

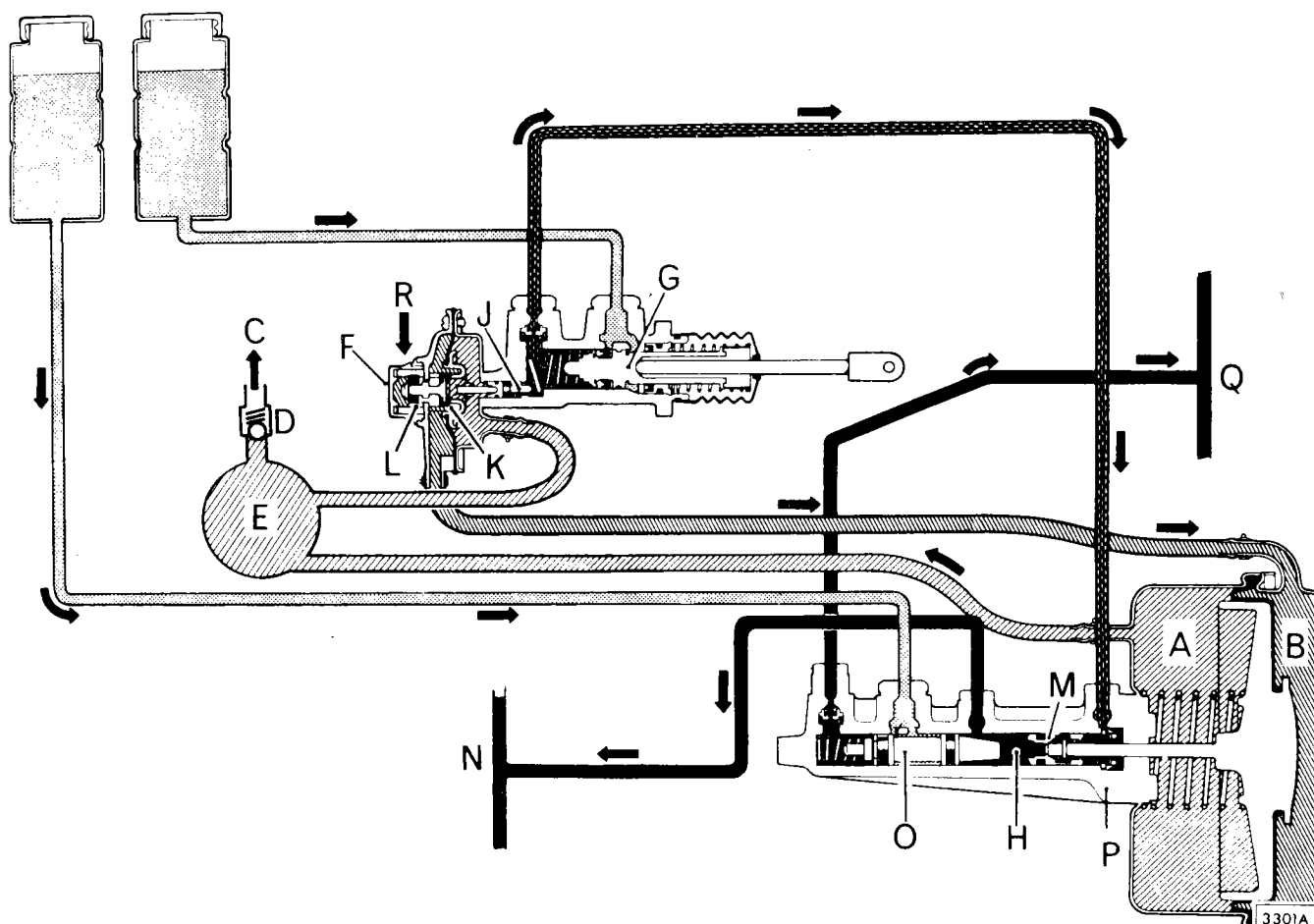


## BRAKE SYSTEM

## Description

The hydraulic servo assisted braking system fitted to this vehicle is of the dual-line type.

The complete system is given schematically below.



## Operation

When the system is at rest, both sides of the servo diaphragm 'A' and 'B' are continuously exhausted by the engine manifold depression 'C' via a check valve 'D' reservac tank 'E' and reaction valve 'F'. As the brake pedal is depressed, the master cylinder piston 'G' moves along the cylinder building up pressure and forcing fluid to the primary chamber 'H' of the servo slave cylinder 'P'. Simultaneously, the intermediate piston 'J' in the end of the master cylinder, closes the diaphragm valve 'K' in the reaction valve. This isolates the reservac and front side of the servo diaphragm from the rear.

Further progress of the intermediate piston along its bore will crack the air control spool 'L' in the reaction valve and admit air at atmospheric pressure to the rear of the servo diaphragm 'B'. Atmospheric pressure applied to the rear of the diaphragm provides the servo assistance to hydraulic braking operation; the primary piston 'M' attached to the servo push rod directly providing braking on the front wheels 'N'. The movement of the primary piston, and the consequent front brake operating pressure, forces the secondary piston 'O' forward to provide braking on the rear wheels 'Q'.

## Safety Factors

**WARNING: ALTHOUGH THESE SAFEGUARDS PREVENT COMPLETE FAILURE OF THE BRAKING SYSTEM ANY CHANGE IN BRAKING EFFICIENCY OR SUDDEN LOSS OF HYDRAULIC FLUID MUST BE INVESTIGATED AND RECTIFIED IMMEDIATELY**

**IF A FAILURE IN THE BRAKE SYSTEM IS SUSPECTED THE CAR MUST NOT UNDER ANY CIRCUMSTANCES BE MOVED WITH THE ENGINE SWITCHED OFF**

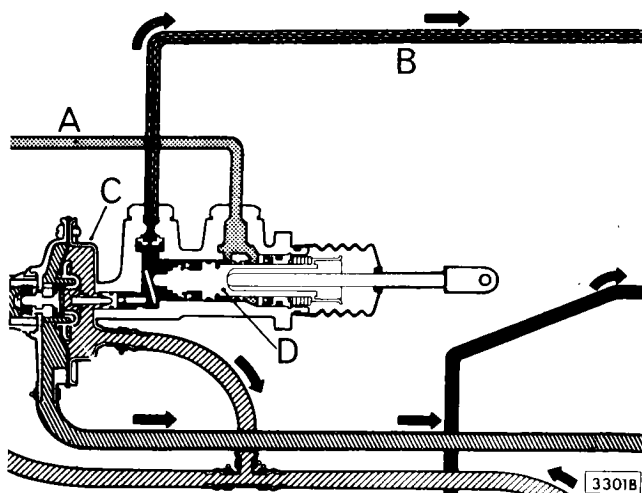
**UNDER CERTAIN CONDITIONS THIS WILL RESULT IN TOTAL LOSS OF BRAKING.**

**\*\*NOTE:** Later cars are fitted with a pressure differential warning actuator. Failure of hydraulic pressure in either front or rear brake systems operates a pressure differential warning actuator (P.D.W.A.), and switches on a warning lamp in the car. \*\*

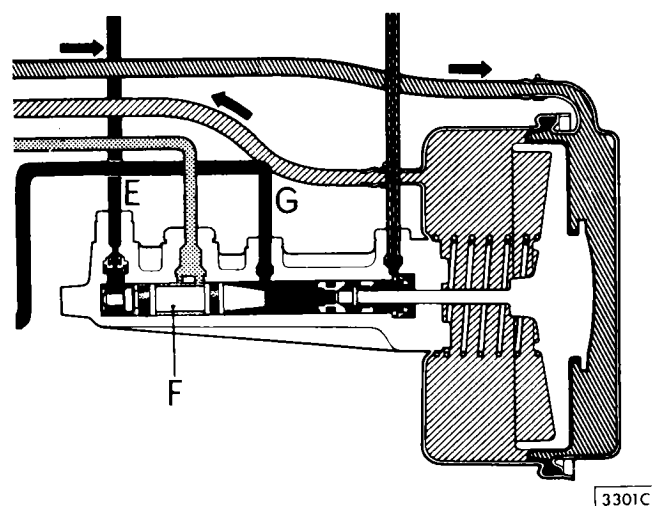


The system has four built in safeguards; 'engine off' complications are also given.

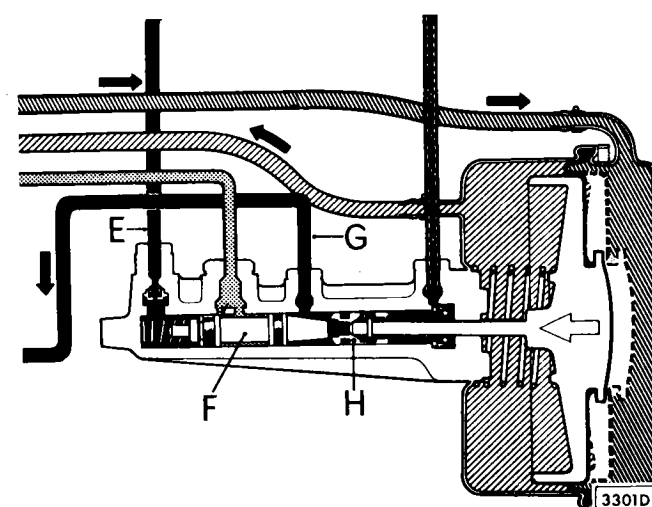
1. In the event of a fluid line failure in the pipe linking the master cylinder to the fluid supply tank 'A' or the pipe linking master cylinder and slave cylinder 'B', the reaction valve 'C' is operated mechanically by the master cylinder piston 'D'. This operates the slave cylinder by air pressure differential alone. This fault will result in rapid draining of the master cylinder reservoir.  
If the engine is switched off. **TOTAL LOSS OF BRAKING.**



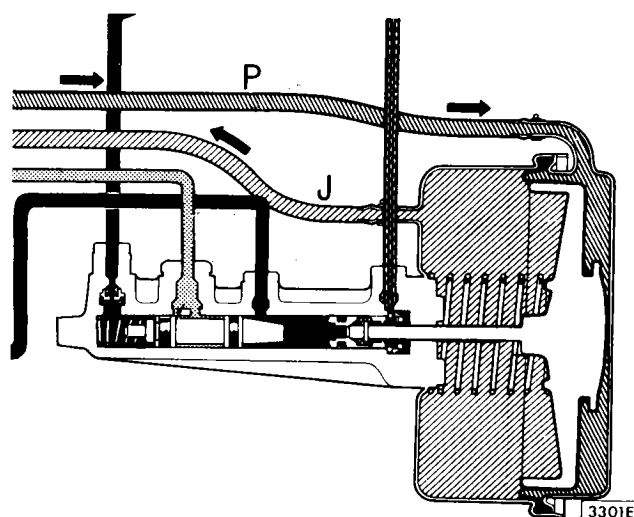
2. A failure in the fluid line coupling the slave cylinder to the rear brakes 'E' will result in the slave cylinder secondary piston 'F' travelling the full length of the bore. This has the effect of isolating the rear brake line from the rest of the system and allowing fluid pressure to build up in the front brake line 'G'. This fault will result in rapid draining of the servo slave cylinder reservoir.  
If the engine is switched off. **LOSS OF SERVO ASSISTANCE.**



3. If a fault exists in the front brake line 'G', the slave cylinder primary piston 'H' will travel along the bore until it contacts the secondary piston; the two pistons together will then apply the rear brakes. This fault will result in rapid draining of the master cylinder reservoir, and eventually, to operation as for fault 1.  
If the engine is switched off. **TOTAL LOSS OF BRAKING.**



4. In the case of leaks in either the air **\*\*pipe\*\*** 'P' or vacuum pipe 'J' both front and rear brakes may still be applied by master cylinder pressure only. In this event, the primary piston is inoperative. The master cylinder pressure therefore operates front brakes direct, and rear brakes via the slave secondary piston. If the engine is switched off. NO ADDITIONAL EFFECT.



