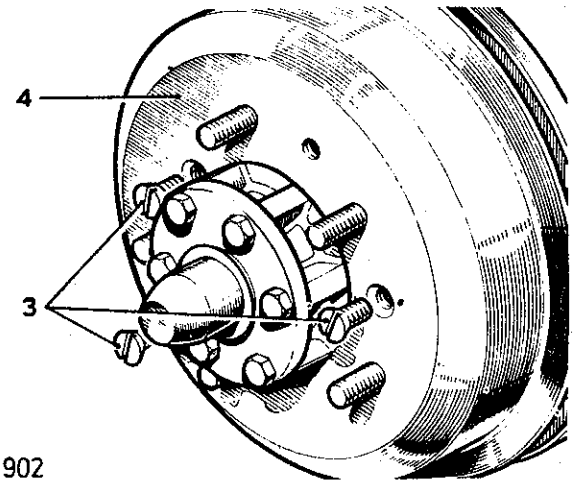
BRAKE OPERATIONS

continued

BRAKE DRUMS



IRC 902

—Remove and refit

Front drums	**70.10.02**
Rear drums	**70.10.03**

Removing

1. Remove the road wheel.
2. Slacken off the brake adjuster/s at the brake anchor plate.
3. Remove the brake drum fixings.
4. Withdraw the brake drum.

Refitting

5. Reverse 1 to 4.

DATA

Brake drums

Diameter:	
front and rear	279,4 mm (11.0 in.).
Reclamation limit:	0,75 mm (0.030 in.) oversize on both models.

BRAKE HOSES AND PIPES

Single system models with servo

HOSES

–Remove and refit	
Front left hand	70.15.02
Front right hand	70.15.03
Intermediate	70.15.04

PIPES

–Remove and refit	
Feed to front multi-way connector	70.20.01
Feed to front left hand hose connector	70.20.02
Feed to front right hand hose connector	70.20.03
Feed to front left hand cylinder	70.20.04
Feed to front right hand cylinder	70.20.05
Feed to rear left hand cylinder	70.20.17
Feed to rear right hand cylinder	70.20.18
Feed to intermediate hose	70.20.28

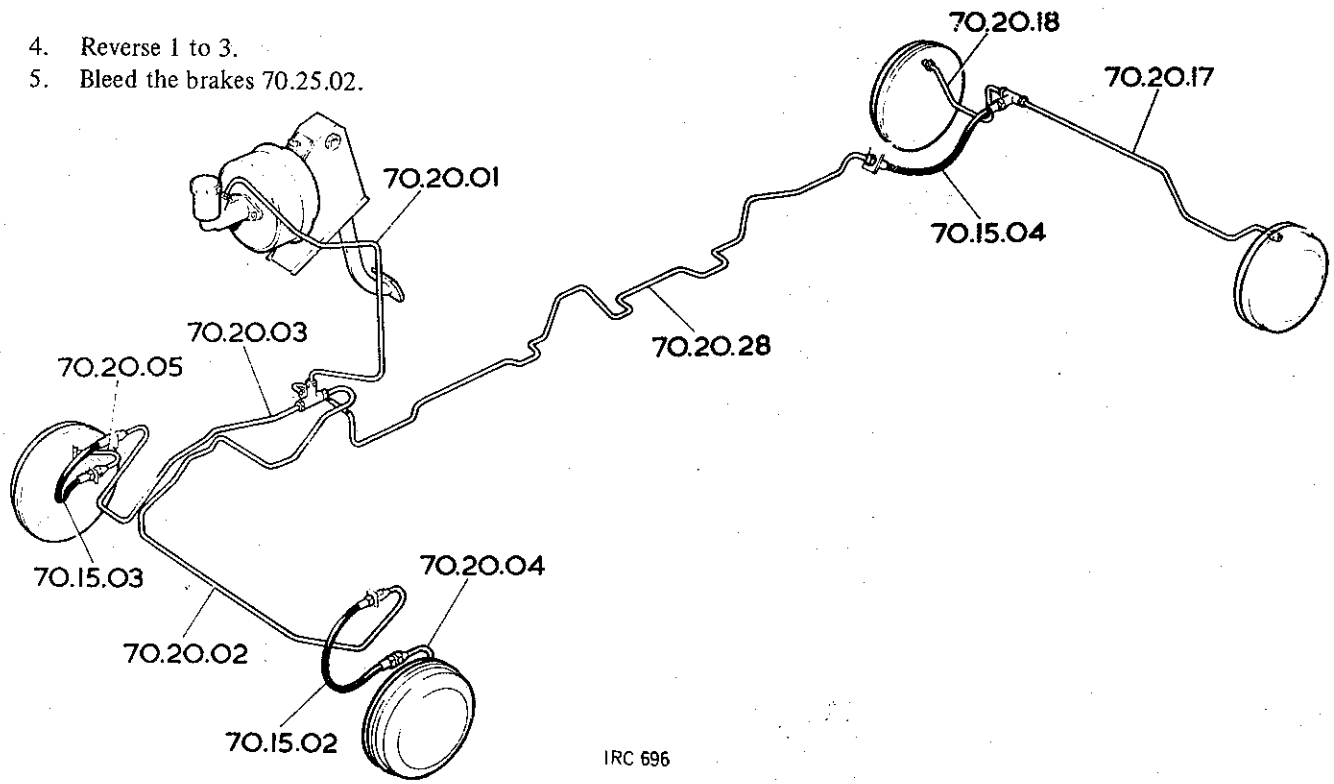
NOTE: The operation numbers are included on the brake system illustration to facilitate identification of the individual pipes.

Removing

1. Disconnect the hose or pipe at both connections.
2. Release the clipping.
3. Withdraw the hose or pipe.

Refitting

4. Reverse 1 to 3.
5. Bleed the brakes 70.25.02.



FOUR-WAY CONNECTOR, Single systems

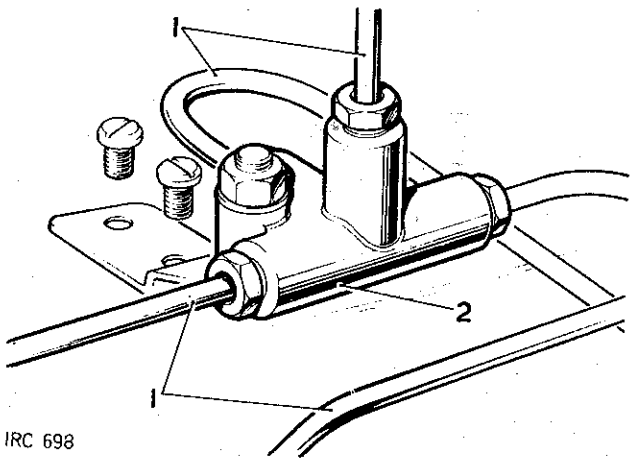
—Remove and refit **70.15.35**

Removing

1. Disconnect and blank off the four fluid pipes.
2. Remove the four-way connector and bracket, located in the engine compartment on top of the chassis R.H. side member.

Refitting

3. Fit the four-way connector with the connection for the rear brakes pipe facing outboard.
4. Bleed the brakes. 70.25.02.



IRC 698

BRAKES

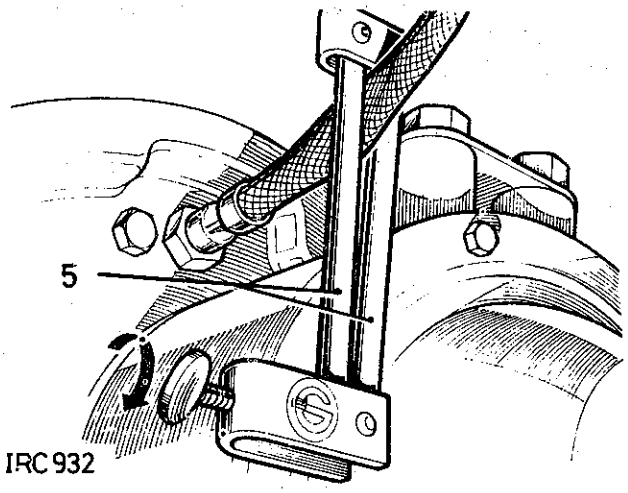
–Bleed 70.25.02

General

1. **Observe strict cleanliness precautions to prevent foreign matter from entering the hydraulic system.**
2. Use only new supplies of the recommended brake hydraulic fluid (see 09–Lubricants and Fluids).
3. Keep the fluid reservoir 'topped up' during bleeding.
4. Where the complete hydraulic system is to be refilled, it is advantageous to first charge the system, to each bleed point in turn, before attempting to expel all air from the system.

