.
12. Lift out return spring.
13. Withdraw pedal.
14. If required, press out spindle bushes. Press in replacements and lubricate.



Refit

15. Reverse removal procedure. 9 to 13.
16. Loosely fit pivot bolt nut.
17. Align clutch pedal to same angle as brake pedal by turning pivot bolt and integral cam.
18. Tighten pivot bolt securing nut.



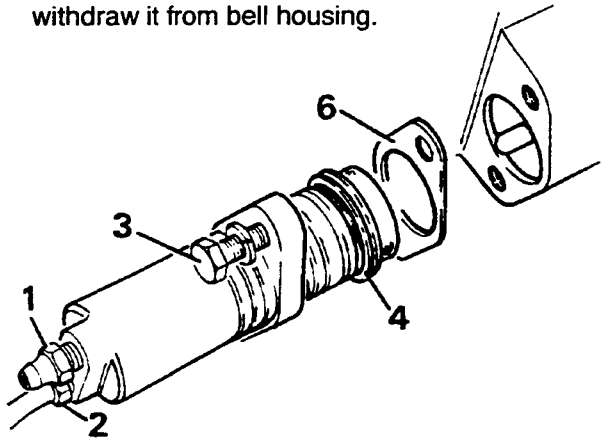
19. Fit accelerator cable.
20. Offer pedal bracket assembly and joint washer to dash panel. Avoid damaging brake light switch.
21. Reverse removal procedure. 1 to 4.
22. Bleed brake and clutch systems.

SLAVE CYLINDER

Service repair no - 33.35.01

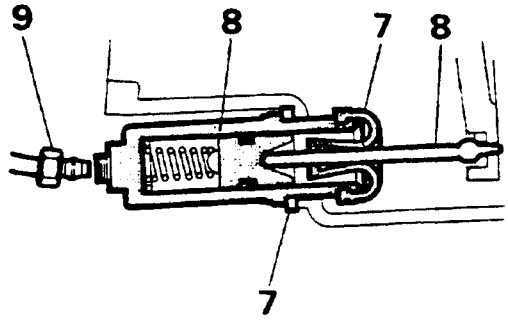
Remove

1. Evacuate clutch system fluid at slave cylinder bleed valve.
2. Disconnect fluid pipe.
3. Remove two securing bolts and withdraw slave cylinder and backing plate.
4. If dust cover is not withdrawn with slave cylinder, withdraw it from bell housing.



Refit

5. Withdraw dust cover and backing plate from slave cylinder.
6. Coat both sides of backing plate with Hylomar P232M waterproof jointing compound.
7. Locate backing plate and dust cover in position on slave cylinder.
8. Fit slave cylinder, engaging push-rod through centre of dust cover and with bleed screw uppermost.



9. Reconnect fluid pipe.
10. Replenish and bleed clutch hydraulic system.
11. Check for fluid leaks with pedal depressed and also with system at rest.

MASTER CYLINDER

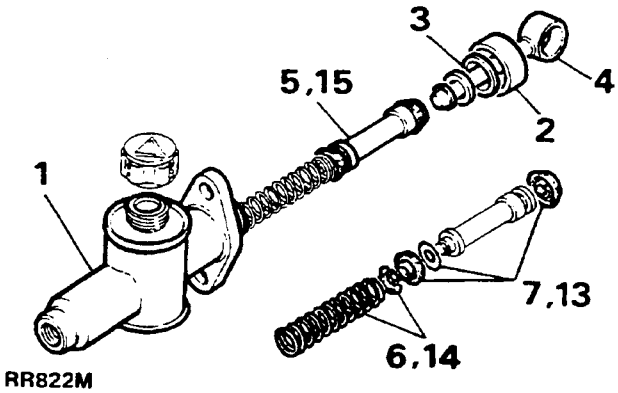
Service repair no - 30.20.07

Overhaul

1. Remove master cylinder. ***See Repair, Master cylinder***

Dismantle

1. Pull back and remove rubber sealing boot from pushrod.
2. Depress push-rod and extract circlip.
3. Withdraw push-rod assembly.
4. Withdraw piston assembly.
5. Withdraw retainer and spring.