## FRONT DISCS

### Remove and refit

70.10.10

#### Removing

- \*\*1. Remove front hub — 60.25.01.
2. Remove brake pads — 70.40.02.

**CAUTION:** Do not operate brake pedal while disc is not in place.

3. Draw disc from between jaws of caliper.

#### Refitting

**CAUTION:** Use new self-locking nuts (knock on wheels).

4. Reverse operations 1 to 3 (bolts fit from outside to in-knock on wheels).

**NOTE:** Do not fit road wheel at this stage.

5. Check brake disc for 'run-out' by clamping a dial test indicator to stub axle carrier. Clamp indicator so that button bears on face of disc. 'Run-out' must not exceed .15 mm. (.006 in.).
6. Fit road wheel.\*\*

### REAR DISCS

#### Remove and refit – each

70.10.11

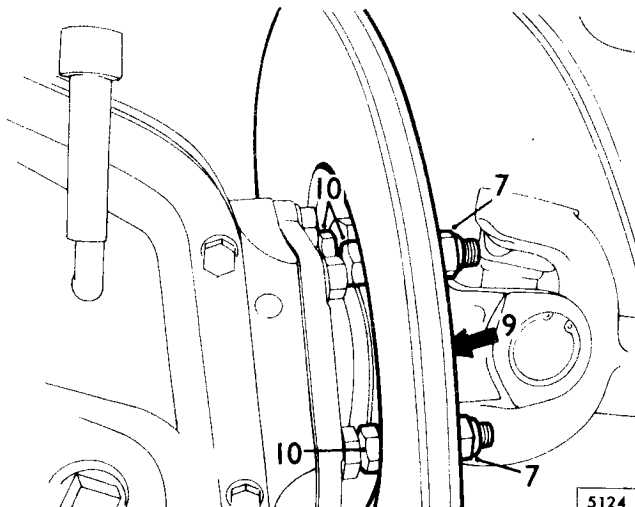
##### Removing

1. Remove rear suspension unit – 64.25.01.
2. Remove brake caliper – 70.55.03.
3. Invert suspension unit.
4. Remove hydraulic damper – 64.30.01.
5. Remove road spring – 64.20.01.
6. Release jubilee clip(s) and slide back half shaft inner universal joint shield (if fitted).
7. Remove four steel self locking nuts securing half shaft inner universal joint and brake disc to axle output shaft flange.
8. Withdraw half shaft from bolts.
9. Note number of camber shims between universal joint and brake disc.
10. Tap brake disc securing bolts back as far as possible.
11. Lift lower wishbone, hub carrier and half shaft assembly upwards until brake disc can be withdrawn from securing bolts.

**NOTE:** Do not disturb shims on axle flange.

##### Refitting

12. Position new disc against axle output shaft flange and tap securing bolts through.
13. Place camber shims removed in operation 9 on securing bolts.
14. Secure half shaft inner universal joint flange to axle output shaft flange using four new steel self locking nuts.
15. Check brake discs for 'run-out' by clamping a dial test indicator to suspension unit cross member. Clamp indicator so that button bears on face of disc. 'Run-out' must not exceed .15 mm. (.006 in.).
16. Reverse operations 2 to 6.
17. Use feeler gauges to check centralization of disc between caliper jaws. If necessary determine shims required. Remove caliper and disc, and fit shims between axle drive shaft and disc.
18. Replace brake caliper.
19. Refit rear suspension.
20. Check and, if necessary, adjust rear wheel camber – 64.25.18.



## DISC SHIELDS — FRONT

## Remove and refit

70.10.18

## Removing

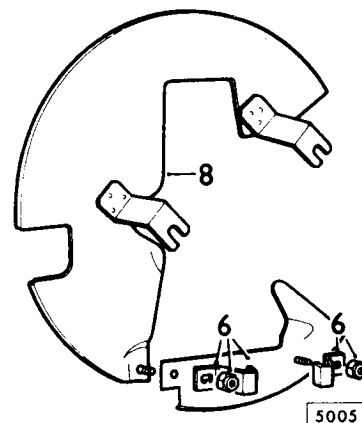
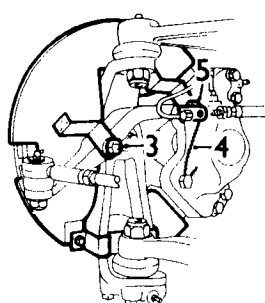
1. Remove road wheel — 74.20.01.
2. Place a stand beneath the lower wishbone at a point adjacent to the damper.
3. Slacken bolt securing steering arm to stub axle carrier.
4. Break and remove caliper securing bolt locking wire.
5. Slacken upper securing bolt.

**CAUTION:** Take care not to strain brake pipe bracket.

6. Remove self-locking nuts and clips securing lower shield assembly to stub axle carrier. Remove lower shield assembly.
7. Pull slotted brackets on upper shield assembly from beneath large washers.
8. Manoeuvre upper shield assembly clear of disc.

## Refitting

9. Offer disc shield into position so that slotted brackets locate beneath large washers on steering arm securing bolt and upper caliper securing bolt.
10. Fit lower shield assembly and securing brackets using self-locking nuts.
11. Tighten steering arm and caliper securing bolts. Torque 6.91 – 8.30 kg.m (50 – 60 lb.ft.).
12. Wire lock together both caliper securing bolts.
13. Remove stand.
14. Refit road wheel.



**WARNING:** Throughout the following operations absolute cleanliness must be observed to prevent grit or other foreign matter contaminating the brake system. If the system is to be flushed or cleaned through, ONLY Girling Brake Cleaner or methylated spirit must be used. Brake system components must be washed in methylated spirit and all traces of spirit removed before reassembly.

All brake system components must be dipped in clean brake fluid and assembled using the fingers only.

## BRAKES

### BRAKE HOSES

Remove and refit – each

Left hand – 70.15.02

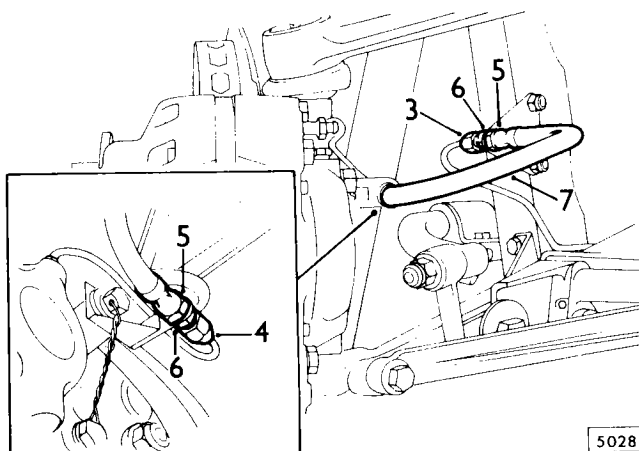
Right hand – 70.15.03

#### Removing

1. Remove road wheel – 74.20.01.
2. Place stand under wishbone at a point adjacent to damper.
3. Remove vehicle pipe connector at sub-frame bracket. Immediately plug pipe to prevent fluid loss.
4. Remove pipe connector to caliper.
5. Restrain hexagonal ends of hose.
6. Remove lock nuts.
7. Pull hose from brackets.

#### Refitting

8. Reverse operations 1 to 7, using a new shake proof washer beneath lock nuts.
9. Bleed brakes – 70.25.02.



### CENTRE HOSE

Remove and refit

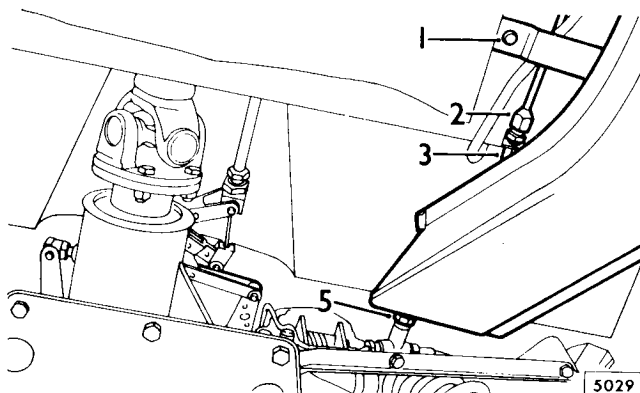
70.15.04

#### Removing

1. Remove two setscrews and one locknut securing left hand rear brake air scoop.
2. Remove vehicle pipe connector at brackets. Immediately plug pipe to prevent fluid loss.
3. Restrain hexagonal end of hose at bracket.
4. Remove lock nut and pull hose from bracket.
5. Remove hose from three way union on rear suspension unit cross member. Immediately plug three way union to prevent fluid loss.

#### Refitting

6. Reverse operations 1 to 5, using a new copper gasket at three way union, and a new shake proof washer beneath lock nut.
7. Bleed brakes – 70.25.02.



### BRAKE UNIONS

Front three way union – remove and refit

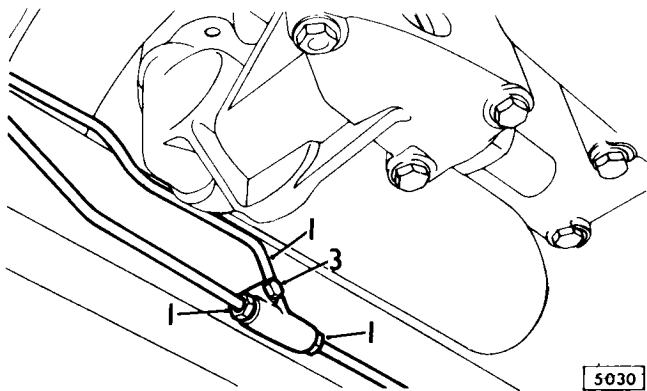
70.15.33

#### Removing

1. Remove pipe connectors from three way union.
2. Plug each pipe as it is freed to prevent fluid loss.
3. Remove nyloc nut, two plain washers and setscrew securing three way union to cross member.