Isolating local air pockets

5. Use of Girling Brake Service Hose Clamp considerably facilitates the location of air in the system, therefore saving time by locating the hydraulic fault, and saving fluid when servicing the wheel cylinders.



Providing the brake hose is in reasonable condition, damage cannot be caused using the hose clamp, but the use of other tools to clamp the hoses is not recommended as damage may be caused internally to the hose without it being noticed externally.

6. With clamps fitted on the two front and one rear hose the pedal action should be perfect with no indication of 'spongyness'. If under these circumstances a spongy pedal is apparent, a new or overhauled master cylinder assembly must be fitted and bled and the test repeated.
7. If perfect pedal action is obtained with the three hose clamps in position, remove the rear clamp and if the pedal is spongy, the air must be in the rear cylinders. However, if the pedal action is good, remove first one then the other of the two front clamps, repeating the test until the air is located.

Wheel cylinder–servicing

8. For wheel cylinder servicing only the appropriate hose need be clamped. This keeps the loss of fluid to a minimum and after the service is satisfactorily completed, only the affected parts require bleeding.

continued

Brake bleeding procedure

9. Slacken off the brake shoe adjusters on each wheel to minimise wheel cylinder volume.
10. Attach a bleed tube to the bleed nipple farthest from the master cylinder. Submerge the tube free end in brake fluid in a transparent container.
11. Slacken the bleed nipple a half-turn.
12. Push down the brake pedal through the full stroke; follow with three short rapid strokes then allow the pedal to fully return.
    Pause for four or five seconds before commencing the next pedal stroke.
13. Repeat the procedure until fluid discharged from the bleed tube is free of air, then tighten the bleed nipple during a pedal downstroke.
14. Repeat the procedure on the remaining wheels, commencing and continuing at the next wheel farthest from the master cylinder.
15. Adjust the brakes. 70.25.03.
16. To test system for servo assistance: With engine switched off, exhaust all vacuum by applying brakes several times.Hold foot pressure on the brake pedal and start the engine. If the vacuum system is functioning correctly, the pedal will move towards the board. If no movement is felt, the vacuum system is not operating.

WHEEL BRAKES

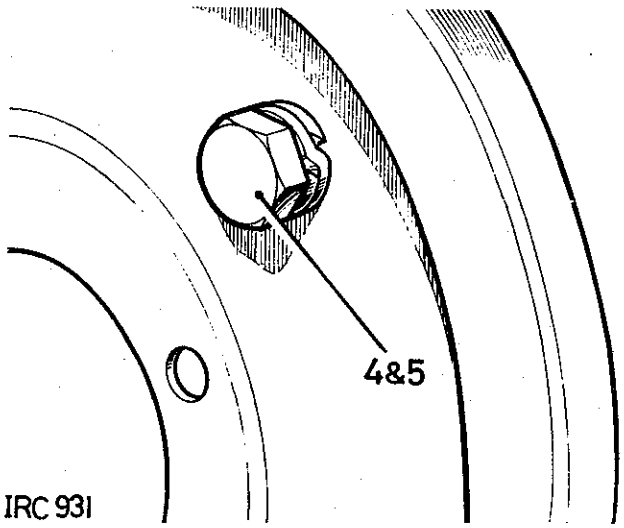
–Adjust 70.25.03

General

Two adjusters are provided on each road wheel.

Adjusting procedure

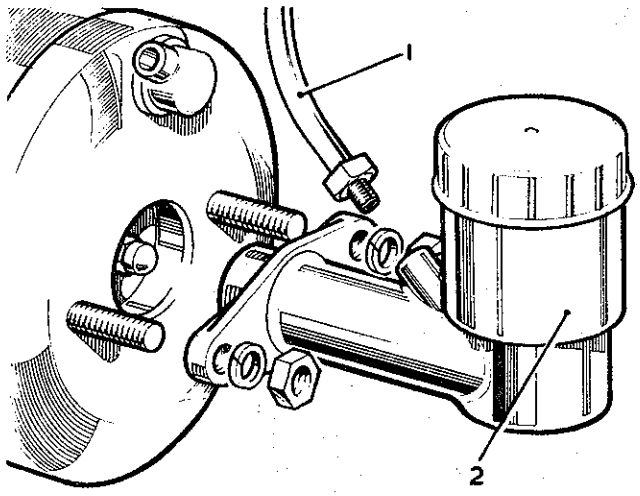
1. Apply the transmission brake.
2. Raise the applicable wheel.
3. Ensure that the wheel is free to rotate, back-off the adjuster as necessary.
4. Turn in the adjuster until the brake shoe contacts the wheel drum.
5. Back-off two serrations on the adjuster.
6. Lower the wheel.



MASTER CYLINDER, Servo systems

–Remove and refit 70.30.01

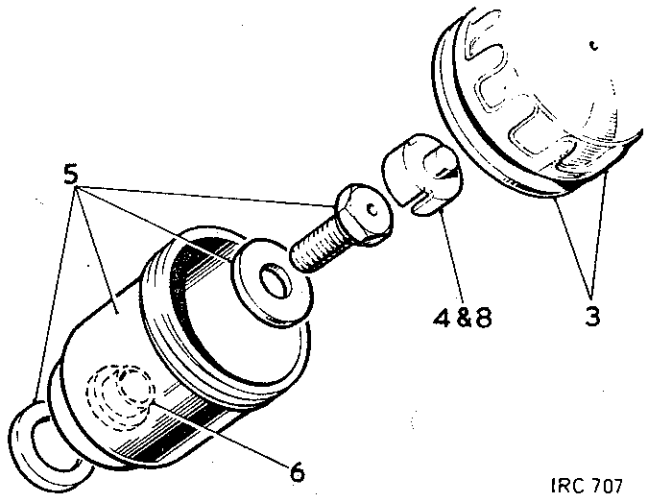
1. Disconnect the outlet pipe from the brake master cylinder.
2. Remove the fixings and withdraw the master cylinder complete with reservoir.
3. Remove the filler cap and filter, where fitted, from the reservoir and drain all the fluid.
4. Using long-nosed pliers, withdraw the plastic cover from the reservoir adaptor bolt.
5. Remove the adaptor bolt and withdraw the plain washer, reservoir body, and seal.
6. DO NOT attempt to remove the distance piece from the base of the reservoir.



IRC 706

Refitting

7. Smear the seal for the reservoir base with Castrol-Girling rubber grease and place it in position.
8. Locate the fluid reservoir in position on the master cylinder, and secure with the plain washer and adaptor bolt. Tighten the adaptor bolt to a torque figure of 2,8 to 3,5 kgf.m. (20 to 25 lbf.ft.).
9. Reverse 3 and 4.
10. Reverse 1 and 2; master cylinder fixings torque load is 2,2 to 2,6 kgf.m. (16 to 19 lbf.ft.).
11. Bleed the brake hydraulic system. 70.25.02.