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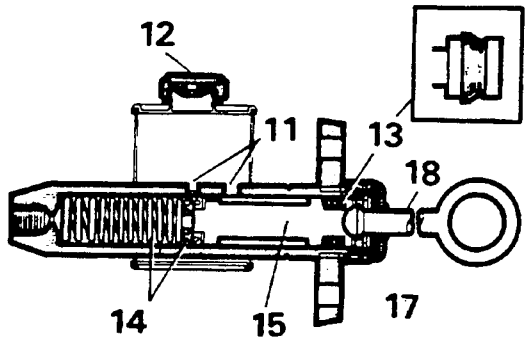
6. Remove two piston seals and piston washer.

Inspecting

7. Clean all components thoroughly using new hydraulic fluid. Dry, using a lint-free cloth.
8. Examine cylinder bore and piston, ensure they are smooth to touch with no corrosion, score marks or ridges. If in doubt, fit new components.
9. Fit new seals and rubber boot. These items are all included in master cylinder overhaul kit.
10. Ensure that feed and by-pass ports are not obstructed.



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11. Ensure reservoir cap vent is clear.

Reassemble

△ **NOTE: Cleanliness is essential, ensure hands are free of grease or dirt. Lubricate cylinder bore and rubber seals with new hydraulic fluid before assembly.**

1. Fit a new piston washer and thinner of two piston seals, lip last, over piston nose, up against drilled piston head. Fit thicker seal into piston groove with lip facing towards seal at opposite end.
2. Insert spring and retainer into master cylinder bore.
3. Insert piston and seal assembly, ensuring that seal lips do not bend back.
4. Reverse removal procedure. 3 and 4, correctly locating circlip.
5. Stretch new rubber boot over push-rod, pack with rubber grease. Fit securely into locating groove.
6. Operate push-rod several times to ensure free movement of internal components.
7. Fit master cylinder.

SLAVE CYLINDER

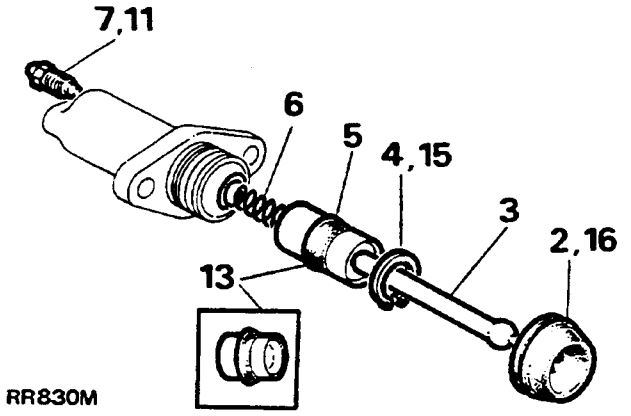
Service repair no - 33.35.07

Overhaul

1. Remove slave cylinder.

Dismantle

1. Withdraw rubber boot.
2. Withdraw push-rod.
3. Remove circlip.
4. Extract piston and seal assembly, applying low pressure air to fluid inlet if necessary.
5. Withdraw spring.
6. Remove bleed valve.



Inspecting

7. Clean all components thoroughly using new hydraulic fluid, and dry using lint-free cloth.
8. Examine cylinder bore and piston which must be free from corrosion, scores and ridges.
9. Replace seal and rubber boot using appropriate repair kit.

Reassemble

△ **NOTE: Cleanliness is essential, ensure hands are free of grease or dirt.**

1. Fit bleed valve. Do not overtighten.
2. Lubricate seals, piston and bore using new hydraulic fluid.
3. Fit seal into piston groove, lip of seal towards fluid inlet end of cylinder.
4. Enter piston assembly, spring first, into cylinder bore. Ensure that seal lip does not fold back.
5. Secure with circlip.
6. Fill rubber boot with rubber grease.
7. Reverse removal procedure. 1 to 3.