#### Refitting

4. Reverse operations 1 to 3.
5. Bleed brakes – 70.25.02.

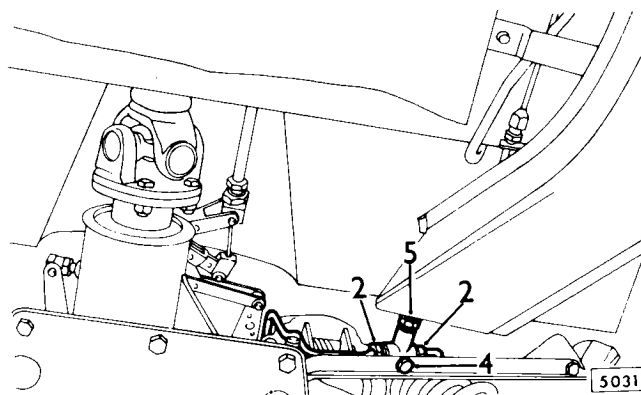


**Rear three way union – remove and refit****70.15.34****Removing**

1. Remove two setscrews and one locknut securing left hand rear brake air scoop.
2. Remove pipe connectors from ends of three way union.
3. Plug each pipe as it is freed to prevent fluid loss.
4. Remove setscrew, nut, spring and plain washers securing three way union to cross member.
5. Restrain hexagon end of flexible hose and screw off three way union.

**Refitting**

6. Reverse operations 1 to 5, using a new copper gasket between flexible hose and three way union.
7. Settle lay of flexible hose to remove as much twist as possible.
8. Bleed brakes – 70.25.02.

**\*\*PRESSURE DIFFERENTIAL WARNING ACTUATOR (P.D.W.A.)****Remove and refit****70.15.36****Removing**

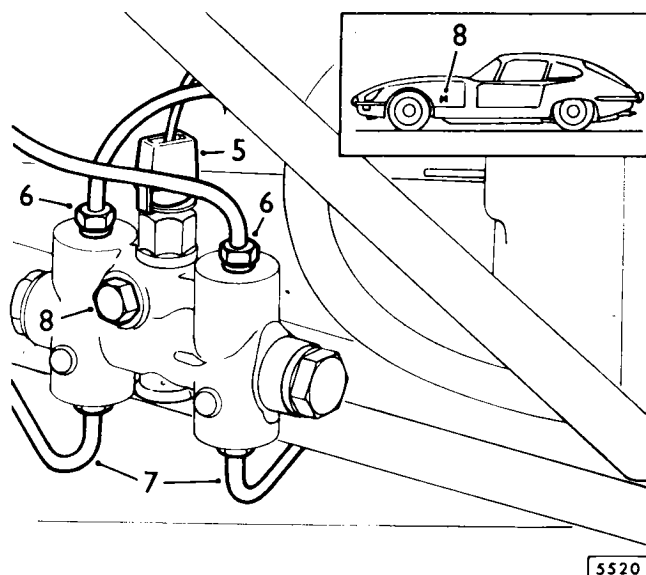
1. Disconnect battery – 86.15.17.
2. Remove reservac tank – 70.50.04.
3. Remove windscreen washer reservoir – 84.10.01.
4. Remove brake servo fluid reservoir – 70.30.17.
5. Disconnect electrical connector from P.D.W.A. switch.
6. Disconnect input pipes to P.D.W.A. plug pipes to prevent loss of fluid and ingress of dirt.

**NOTE:** Slacken input pipe connectors at servo slave cylinder swing pipes clear of P.D.W.A.

7. Disconnect output pipes from P.D.W.A. plug pipes.
8. Remove nut, spacer and bolt securing P.D.W.A. to bracket.

**Refitting**

9. Reverse operations 1 to 8.
10. Bleed brakes – 70.25.02.\*\*

**BRAKE PIPES****Feed pipe – brake servo to adaptor****Remove and refit****70.20.14****Removing**

1. Remove left hand undershield – 76.10.42.
2. At torsion bar reaction bracket disconnect out board pipe connectors from front of adaptor. Plug pipe and adaptor.
3. Remove windscreen washer reservoir – 84.10.01.
4. Remove pipe from front connector of brake slave cylinder. Plug connector outlet \*\*or pressure differential warning actuator (P.D.W.A.) if fitted;\*\* to prevent fluid loss.

**Refitting**

5. Reverse operations 1 to 4.
6. Bleed brakes – 70.25.02.





## BRAKES

### Bleed

70.25.02

Bleeding the brake system is not a routine maintenance operation and should only be necessary if the fluid level has been allowed to fall or a portion of the system has been disconnected. During the bleeding operation it is important that the level in the reservoir is kept topped up to avoid drawing air into the system. It is recommended that new fluid be used for this purpose, as fluid bled from the system may be aerated.

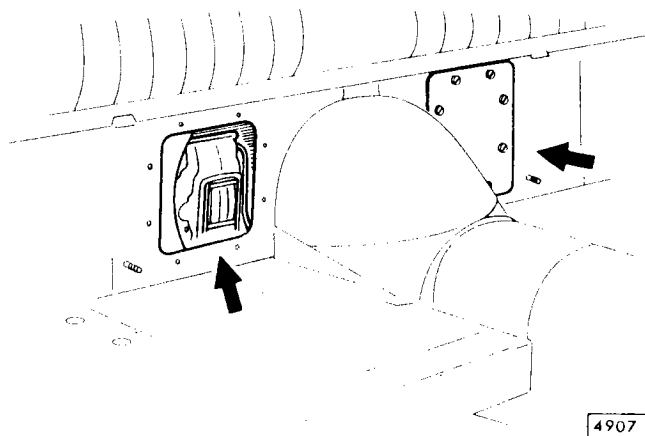
**\*\*NOTE:** If car is fitted with a pressure differential warning actuator (P.D.W.A.), items 20 to 24 must also be carried out.\*\*

1. Check that all connections are tightened and both front bleed screws closed.
2. Ensure both fluid reservoirs are filled with fluid of correct specification.
3. Remove rear seat lower squab - 76.70.40.
4. Remove eight drive screws securing each inspection plate and remove plates. Remove all sealer.
5. Check left hand bleed screw closed.
6. Attach bleeder tube to bleed screw on right hand brake caliper and immerse open end of tube in clean glass jar containing a little clean brake fluid.
7. Slacken bleed screw.
8. Operate brake pedal slowly backwards and forwards through full stroke until fluid pumped into jar is reasonably free of bubbles.

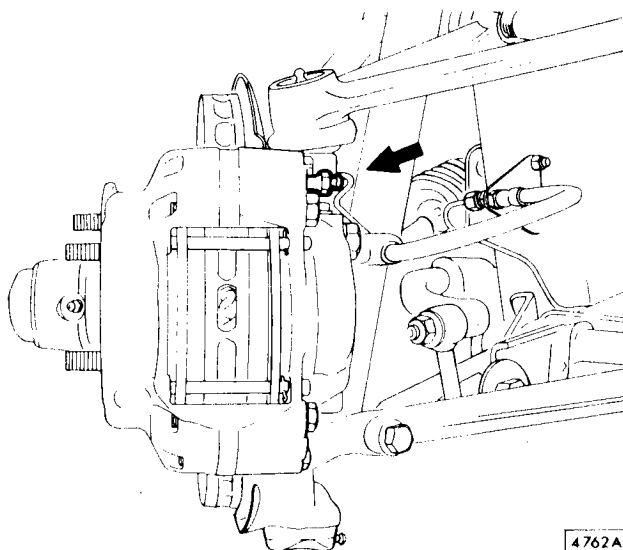
**NOTE:** Check fluid level in both reservoirs at regular intervals and replenish as necessary.

9. Keep pedal fully depressed and close bleed screw.
10. Repeat operations 6 to 9 inclusive to bleed left hand rear brake then continue with operation 11.
11. Repeat for each front brake in turn.
12. Repeat complete sequence for bleeding brakes until brake fluid pumped into jar is completely free from air bubbles.
13. Finally check tighten all bleed screws. Fit caps.
14. Regulate fluid level in both reservoirs.
15. Apply normal working load to brake pedal for two or three minutes to ensure pedal position does not change. If pedal moves, the system is not sufficiently bled or has a leak or faulty seal. The cause must be ascertained and rectified, and the brakes re-bled.
16. Check complete system for evidence of fluid leakage.
17. Apply suitable waterproof sealing compound around inspection plates. Use new gaskets.
18. Secure each inspection plate in position using eight drive screws.
19. Replace rear seat lower squab.
- \*20. Run engine when bleeding brakes.
21. Only light pedal pressure is required.
22. Pedal must not be pushed through at end of stroke.
23. Never check feel of pedal until system is fully bled.
24. On completion of bleeding operation carry out P.D.W.A. operation check and reset if necessary see operation 70.25.08.

**NOTE:** Any of operations 20 to 24, if not carried out correctly can cause the P.D.W.A. to operate.\*\*



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## BRAKE SYSTEM – FLUSH

## Drain, flush and bleed

70.25.17

## Draining

1. Loosen front road wheel fastenings.
2. Jack up front of car.
3. Place stands under cross tube brackets beneath lower wishbone rear fulcrum supports.
4. Remove front road wheels.
5. Remove rear seat lower squab - 76.70.40.
6. Remove eight drive screws securing each inspection plate and remove plates. Remove all sealer.
7. Attach bleeder tube to left hand rear caliper bleed screw and place end in suitable container.

**NOTE:** It is imperative that the rear brakes are drained before the front. Once the front brake system is drained, it is impossible to operate the rear brakes from the master cylinder unless the engine is running.

8. Loosen bleed screw.
9. Operate brake pedal slowly backwards and forwards through full stroke until slave cylinder reservoir is empty.
10. Attach another bleeder tube to right hand rear caliper bleed screw.
11. Place end of tube in suitable container, loosen bleed screw and again operate brake pedal until no fluid is expelled.
12. Remove clips and pins retaining both sets of rear brake pads.