IRC 707

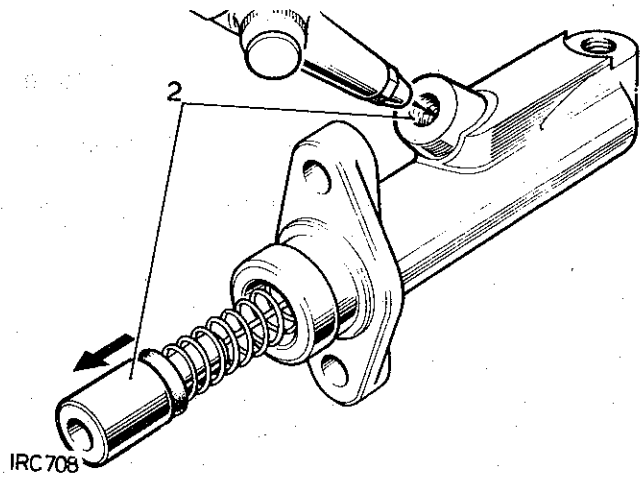
MASTER CYLINDER, Servo systems

–Overhaul 70.30.02

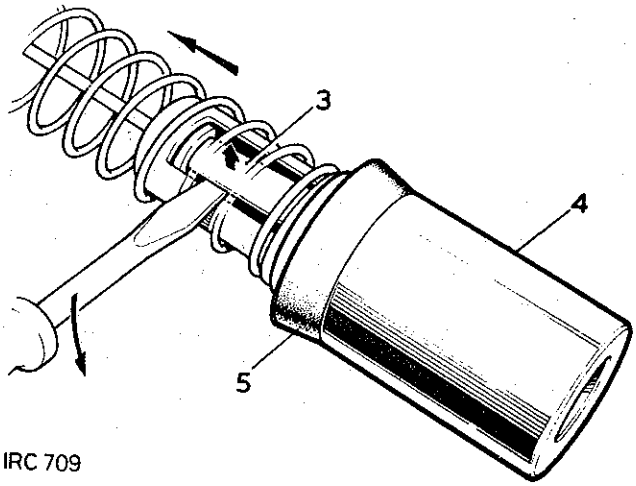
Dismantling

1. Remove the master cylinder. 70.30.01
2. Withdraw the piston assembly from the master cylinder. If necessary, apply a low air pressure to the outlet port to expel the piston.
3. Prise the locking prong of the spring retainer clear of the piston shoulder.
4. Withdraw the piston.
5. Remove the piston seal.
6. Compress the spring and position the valve stem to align with the larger hole in the spring retainer.

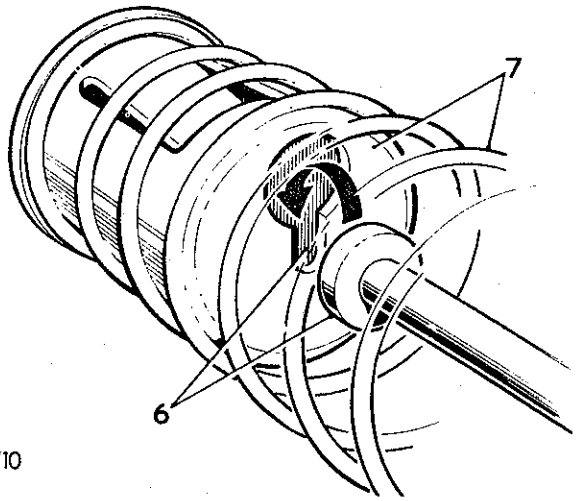
continued



IRC 708



IRC 709



IRC 710

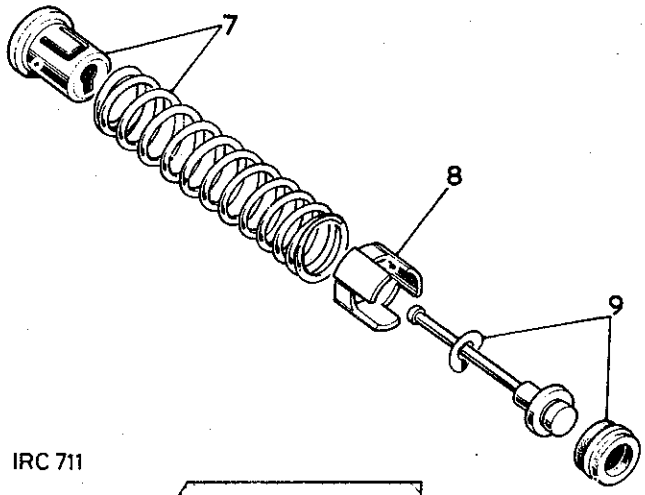
7. Withdraw the spring and retainer.
8. Slide the valve spacer over the valve stem.
9. Remove the spring washer and valve seal from the stem.

Inspecting

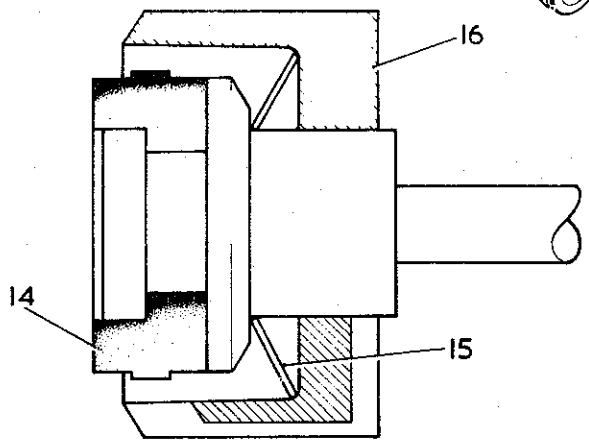
10. Clean all components in Girling cleaning fluid and allow to dry.
11. Examine the cylinder bore and piston. Ensure that they are smooth to the touch with no corrosion, score marks or ridges. If there is any doubt, fit new replacements.
12. The seals should be replaced with new components. These items are included in the master cylinder overhaul kit.

Assembling

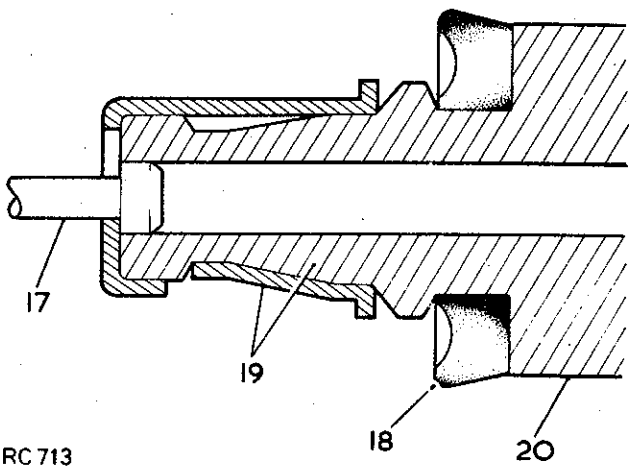
13. Smear the seals with Castrol-Girling rubber grease and the remaining internal items with Castrol-Girling Brake and Clutch Fluid.
14. Fit the valve seal, flat side first, to the end of the valve stem.
15. Place the spring washer, domed side first, over the small end of the valve stem.
16. Fit the valve spacer, legs first, then the coil spring.
17. Insert the retainer into the spring and compress until the stem passes through the keyhole and is engaged in the centre.
18. Fit the seal, large diameter last, to the piston.
19. Insert the piston into the spring retainer and engage the locking prong.
20. Smear the piston with Castrol-Girling rubber grease and insert the assembly, valve end first, into the cylinder.
21. Liberally smear Castrol-Girling rubber grease inside the piston end of the master cylinder.
22. Refit the master cylinder. 70.30.01.



IRC 711



IRC 712



IRC 713

DATA

Master cylinder bore size:	25,4 mm (1.0 in.) diameter.