**WARNING: DO NOT OPERATE BRAKE PEDAL WHILE PADS ARE REMOVED.**

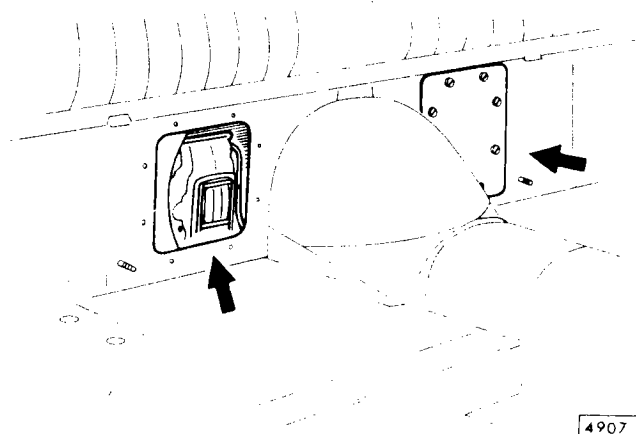
13. Remove pads from rear calipers and lever pistons back into bores to expel trapped fluid.
14. REPLACE REAR BRAKE PADS.

**NOTE:** It is not necessary to replace retaining pins and clips at this time.

15. Repeat above procedures 7 to 14 inclusive on front calipers to drain front brake system. Operate pedal until master cylinder fluid reservoir is empty, then continue as detailed. Remove containers of expelled fluid, DISCARD FLUID, and replace containers. Continue with operation 16 on completion.
16. Close both front caliper bleed screws.

## Flushing

17. Fill both fluid reservoirs with Castrol Girling Brake Flushing Fluid.
18. Operate brake pedal slowly through full stroke until clean flushing fluid is expelled from both rear bleed screws.



## \*\*PRESSURE DIFFERENTIAL WARNING ACTUATOR

## Check and reset

70.25.08

1. Switch on ignition. 'Brakes' warning light illuminates.
2. Release handbrake if warning light remains illuminated, proceed with item 3.
3. Check brake reservoir fluid level, top up as necessary. If warning light is still illuminated, proceed with item 4.
4. Disconnect electrical connector from P.D.W.A. switch.

If warning light goes out P.D.W.A. has operated, if warning light remains illuminated check for a short in electrical circuit of the brake warning switches.

**WARNING: IF WARNING LIGHT GOES OUT IN OPERATIONS 1 to 3 P.D.W.A. HAS NOT OPERATED.**

## Reset

1. Switch on ignition and run engine, release handbrake, ensure that brake reservoir is full and brake warning light illuminated.
2. Using suitable container and bleed tube attached to FRONT right-hand bleed nipple apply gentle pressure to brake pedal. Slacken bleedscrew and slowly increase brake pedal pressure until P.D.W.A. resets and warning light goes out.

**WARNING: AS P.D.W.A. RESETS, IMMEDIATELY REFRAIN FROM INCREASING BRAKE PEDAL PRESSURE AS ADDITIONAL PRESSURE MAY TRIP P.D.W.A. IN OPPOSITE DIRECTION.**

3. Hold pedal stationary and close bleed screw.
4. If warning light goes out and immediately illuminates, P.D.W.A. has tripped in opposite direction and operations 2 and 3 must be carried out on left-hand REAR bleed nipple.
5. Continue operations 2 to 4 alternately until warning light is permanently out.
6. Apply operating pressure to brake pedal, check 'Brake' warning light does not illuminate.
7. Switch off ignition, apply handbrake, refit bleedscrew covers and check system for any fluid leakage.\*\*

70.25.08  
70.25.17



**NOTE:** Keep both reservoirs topped up with flushing fluid.

19. Close both rear brake bleed screws and operate pedal two or three times.
20. Open both front bleed screws, and operate pedal until clean flushing fluid is expelled from both front bleed screws.
21. Close both bleed screws and operate pedal two or three times.
22. Open both rear bleed screws and operate pedal until no fluid is expelled.

**WARNING: DO NOT OPERATE BRAKE PEDAL WHILE PADS ARE REMOVED.**

23. Remove pads from rear calipers and lever pistons back into bores to expel trapped fluid.
24. **REPLACE REAR BRAKE PADS.**
25. Secure rear pads with retaining pins and clips.
26. Loosen both front bleed screws.
27. Operate brake pedal slowly through full stroke until no fluid is expelled.

**WARNING: DO NOT OPERATE BRAKE PEDAL WHILE PADS ARE REMOVED.**

28. Remove pads from front calipers and lever pistons back into bores to expel trapped fluid.
29. **REPLACE FRONT BRAKE PADS.**
30. Secure front pads with retaining pins and clips.
31. Fit anti-chatter springs.
32. Close bleed screws on front and rear calipers.
33. Remove fluid containers, discard fluid, and replace containers.

### Refilling

34. Fill both brake reservoirs with new brake fluid of correct specification.
35. Loosen left hand rear bleed screw.

**NOTE:** Throughout the following operations, check fluid levels at regular intervals and replenish as necessary.

36. Operate brake pedal slowly backwards and forwards through full stroke until fluid pumped into jar is absolutely clean and reasonably free from bubbles.
37. Keep pedal depressed and close bleed screw.
38. Repeat operations 36 and 37 on right hand rear caliper, and right and left hand front calipers in turn. Continue with these operations in turn on all calipers until fluid is completely free from bubbles.
39. Regulate fluid level in both reservoirs.
40. Apply normal working load to brake pedal for two to three minutes to ensure pedal position does not change. If pedal moves, the system is not sufficiently bled or has a leak or faulty seal. The cause must be ascertained and rectified, and the brakes re-bled.

41. Check complete system for signs of fluid leakage.
42. Check tightness of all bleed screws. Fit caps.
43. Apply suitable waterproof sealing compound around inspection plates. Use new gaskets.
44. Secure each inspection plate in position using eight drive screws.
45. Replace rear seat lower squab.
46. Remove stands.
47. Fit front road wheels.



## MASTER CYLINDER

Left hand drive – remove and refit

70.30.01

## Removing

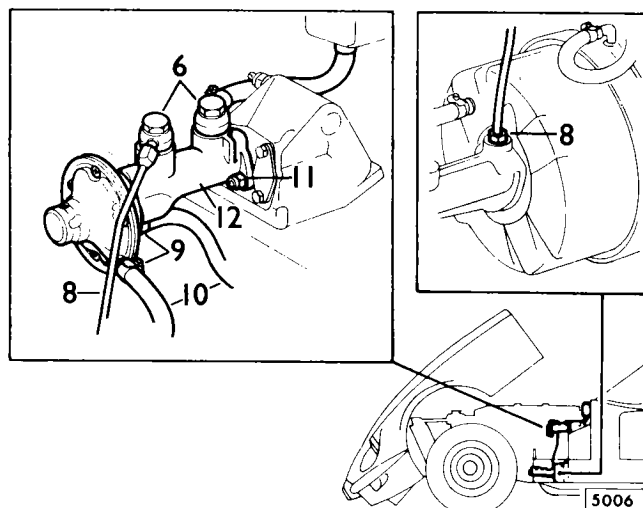
1. Disconnect battery – 86.15.17.
2. Remove left hand air cleaner – 19.10.01.
3. **Cars fitted with manual transmission**  
Release nyloc nut securing brake master cylinder and clutch reservoirs. Re-secure clutch reservoir.
4. **Cars fitted with automatic transmission**  
Remove nyloc nut and bolt retaining reservoir.
5. Taking great care to avoid spilling hydraulic fluid on paintwork, empty brake reservoir into a suitable container.
6. Release two banjo connectors on top of master cylinder.

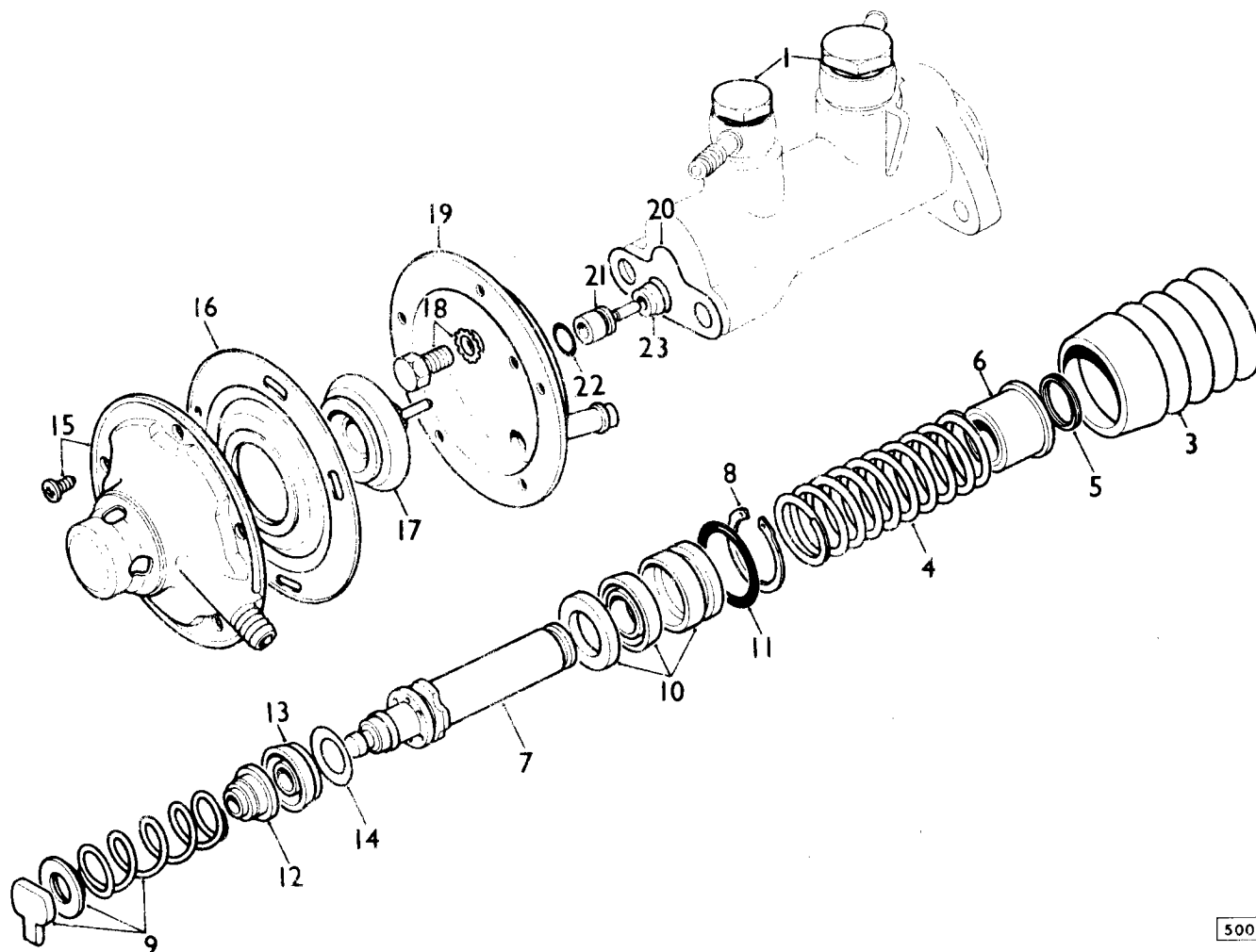
**NOTE:** Temporarily refit banjo bolt to retain valve trap assembly in outlet port.

7. Remove windscreen washer reservoir – 84.10.01.
8. Slacken connector nearest to servo vacuum shell and move pipe clear of brake master cylinder.
9. Loosen pipe clips securing air pipes to reaction valve.
10. Pull air pipes from reaction valve.
11. Remove two nyloc nuts securing brake master cylinder to pedal box studs.
12. Draw master cylinder from studs, leaving push rod attached to pedal.

## Refitting

13. Locate replacement master cylinder rubber boot over brake pedal push rod.
14. Reverse operations 6 to 11 using new copper gaskets on banjo fittings.
15. Secure brake fluid and clutch reservoirs in position. Ensure neither feed pipe is kinked or twisted.
16. Fill reservoir with hydraulic fluid of the correct type.
17. Fit left hand air cleaner.
18. Bleed brakes – 70.25.02.
19. Connect battery.
20. Check that brake pedal has approximately 3.17 mm (.125 in.) free movement before resistance of master cylinder is felt.
21. If necessary release lock nut and adjust to achieve this result.
22. Ensure brake light switch still functions correctly. Reset if necessary – 86.65.51.





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## MASTER CYLINDER AND REACTION VALVE ASSEMBLY

### Overhaul

Left hand — 70.30.02  
Right hand — 70.30.04

### Service tool

circlip pliers — 7066

Differences between master cylinders fitted to right and left hand drive vehicles are minimal. The deviation is given in text.

Before dismantling the master cylinder and reaction valve assembly, it is advisable to obtain the repair kits containing all parts necessary during overhaul. The kits are:—

- (a) Reaction valve repair kit.
- (b) Master cylinder repair kit.

### Dismantling

1. Remove banjo connector bolts.
2. Recover trap valve assembly from outlet port.
3. Remove rubber boot.
4. Compress return spring.
5. Remove spiral circlip.
6. Recover spring retainer and return spring.
7. Press piston down bore and hold.
8. Use special circlip pliers (Tool number 7066) to remove circlip.

**CAUTION:** Do not damage the surface finish of the piston.

9. Withdraw piston assembly followed by spring, spring retainer and lever.  
'O' ring seal may enter circlip groove and make withdrawal difficult. **Thickly pad** jaws of a pair of pliers to extract piston assembly if this happens.
10. Withdraw bearing and secondary cup assembly from piston.
11. Withdraw 'O' ring from bearing.
12. Due to the plastic spring retainer being an interference fit on the piston, it will probably be damaged during dismantling. To remove the spring retainer hold the piston head **downwards** on a bench and apply a downward force to the back of the spring retainer using a slim open end spanner.
13. Remove main cup.
14. Remove piston washer.
15. Remove five screws retaining reaction valve cover. Prise clear.
16. Remove diaphragm.
17. Peel diaphragm from diaphragm support.
18. Remove two screws and shakeproof washers.
19. Remove valve housing.
20. Remove and discard gasket.
21. Remove valve piston by inserting a blunt screwdriver into master cylinder output port. Ease valve along its bore until it can be removed by hand.
22. Remove 'O' ring from piston.
23. Remove seal from piston.

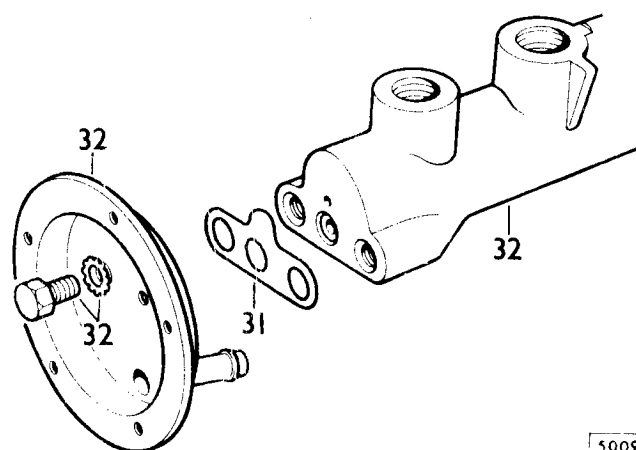
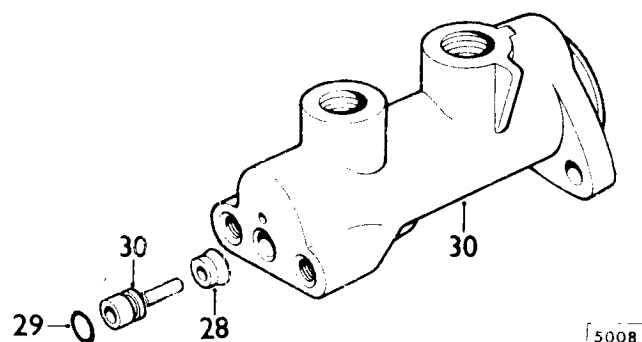


### Inspection

24. Check bores and pistons for scoring or pitting.
25. Wash all components in methylated spirit or Girling Brake Cleaner.
26. Thoroughly dry with lint free cloth.
27. Liberally smear 'O' ring seals and plastic bearings with disc brake lubricant.

### Reassembling

28. Using fingers only, fit seal.
29. Fit 'O' ring.
30. Moisten piston with clean brake fluid and insert assembly into master cylinder body.
31. Place new gasket in position.
32. Secure valve housing to master cylinder body using two screws and shakeproof washers. Torque screws to 1.8 -- 2 kg/m (13.3 -- 15 lbs.ft.).
33. Stretch diaphragm on to diaphragm support.
34. Ensure that flex of diaphragm is correct way round.
35. Place diaphragm support through hole in master cylinder body to engage depression in valve piston. Locate slots in diaphragm centrally over screw holes.

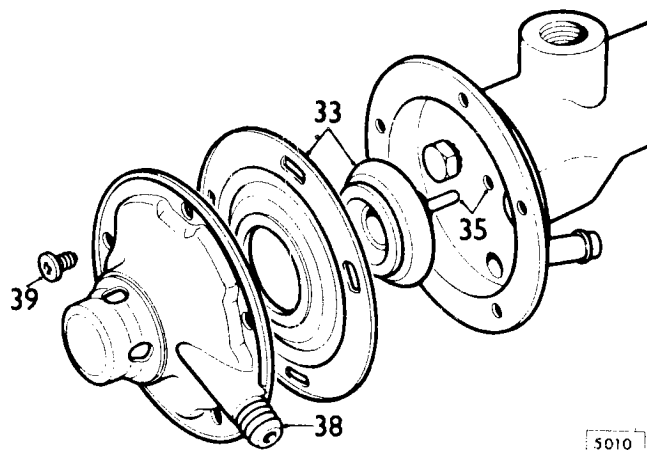


### Right hand drive vehicle

36. Locate replacement valve cover with air hose connection in line with valve housing air hose connection. Ensure moulded bosses on valve cover locate with slots in diaphragm.
37. Secure with five screws.

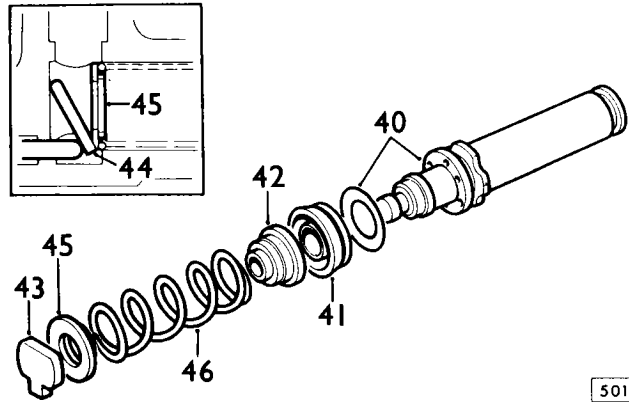
### Left hand drive vehicle

38. Locate replacement valve cover with air hose connection to right hand side viewed from filter end. Ensure moulded bosses on valve cover locate with slots in diaphragm.
39. Secure with five screws.



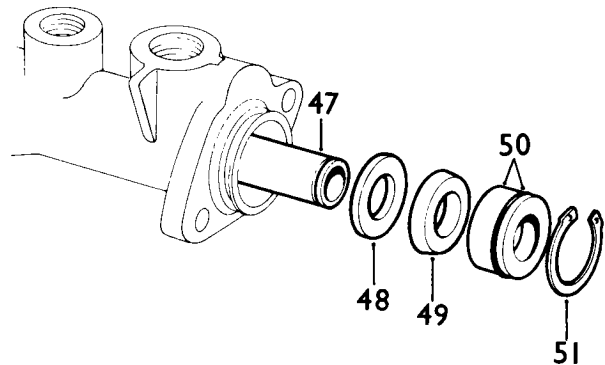
## All vehicles

40. Fit replacement piston washer to main piston, convex face towards piston flange.
41. Fit replacement main cup to piston.
42. Press new plastic spring retainer into position.
43. Hold master cylinder body at an angle of 25 degrees to horizontal and insert lever, tab foremost into bore.
44. Ensure that when lever reaches bottom of bore tab drops into recess. If necessary press the reaction valve piston forward with a blunt screwdriver fed through fluid outlet port.
45. Drop pressed steel spring retainer into bore. Ensure it locates square, and right way up.
46. Drop piston return spring into bore.



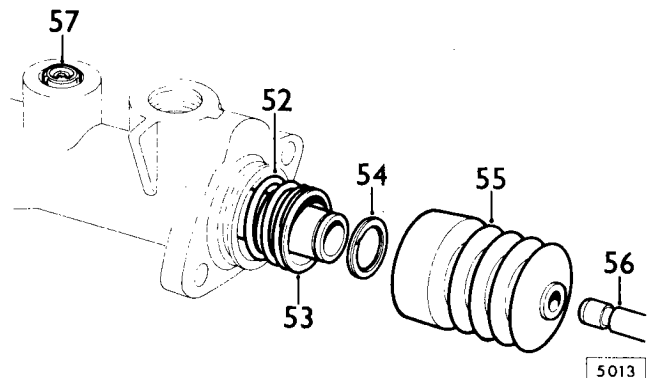
5011

47. Lubricate main cup with clean brake fluid and place piston in bore.
48. Slide rectangular section plastic bearing on to piston.
49. Slide secondary cup on to piston and lubricate with clean brake fluid.
50. Fit 'O' ring seal to plastic bearing and slide on to piston over secondary cup.
51. Press bearing assembly down as far as possible and, using special tool 7066 with K points, fit circlip to retain internal parts.