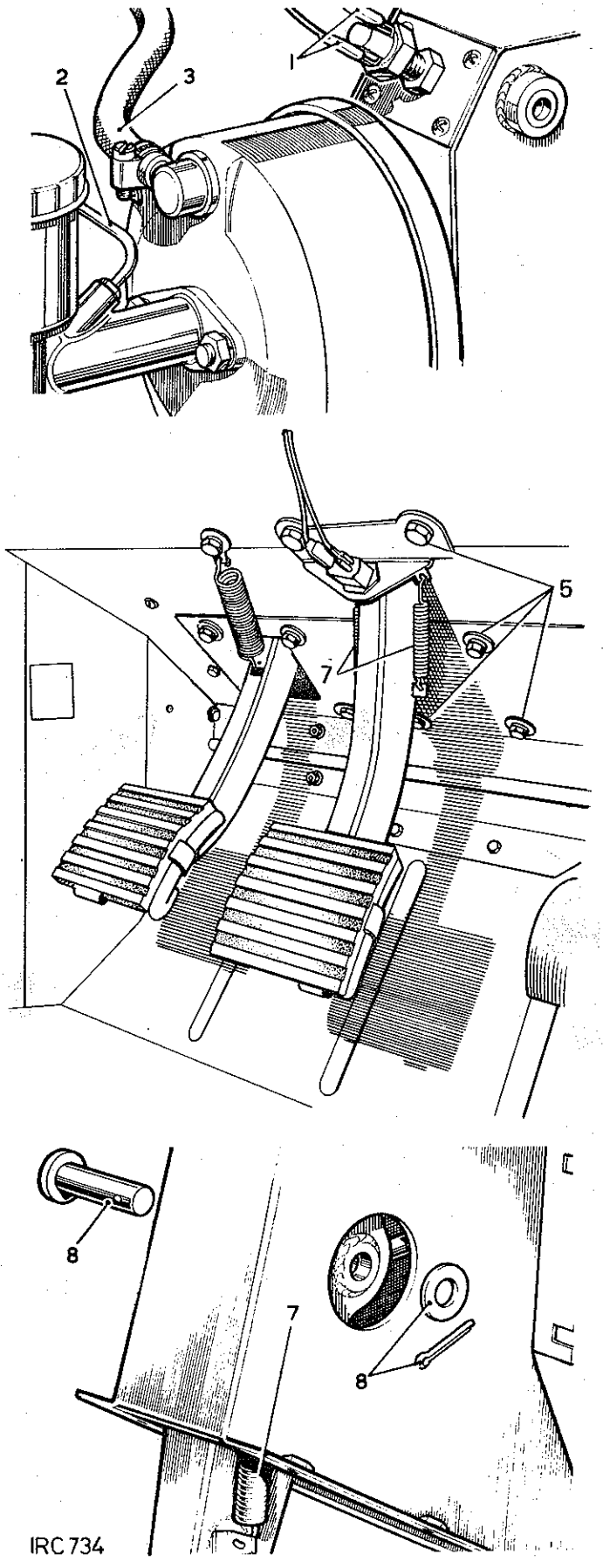
BRAKE PEDAL, Servo Systems

–Remove and refit **70.35.01**

Removing

1. Disconnect the electrical lead from the stop light switch.
2. Disconnect the outlet pipe from the master cylinder. Fit a blanking plug to the outlet aperture or drain the fluid reservoir, to prevent fluid spillage.
3. Disconnect the vacuum pipe from the servo unit.
4. Remove the toe-board finisher panel.
5. Remove the fixings securing the brake pedal bracket to the toe box.
6. Withdraw the brake pedal and bracket assembly from the engine compartment, manoeuvring the pedal through the aperture in the toe box.
7. Disconnect the brake pedal return springs.
8. Remove the split pin and pivot pin from the brake pedal to servo coupling.

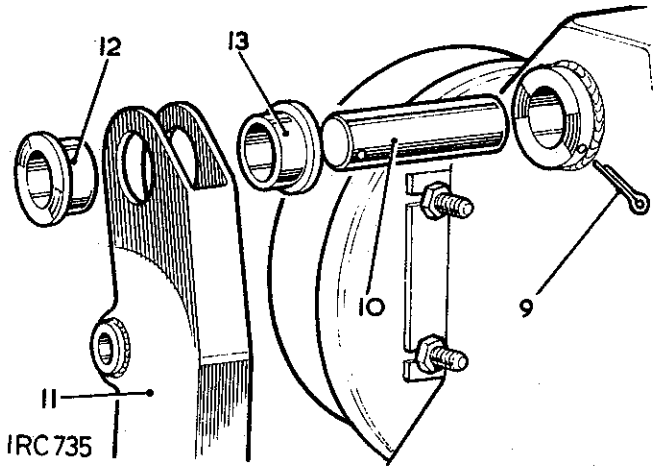
continued



9. Using a suitable punch, drift out pin from the pedal shaft.
10. Remove pedal shaft.
11. Withdraw the brake pedal complete with bushes.
12. If required, remove the bushes from the pedal.

Refitting

13. If removed, fit the bushes to the brake pedal. New bushes must be reamered to 15,875 mm + 0,025 mm (0.750 in. + 0.001 in.).
14. Reverse 7 to 10, using general purpose grease to lubricate moving parts.
15. Apply a waterproof sealant between the joint flanges of the pedal bracket and the tow box.
16. Reverse 1 to 6.
17. Check, and if necessary, adjust the brake pedal switch located on the pedal box top cover to operate at 19 mm to 25 mm (0.750 in. to 1 in.) of pedal movement.
18. Bleed the complete braking system. 70.25.02.



FRONT BRAKE SHOES

–Remove and refit **70.40.02**

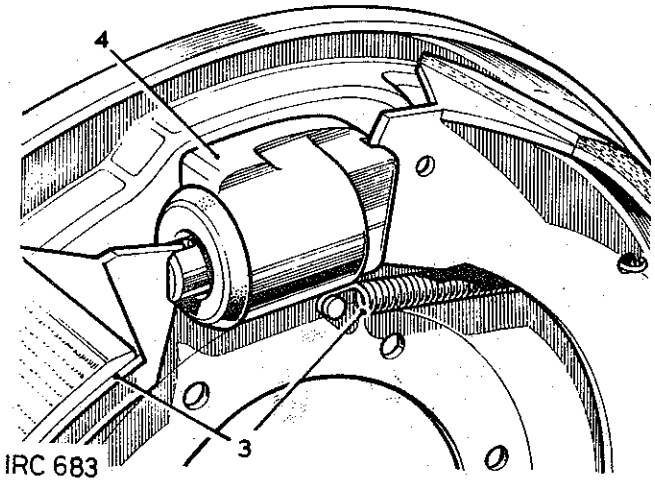
Removing

1. Remove the road wheel.
2. Remove the brake drum. 70.10.02.
3. Release the brake shoes and pull-off springs by levering the trailing edges away from the wheel cylinders.
4. Retain the pistons in the wheel cylinders, using a rubber band.
5. If required, re-line the brake shoes. 70.40.10.

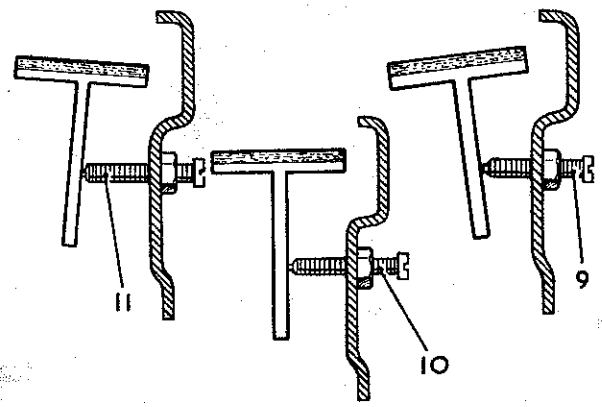
Refitting

NOTE: Ensure that the correct width of brake shoe is fitted as follows: – – 76 mm (3.0 in.) wide

6. Reverse 2 to 4.
7. Adjust the brakes fully on, then back-off two serrations on the adjusters.
8. If the brake shoe steady posts have been disturbed, reset as follows, items 9 to 11.
9. Screw back the steady posts clear of the brake shoes and apply the brakes.
10. Screw in the steady posts to contact the brake shoes then secure.
11. Do not tilt the brake shoes by screwing in the steady posts too far.
12. Reverse 1.



IRC 683



IRC 686

DATA

Brake shoe width	76 mm (3.0 in.).

REAR BRAKE SHOES

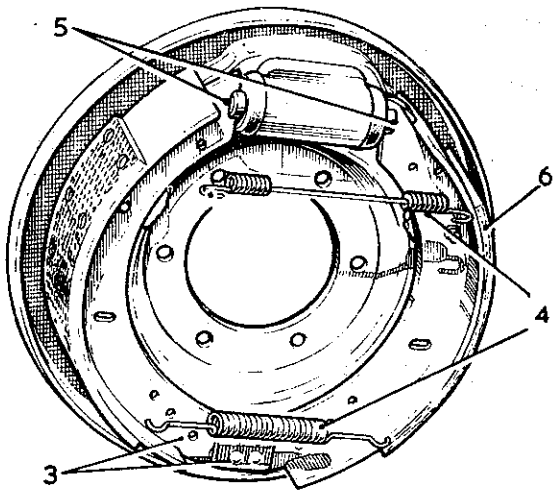
–Remove and refit 70.40.03

Removing

1. Remove the road wheel.
2. Remove the brake drum. 70.10.03.
3. Release the brake shoes by levering the shoes away from the pivot.
4. Disconnect the springs.
5. Retain the pistons in the wheel cylinder, using a rubber band.
6. If required, re-line the brake shoes 70.40.10.

Refitting

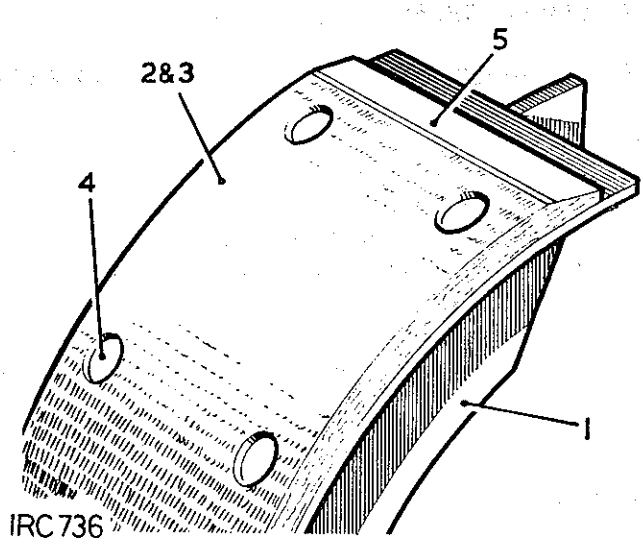
7. Reverse 2 to 4.
8. Adjust the brakes fully on, then back-off two serrations on the adjuster.
9. Reverse 1.



IRC 692

BRAKE LININGS

–Remove and refit **70.40.10**



Removing

1. Remove the brake shoes. 70.40.02 and 70.40.03.
2. Remove the old linings from the shoes by shearing the rivets.

NOTE: Brake shoes fitted with bonded linings: If the shoes incorporate rivet holes, the bonded linings can be removed and rivetted linings can be fitted in their place. If the shoes are not pre-drilled, replacement shoe and lining assemblies must be fitted.

Refitting

3. Attach the new linings to the shoes, commencing at the centre and working outwards, but only peen the rivets sufficient to locate the linings.
4. Then with all the rivets loosely fitted, fully secure, commencing from the centre again.
5. Chamfer both ends of each lining.
6. Reverse 1.

TRANSMISSION BRAKE, HAND LEVER AND LINKAGE

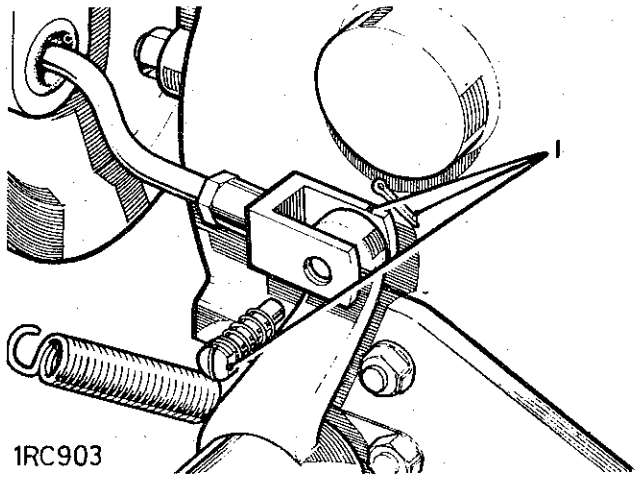
–Remove and refit **70.45.01**

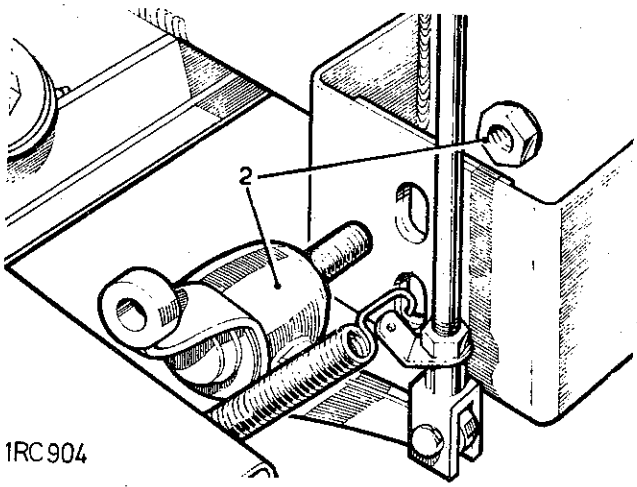
Removing

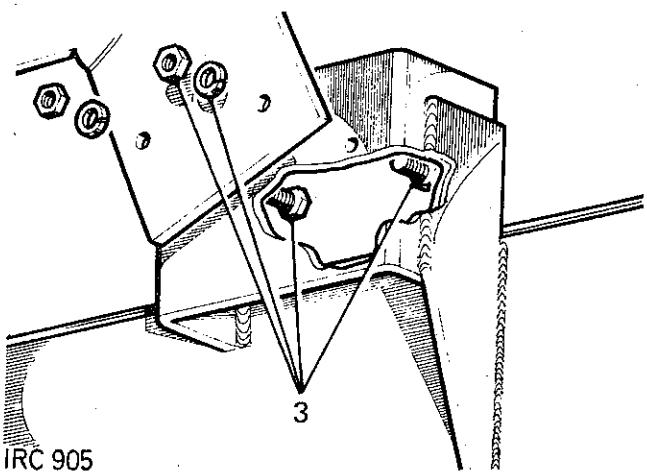
CAUTION: Before commencing work on the hand brake mechanism, chock the road wheels to prevent the vehicle moving.

1. From under the vehicle, disconnect the hand brake expander rod from the relay lever.
2. Remove the relay lever fixings.
3. Remove the fixings securing the hand brake lever to the chassis.

continued







4. Remove the hand brake assembly complete from the vehicle, withdrawing the lever grip carefully through the rubber draught excluder in the front of the seat box.
5. Remove the brake catch pin, catch and distance pieces.
6. Remove the fulcrum pin, ratchet fixings and ratchet from the hand brake lever.
7. Unscrew the plunger and withdraw the spring, washer and the plunger rods.
8. If required, remove the relay lever and spindle. If necessary, press the bush from the lever.