5012

52. Locate larger piston return spring over piston.
53. Place pressed steel spring retainer in position and compress spring to fullest extent.
54. Secure spring and spring retainer with spiral circlip.
55. Fit replacement rubber boot to groove.
56. Enter round ended rod through rubber boot to engage in piston. Check piston for freedom of operation.
57. Place trap valve in outlet port.
58. Temporarily replace banjo connector bolts.



5013

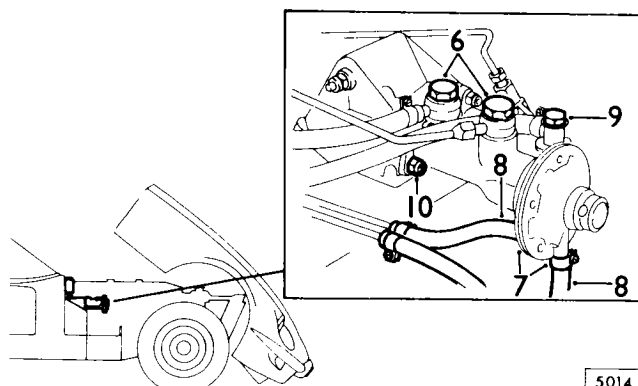
## MASTER CYLINDER

Right hand drive – remove and refit

70.30.03

## Removing

1. Disconnect and remove battery – 86.15.01.
  2. Remove right hand air cleaner – 19.10.01.
  3. **Cars fitted with manual transmission**  
Release nyloc nut securing brake master cylinder and clutch reservoirs.
  4. **Cars fitted with automatic transmission**  
Remove nyloc nut and bolt retaining reservoir.
  5. Taking great care to avoid spilling hydraulic fluid on paintwork, empty both reservoirs into a suitable container.
  6. Release two banjo connectors on top of master cylinder.
- NOTE:** Temporarily refit banjo connector bolts to retain valve trap assembly in outlet port.
7. Loosen pipe clips securing air pipes to reaction valve.
  8. Pull air pipes from reaction valve.
  9. On cars fitted with manual transmission, release feed pipe banjo at front connector of clutch master cylinder.
  10. Remove two nyloc nuts securing brake master cylinder to pedal box studs.
  11. Draw master cylinder from studs, leaving push rod attached to pedal.



5014

## Refitting

12. Locate replacement master cylinder rubber boot over brake pedal push rod.
13. Reverse operations 6 to 10, using new copper gaskets on banjo fittings.
14. Secure brake fluid and clutch reservoirs in position. Ensure neither feed pipe is kinked or twisted.
15. Fill reservoir with hydraulic fluid of the correct type.
16. Fit right hand air cleaner.
17. Bleed brakes – 70.25.02.
18. On cars fitted with manual transmission bleed clutch hydraulic system – 33.15.01.
19. Fit and connect battery.
20. Check that brake pedal has approximately 3.17 mm (.125 in.) free movement before resistance of master cylinder is felt.
21. If necessary release locknut and adjust to achieve this result.
22. Ensure brake light switch still functions correctly. Reset if necessary – 86.65.51.



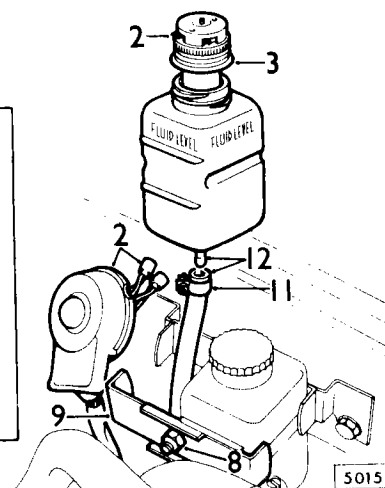
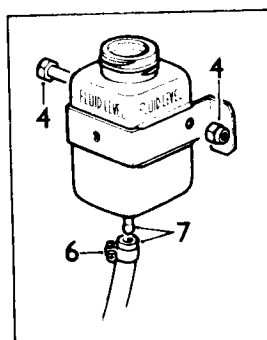
## FLUID RESERVOIR – MASTER CYLINDER

### Remove and refit

70.30.16

#### Removing

1. Disconnect battery -- 86.15.19.
2. Remove reservoir cap/cover and disconnect cables.
3. Remove reservoir cap and filter assembly.
4. **Cars fitted with automatic transmission**  
Remove nyloc nut and bolt securing reservoir.
5. Drain reservoir into suitable container.
6. Release pipe clip.
7. Pull pipe from spigot at base of reservoir.
8. **Cars fitted with manual transmission**  
Remove one nyloc nut securing reservoir clip.
9. Temporarily replace clip to secure clutch reservoir.
10. Drain reservoir into suitable container.
11. Release pipe clip.
12. Pull pipe from spigot at base of container.



#### Refitting

13. **Cars fitted with automatic transmission**  
Reverse operations 1 to 4. Continue with operation 12.
14. **Cars fitted with manual transmission**  
Reverse operations 5 to 9. Continue with operation 12.
15. Bleed brakes -- 70.25.02.
16. Fit reservoir cap and electrical connectors.

## FLUID RESERVOIR – SLAVE CYLINDER

### Remove and refit

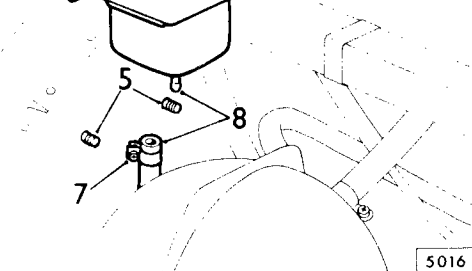
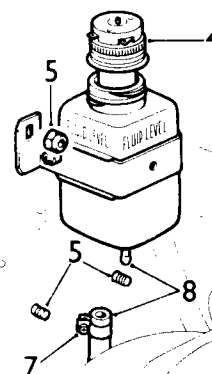
70.30.17

#### Removing

1. Disconnect battery -- 86.15.19.
2. Remove windscreen washer bottle -- 84.10.01.
3. Remove reservoir cap cover and disconnect cables.
4. Remove reservoir cap and switch assembly.
5. Remove two set screws and nyloc nuts securing reservoir bracket.
6. Drain reservoir into suitable container.
7. Release pipe clip.
8. Pull pipe from spigot at base of reservoir.

#### Refitting

9. Reverse operations 1 to 8.
10. Bleed brakes -- 70.25.02.



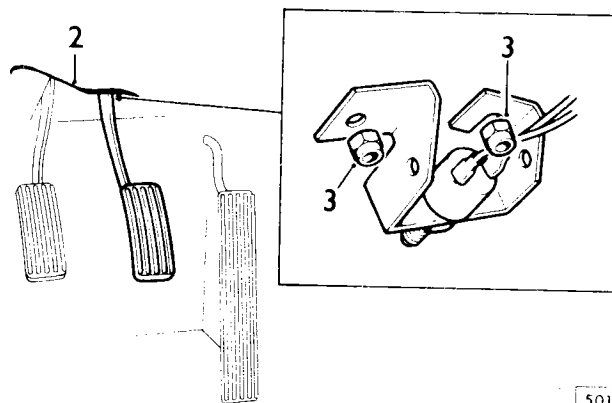
# PEDAL ASSEMBLY

## Remove and refit

70.35.01

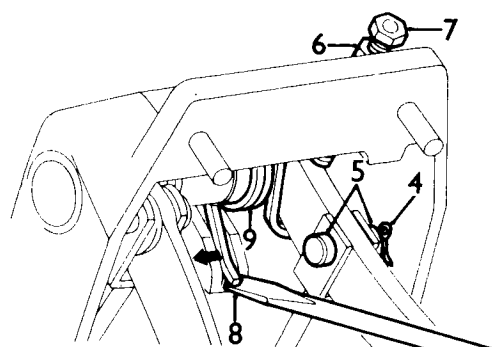
### Removing

1. Disconnect battery — 86.15.19.
2. Inside car pull back trim at top of drivers footwell.
3. Remove two nyloc nuts securing brake light switch.



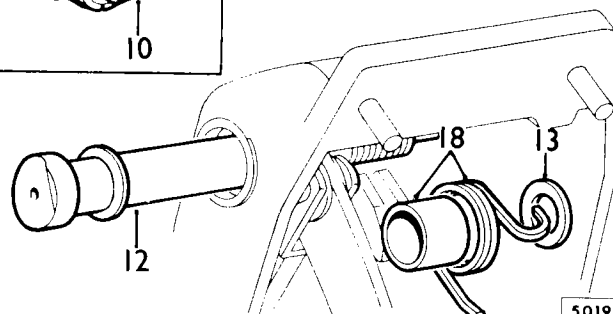
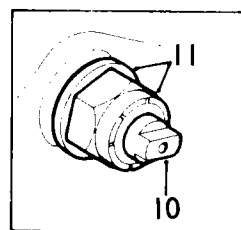
5017

4. Remove split pin from brake push rod yoke.
5. Remove plain washer and clevis pin.
6. Loosen brake pedal stop locknut.
7. Remove setscrew from pedal box.
8. Using a large screwdriver prise brake pedal return spring from high, narrow abutment on opposite side to pedal.
9. Push spring sideways on to spacer.
10. Hold flats on end of pedal shaft in suitable spanner.



5018

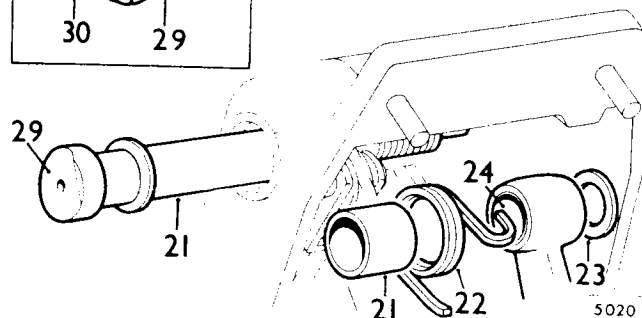
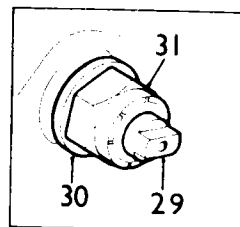
11. Remove nyloc nut and recover plain washer.
12. Carefully tap shaft into housing sufficiently far to free brake pedal. Use a soft drift small enough to pass through brake pedal bush.
13. Remove fibre washer from recess in pedal box.
14. Remove nut securing pedal pad to brake pedal.
15. Check plastic coating of pedal boss bearing bushes. If the coating has picked up or is badly scored the bushes must be replaced as follows:-
16. Remove worn bearing bushes by gently tapping right through pedal boss with suitably sized drift.
17. Fit new bushes, one from each side, using a suitably sized stepped drift. Bush must be square to pedal boss when insertion commences.
18. Remove spacer and brake pedal spring from pedal shaft.
19. Check shaft for scoring or burrs.
20. Check ends of spacer for signs of undue wear.