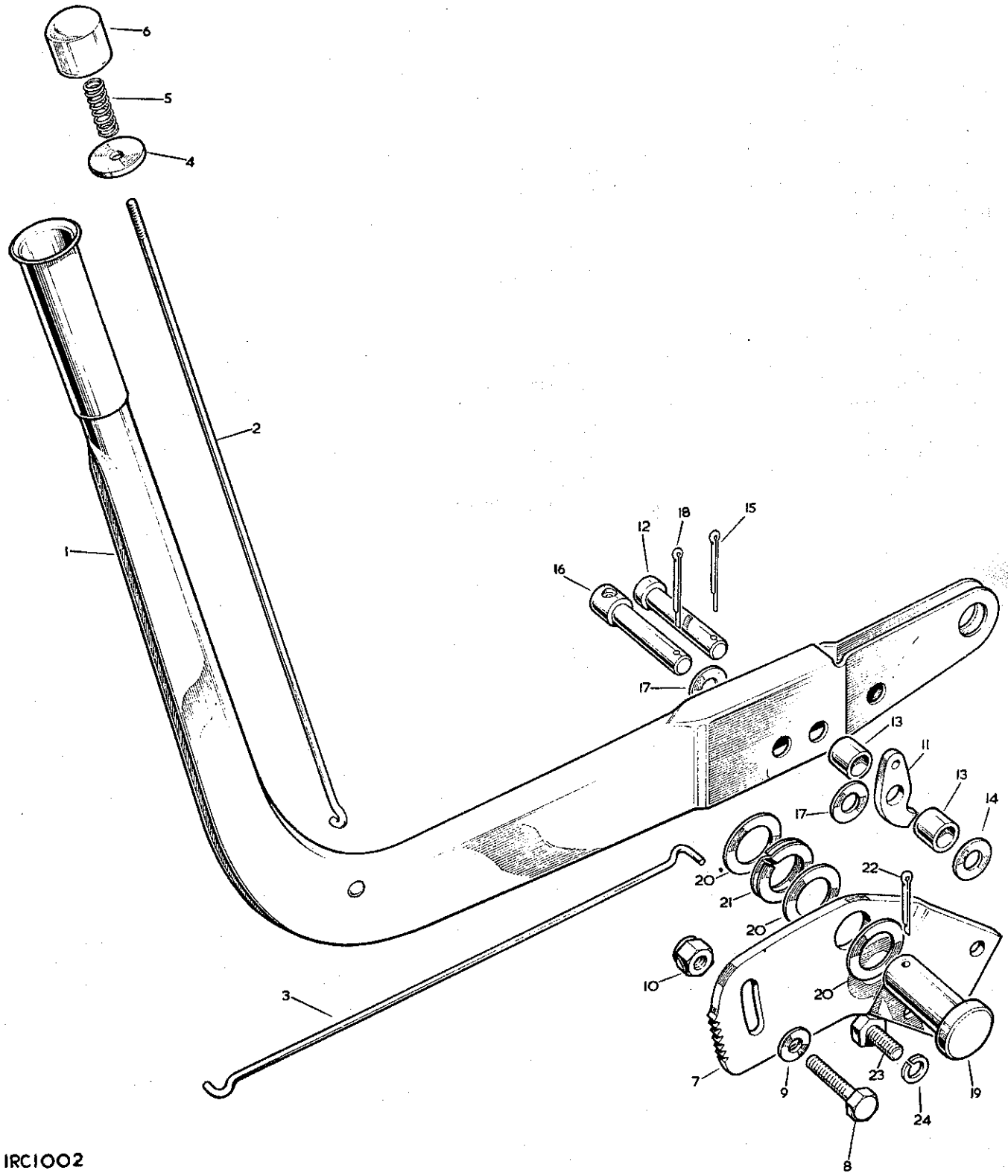
Refitting

9. If removed, fit the bush to the relay lever and fit the relay lever and spindle to the chassis.

NOTE: The bore size of a new relay lever bush is 19,088 mm —0,0254 mm (0.7515 in. -0.001 in.).

10. Reverse 1 to 8; lubricate the cross shaft bearings with general purpose grease.
11. Set the hand brake linkage at the vertical adjuster rod, so that the hand brake has one or two clicks free movement in the 'off' position.

Continued



IRC1002

Hand brake lever arrangement

Key to handbrake lever arrangement

1.	Hand brake lever	
2.	Plunger rod, upper	
3.	Plunger rod, lower	
4.	Washer for plunger spring	
5.	Spring for plunger rod	
6.	Plunger	
7.	Ratchet for hand brake	
8.	Bolt (3/8 in. UNF x 1.1/4 in. long)	Fixing lever to ratchet
9.	Plain washer	
10.	Self-locking nut (3/8 in. UNF)	
11.	Brake catch	
12.	Pin	Fixing catch
13.	Distance piece	
14.	Plain washer	
15.	Split pin	
16.	Pin for hand brake adjuster rod	
17.	Plain washer	Fixing pin to hand brake lever
18.	Split pin	
19.	Fulcrum pin for hand brake lever	
20.	Plain washer	Fixing pin to ratchet and lever
21.	Spring washer	
22.	Split pin	
23.	Bolt (3/8 in. UNF x 7/8 in. long)	Fixing hand brake lever to chassis frame
24.	Spring washer	
	Nut (3/8 in. UNF)	

TRANSMISSION BRAKE ASSEMBLY

–Adjust	36 to 39	70.45.09
–Remove and refit	1 to 39	70.45.16

TRANSMISSION BRAKE SHOES

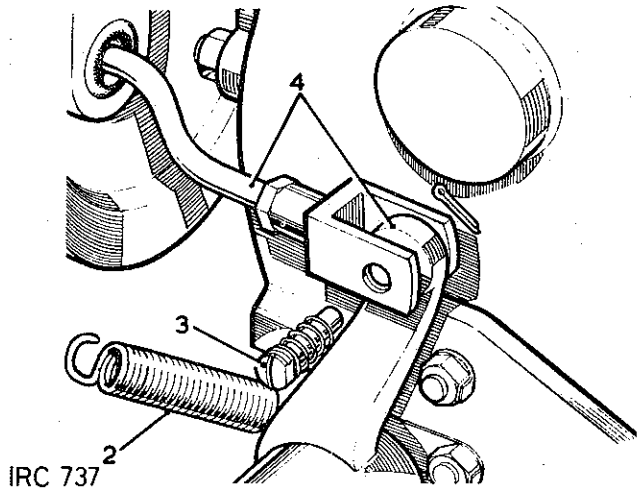
–Remove and refit	1 to 7, 32 to 39	70.45.18

Removing

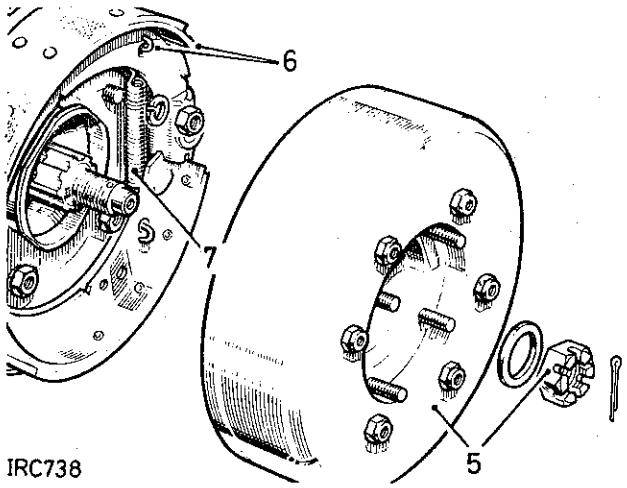
NOTE: It is not essential to remove the transmission brake from the vehicle, the brake shoe components are accessible after removing the brake drum, which can be detached from the gearbox output flange and pushed back over the propeller shaft.

1. Chock the road wheels.
2. Disconnect the brake return spring.
3. Remove the expander rod fork fixings.
4. Disconnect the expander rod from the relay lever.
5. Remove the fixings and withdraw the brake drum.
6. Remove the brake shoes together with the pull-off springs.
7. Separate the shoes by detaching the springs.
8. Withdraw the dust excluder.
9. Remove the expander unit fixing plates.
10. Withdraw the expander unit.
11. Remove the spring clip from the expander unit.
12. Withdraw the plungers and rollers.
13. Withdraw the operating rod.