5019

### Refitting

21. Lightly oil pedal shaft and place spacer in position.
22. Place return spring on spacer so that long straight leg of spring is alongside narrow spring abutment.
23. Place new fibre washer in recess.
24. Oil bushes in pedal boss.
25. Hold pedal in position next to spacer so that stepped flat on foot of pedal is towards front of car.
26. Carefully tap pedal shaft into box to collect pedal boss.
27. Ensure pedal moves freely.
28. Ensure fibre washer sits squarely in recess.
29. Using flats on shaft end, rotate shaft until the chamfers on pedal box and shaft end line up.
30. Fit plain washer to shaft.
31. Lightly secure with nyloc nut.

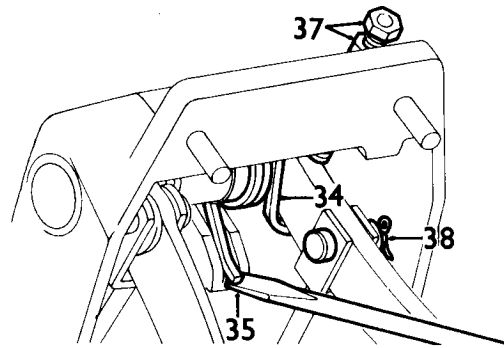


5020



## BRAKES

32. Ensure fibre washer still in recess, then fully tighten nut. Torque 2.5 to 3.0 kg.m (18 to 22 lb.ft.).
33. Check pedal moves freely.
34. Hook return spring around pedal arm.
35. Using a large screwdriver, lever straight arm of return spring on to spring abutment.
36. Use screwdriver to tap spring on to pedal boss.
37. Fit pedal stop and locknut.
38. Using clevis pin, plain washer and new split pin, secure pedal arm to brake push rod yoke.
39. Set pedal stop so that brake pedal pad has approximately 3.17 mm. (1.25 in.) free movement before resistance of master cylinder is felt.
40. Tighten lock nut.
41. Fit brake light switch and secure with two nyloc nuts.
42. Connect battery.
43. Adjust stop light switch as necessary – 86.65.56.
44. Replace trim.
45. Fit pedal pad and secure with nut.



5021

### PEDAL BOX

#### Remove and refit

70.35.03

##### Removing

1. Remove brake master cylinder – Left hand drive cars – 70.30.01 – Right hand drive cars – 70.30.03.
2. Remove nut securing brake pedal pad.

#### Cars with manual transmission only

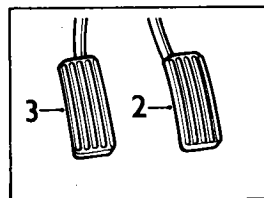
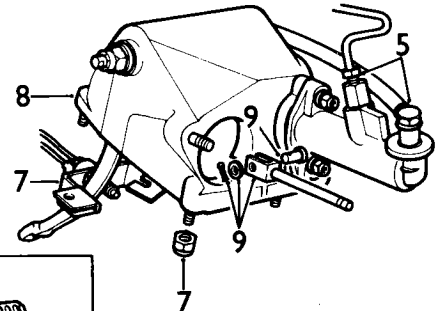
3. Remove nut securing clutch pedal pad.
4. Drain clutch hydraulic fluid reservoir.
5. Disconnect pipes to clutch master cylinder.

#### Left hand drive only

6. Remove heater unit – 80.20.01.

#### All cars

7. Move footwell trim as necessary, and remove five self-locking nuts and washers securing pedal box; recover brake light switch.
8. Lift pedal box from scuttle. Remove all traces of gasket.
9. Remove split pin securing clevis pin at brake pedal push rod. Withdraw rod.



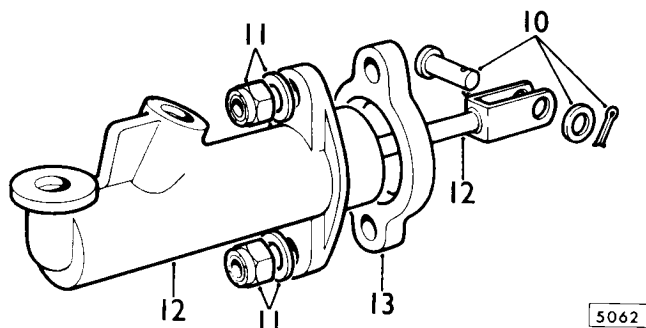
5023

**Cars with manual transmission only**

10. Remove split pin securing clevis pin at clutch pedal push rod.
11. Remove self-locking nuts and washers securing clutch master cylinder to pedal box.
12. Withdraw master cylinder and push rod.
13. Recover spacer.

**Refitting**

14. Reverse operations 1 to 13, using new split pins where appropriate.
15. Adjust stop light switch - 86.65.56.



**Cars with manual transmission only**

16. Bleed clutch hydraulic system 33.15.01.

**PEDAL BOX**

**Overhaul**

70.35.04

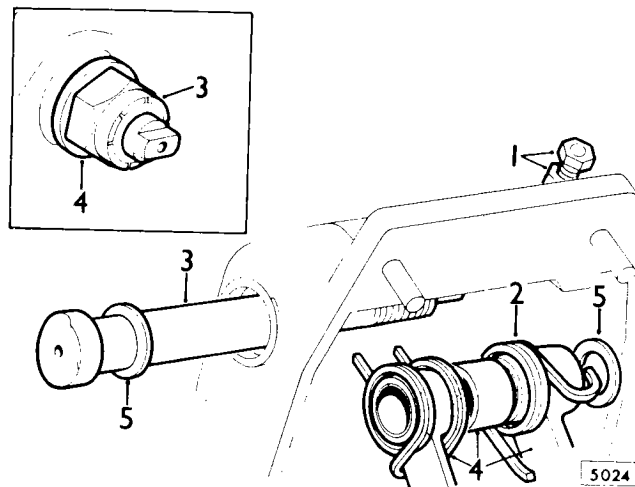
**Dismantling**

1. Release brake pedal adjustment setscrew and locknut.
2. Prise brake pedal spring from abutment.
3. Release locknut from pedal shaft and carefully drift shaft from box.
4. Recover one plain washer, clutch pedal (when fitted) brake pedal and spacer.
5. Remove and discard fibre washer from recess in pedal box. Remove and discard fibre washer from pedal shaft.

**NOTE:** One fibre washer only is fitted to automatic transmission cars.

**Reassembling**

6. Enter pedal shaft into box from clutch master cylinder side.

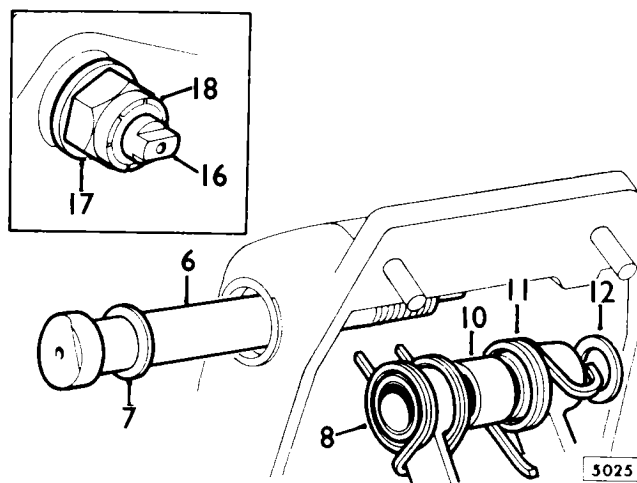


**Cars with manual transmission only**

7. Place new fibre washer on shaft.
8. If clutch pedal return spring has been removed, fit to pedal boss.
9. Fit clutch pedal on to shaft so that legs of spring rest on abutment when pedal installed, and stepped flat on pedal arm is towards master cylinder mountings.

**All cars**

10. Fit spacer to shaft.
11. Place brake pedal return spring on spacer so that long straight leg of spring is alongside narrow spring abutment.
12. Place new fibre washer in recess.
13. Hold brake pedal in position so that stepped flat on foot of pedal is towards master cylinder mountings.
14. Carefully tap pedal shaft into box. Ensure pedal/s move freely.
15. Ensure fibre washer sits squarely in recess.
16. Using flats on shaft end, rotate shaft until the chamfers on pedal box and shaft end line up.
17. Fit plain washer to shaft.
18. Lightly secure with self-locking nut.



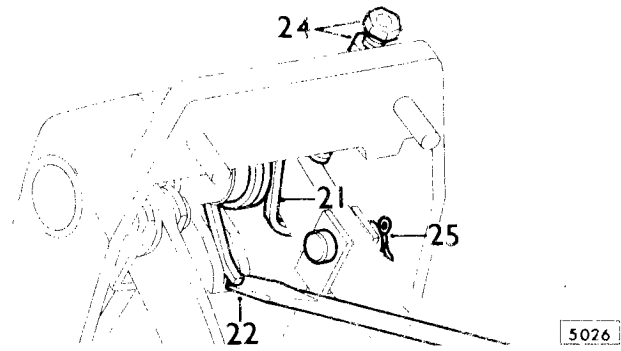
19. Ensure fibre washer still in recess, and fully tighten nut. Torque 2.5 to 3.0 kg.m. (18 to 22 lb.ft.).
20. Ensure pedal/s move freely.
21. Hook brake return spring round pedal arm.
22. Using a large screwdriver, lever straight arm of return spring on to spring abutment.
23. Use screwdriver to tap spring on to pedal boss.
24. Fit brake pedal stop screw and locknut.
25. Fit brake master cylinder push rod and secure with clevis pin, plain washer and new split pin.

## Cars with manual transmission only

26. Fit spacer to clutch master cylinder mounting studs.
27. Fit clutch master cylinder and secure with two plain washers and self-locking nuts. Torque 1.8 kg.m (13 lb.ft.).
28. Secure clutch master cylinder push rod to pedal arm using clevis pin, plain washer and new split pin.

## All cars

29. Refit pedal box to vehicle loosely securing brake light switch until refitting is complete.
30. Adjust brake light switch and tighten two nuts.