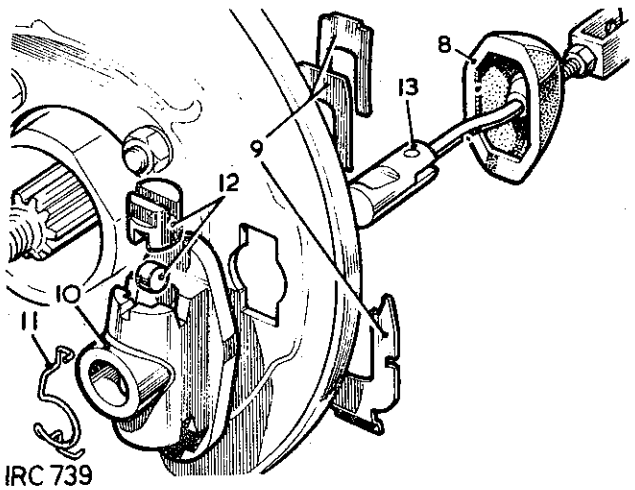
continued



IRC 737

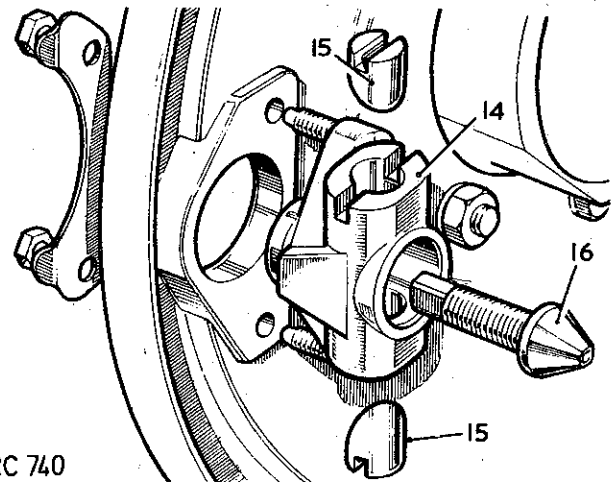


IRC738



IRC 739

14. Remove the adjuster unit assembly.
15. Pull out the adjuster plungers.
16. Unscrew the adjuster cone.



IRC 740

Inspecting

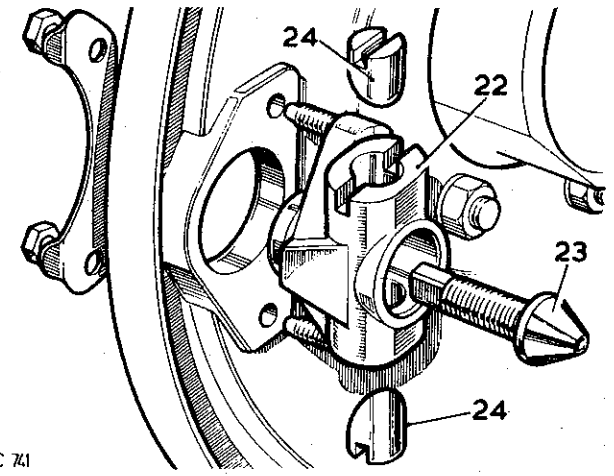
17. Clean all components in Girling cleaning fluid and allow to dry.
18. Examine all items for obvious wear and replace as necessary.
19. Examine the brake drum for scoring and ovality and skim if required.
    Standard diameter is 228,6 mm (9.0 in.); reclamation limit is 0,75 mm (0.030 in.) oversize.
20. If the brake linings are oily, check and if necessary replace the output shaft oil seal, Division 37
21. If required, reline the brake shoes. 70.40.10

Assembling

22. Fit the adjuster unit housing, do not tighten the fixings at this stage.
23. Screw in the adjuster cone.
24. Grease and refit the adjuster plungers.

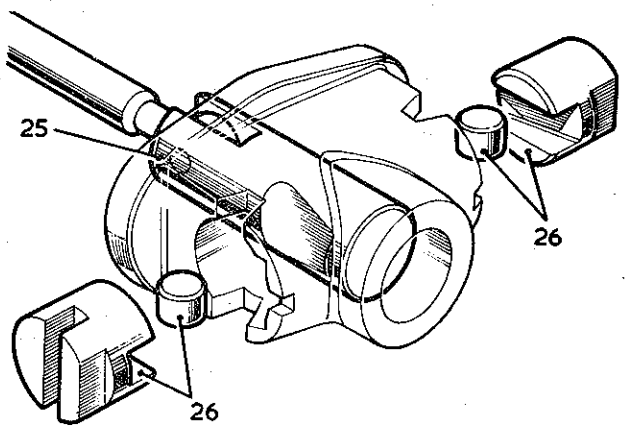
NOTE: The two plungers are identical and may be fitted to either bore. Align the chamfered ends of the plungers with the cone on the adjuster.

continued

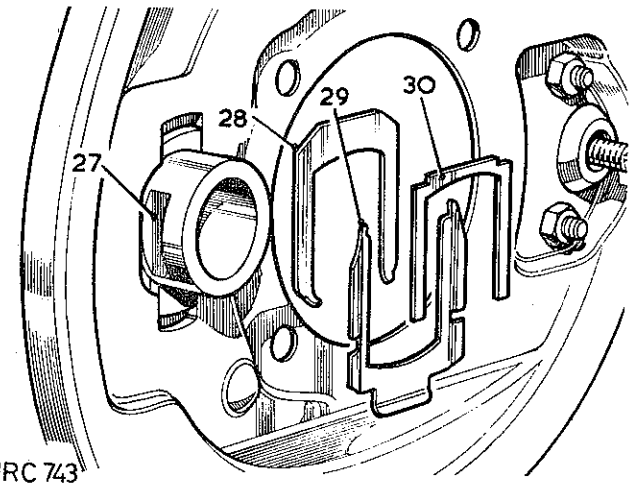


IRC 741

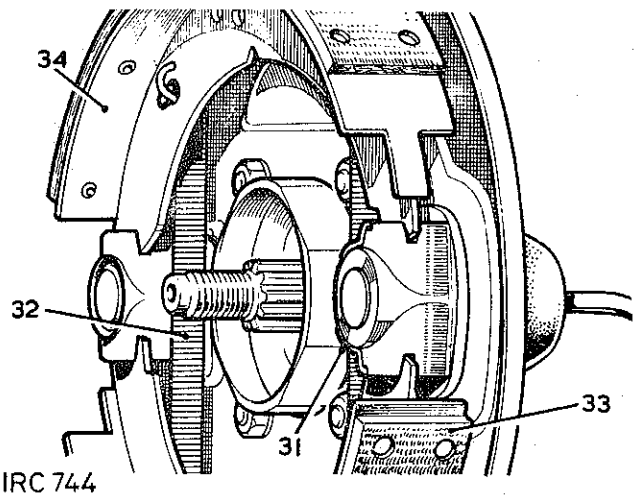
25. Grease and fit the expander rod.
26. Grease and fit the plungers and rollers.
27. Position the adjuster housing on the back plate.
28. Fit the packing piece.
29. Fit the locking plate.
30. Fit the retainer spring.
31. Fit the spring clip to the expander unit.
32. Fit the brake shoes and pull-off springs together.
33. The fully lined end of the lower shoe must be toward the expander housing.
34. The fully lined end of the upper shoe must be toward the adjuster housing.
35. Reverse 2 to 5.
36. Turn the adjuster cone fully in and tighten the fixings.
37. Slacken off the adjuster cone two 'clicks'; give the brake a firm application to ensure that the shoes have centralised at the expander end. The brake drum should now be free to rotate.
38. Set the hand brake linkage at the vertical adjuster rod, so that the hand brake has one or two clicks free movement in the 'off' position.
39. Remove the road wheel chocks.



IRC 742



IRC 743



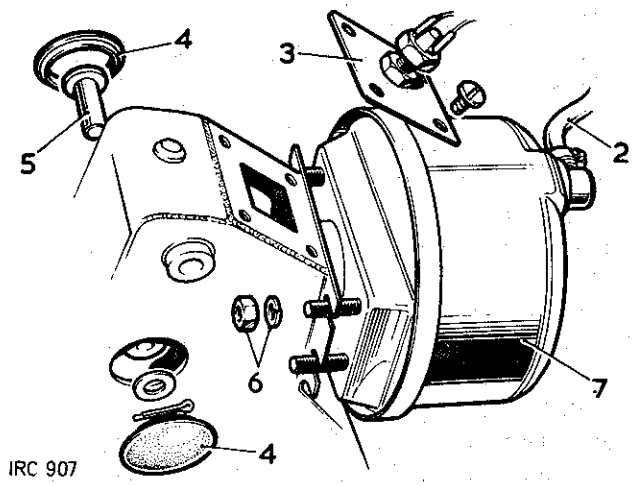
IRC 744

SERVO ASSEMBLY

–Remove and refit **70.50.01**

Removing

1. Remove the brake master cylinder. 70.30.01.
2. Disconnect the vacuum hose from the servo assembly.
3. Remove the switch plate.
4. Remove the rubber plugs from the pedal box.
5. Remove the split pin and withdraw the clevis pin securing the servo rod to the pedal.
6. Remove the fixings.
7. Withdraw the servo assembly.



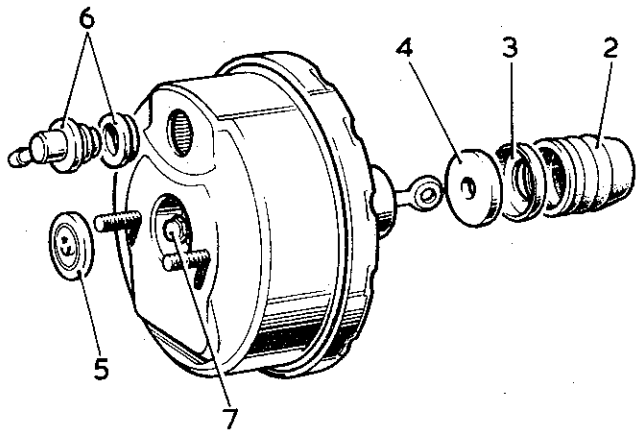
Refitting

8. Reverse 1 to 7. Torque load for servo fixings is 1,2 kgf.m. (9 lbf.ft.).

SERVO ASSEMBLY

—Overhaul **70.50.06**

NOTE: The Supervac servo unit can be serviced, with a kit that is available, without completely dismantling the servo. In the event of the servo developing a major fault, the unit must be renewed.



IRC 908

Dismantling

1. Remove the servo. 70.50.01.
2. Pull back the dust cover.
3. Remove the end cap.
4. Withdraw the filter.
5. Remove the seal and plate assembly from the front shell recess.
6. Remove the non-return valve and grommet.
7. **CAUTION:** Do not attempt to remove or adjust the operating rod which is pre-set and locked at the manufacturers.

Reassembling (using the service kit)

8. Lubricate the non-return valve grommet with Girling Grease (64949009), and fit to the front shell.
9. Fit the new non-return valve into the grommet.
10. Smear the new seal and plate assembly with Girling Grease (64949008), and press into the front shell, ensuring the plate faces inwards.
11. Fit the new filter into the neck of the diaphragm plate.
12. Fit the new end cap.
13. Locate the new dust cover over the lugs of the rear shell.
14. Fit the servo. 70.50.01.

FRONT WHEEL CYLINDERS

–Remove and refit, 1 to 5 and 16 and 17 **70.60.03**

–Overhaul **6 to 15** **70.60.11**

Removing

1. Remove the road wheel.
2. Remove the brake drum. 70.10.02
3. Remove the brake shoes. 70.40.02.
4. Disconnect and seal off the brake fluid pipe.
5. ** Remove the bleed screw (lower cylinder only).
6. Remove the wheel cylinder.

Dismantling

7. Withdraw the dust cover.
8. Withdraw the piston and seal.
9. Withdraw the spring.**

Inspecting

10. Clean all components, using Girling cleaning fluid, and allow to dry.
11. Inspect the cylinder bore and piston for corrosion, scores and wear. If any component is unsatisfactory, replace the wheel cylinder assembly complete.
12. Provide new seals and dust covers from the wheel cylinder overhaul kit.

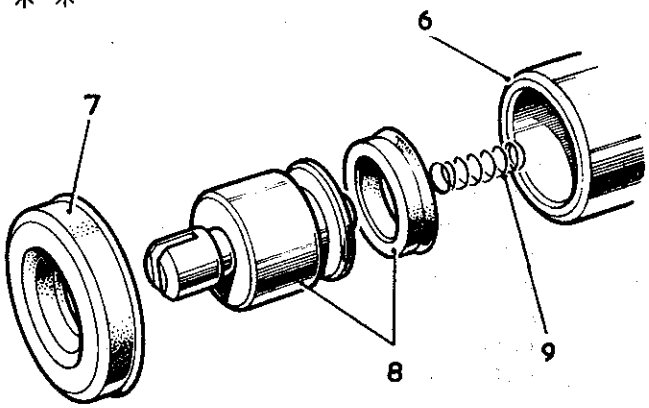
Assembling

13. Lubricate the components, using the recommended Girling brake fluid.
14. Reverse 6 to 8. Fit the piston seal with the lipped side away from the slotted end.
15. Fit the bleed screw, do not overtighten. Torque 0,5 to 0,8 kgf.m (4 to 6 lbf.ft.).

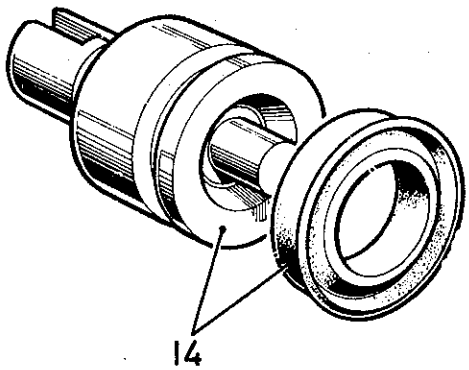
Refitting

16. Reverse 1 to 5.
17. Bleed the brakes. 70.25.02.

* *



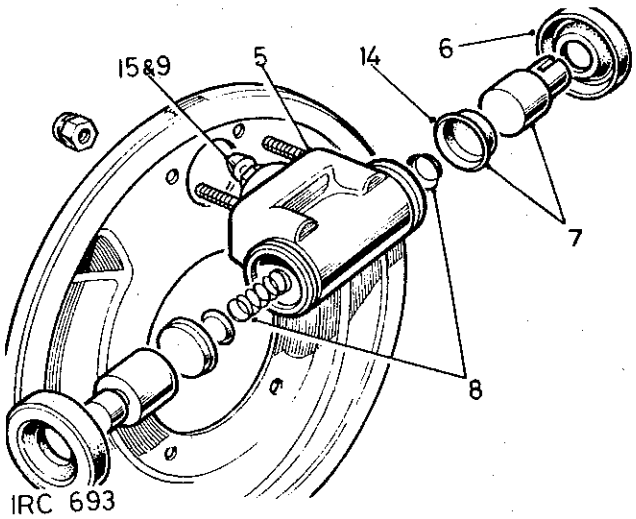
IRC 684A * *



IRC 685

REAR WHEEL CYLINDER

—Remove and refit	**1 to 5 and 16 and 17**	**70.60.18**
—Overhaul	**6 to 15**	**70.60.26**



Removing

1. Remove the road wheel.
2. Remove the brake drum. 70.10.03.
3. Remove the brake shoes. 70.40.03.
4. Disconnect and seal off the brake fluid pipe.
5. Remove the wheel cylinder.

Dismantling

6. Withdraw the dust covers.
7. Withdraw the pistons and seals.
8. Withdraw the spring and seal supports.
9. Remove the bleed screw.

Inspecting

10. Clean all components, using Girling cleaning fluid, and allow to dry.
11. Inspect the cylinder bore and piston for corrosion, scores and wear. If any component is unsatisfactory, replace the wheel cylinder assembly complete.
12. Provide new seals and dust covers from the wheel cylinder overhaul kit.

Assembling

13. Lubricate the components, using the recommended Girling brake fluid.
14. Reverse 6 to 8. Fit the piston seal with the lipped side away from the slotted end.
15. Fit the bleed screw, do not overtighten. Torque 0,5 to 0,8 kgf.m (4 to 6 lbf.ft.).

Refitting

16. Reverse 1 to 5.
17. Bleed the brakes. 70.25.02.