## HANDBRAKE LEVER ASSEMBLY

### Remove and refit

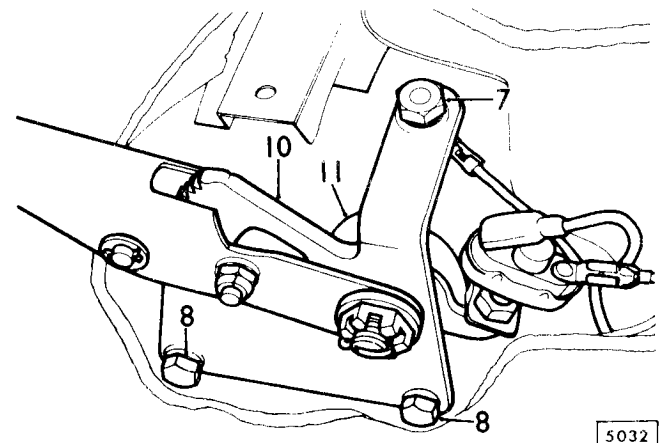
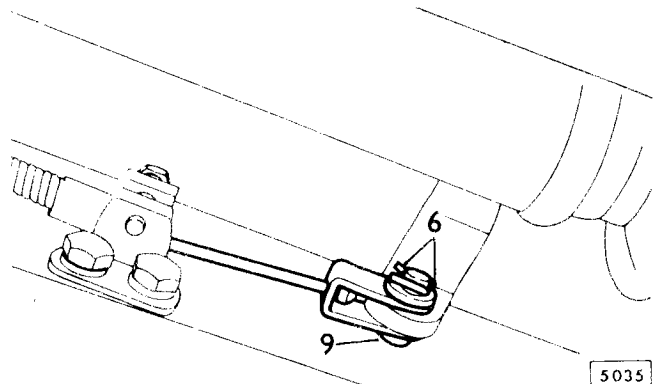
70.35.08

#### Removing

1. Disconnect battery – 86.15.19.
2. Remove left hand front seat – 76.70.01.
3. Remove console assembly – 76.25.01.
4. Remove exhaust system complete – 30.10.01.
5. Remove six setscrews, plain washer and shakeproof washers securing main heatshield.
6. Remove split pin and plain washer retaining clevis pin in cable yoke.

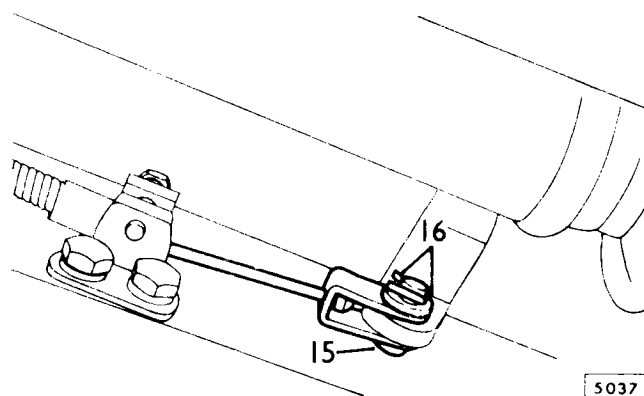
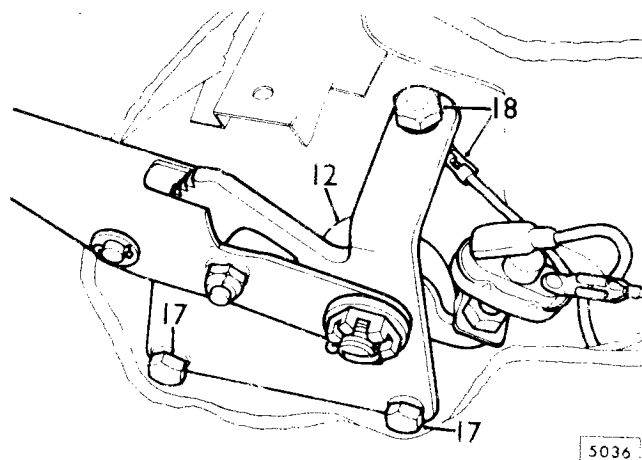
**NOTE:** It will probably not be possible to withdraw clevis pin.

7. Remove one setscrew, lock washer, and spacer securing top of handbrake plate to tunnel.
8. Remove two setscrews and shakeproof washers securing bottom of handbrake plate to tunnel.
9. Beneath car, free clevis pin from cable yoke.
10. Remove handbrake lever assembly from tunnel.
11. Recover one rubber seal.



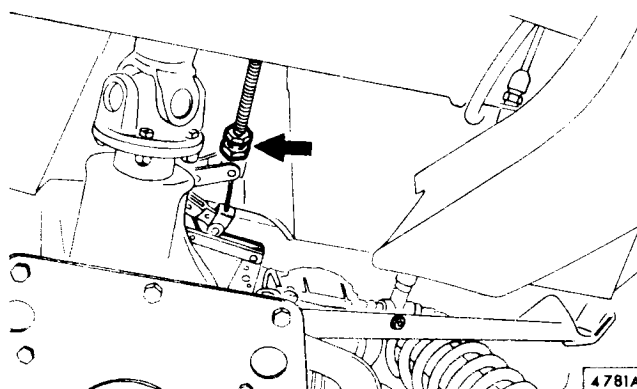
**Refitting**

12. Lightly grease new rubber seal and slide over hand brake lever arm.
13. Pass lever arm through hole in tunnel.
14. Strike hand brake assembly sharply with a hammer to finally locate in tunnel.
15. Secure cable yoke to lever with clevis pin fitted in direction shown.
16. Retain with plain washer and new split pin.
17. Smear threads of two set screws in suitable waterproof sealing compound and, using shakeproof washers, secure bottom of plate to tunnel.
18. Smear thread of one setscrew with waterproof sealing compound and secure top of plate to tunnel. Use one shakeproof washer beneath set screw head, and spacer beneath plate. Fit electrical terminal between plate and spacer.
19. Set handbrake fully off.
20. Use large screwdriver as lever to obtain correct clearance.
21. Check handbrake cable adjustment – 70.35.10.
22. Fit main heatshield and secure using six setscrews, plain washers and shakeproof washers.
23. Fit exhaust system complete.
24. Connect battery.
25. Check adjustment of handbrake warning switch, operation 4 to 10 – 86.65.46.
26. Refit console assembly.
27. Refit left hand front seat.

**HANDBRAKE CABLE****Adjust****70.35.10**

1. Set handbrake to fully off position.
2. Slacken locknut at rear end of handbrake cable.
3. Screw out threaded adaptor until handbrake operating levers at caliper just start to move.
4. Slacken off one half turn of adaptor and secure locknut.

**NOTE:** When correctly adjusted a certain amount of slack will be apparent in the cable. No attempt should be made to place the cable under tension, or the handbrake may bind.



## CABLE ASSEMBLY

### Remove and refit

70.35.16

#### Removing

1. Set handbrake fully off.
2. Remove exhaust system complete — 30.10.01.
3. Remove six setscrews, plain washers and shakeproof washers securing main heatshield.
4. Remove pinch bolt and spring washer securing cable in cable abutment. Pull cable clear.
5. Remove split pin and plain washer from front yoke. Remove clevis pin.

**NOTE:** It may be necessary to spring lever slightly to remove clevis pin.

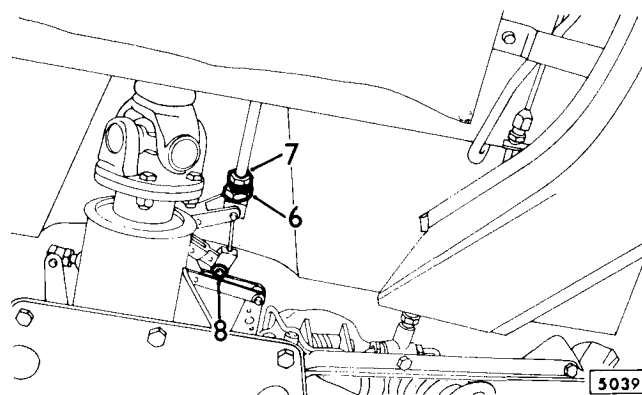
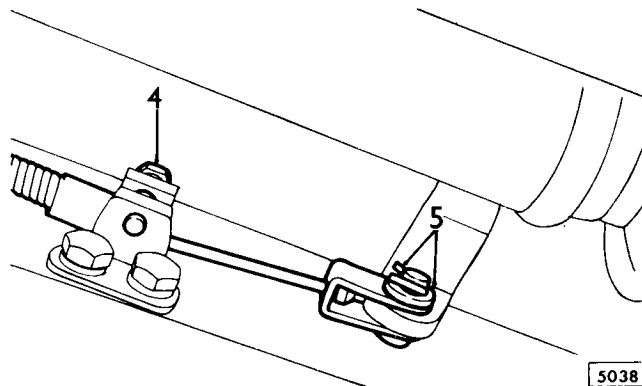
6. Release locknut at handbrake cable adjuster.
7. Screw cable adaptor out of compensator lever.
8. Remove split pin and plain washer securing clevis pin at compensator lever.
9. Remove handbrake cable from car by pulling towards rear through bracket.

#### Refitting

10. If necessary fit new grommet in cable bracket.
11. Feed cable through grommet to rest in position, adjustment adaptor to rear.
12. Fit rear cable yoke to compensator arm and secure with a clevis pin, plain washer and new split pin.
13. Screw locknut along thread and screw adaptor well into compensator arm.
14. At forward end of cable secure yoke to handbrake lever arm.

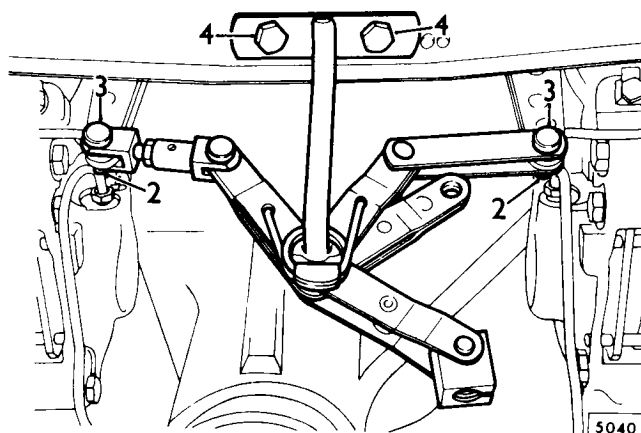
**NOTE:** The clevis pin must be passed through yoke towards centre-line of vehicle. It will be necessary to spring lever slightly.

15. Secure clevis pin with one plain washer and new split pin.
16. Position cable sheath in cable abutment and secure with one setscrew and spring washer.
17. Adjust handbrake cable — 70.35.10.
18. Fit main heatshield and secure with six setscrews, plain washers and shakeproof washers.
19. Refit exhaust system complete.

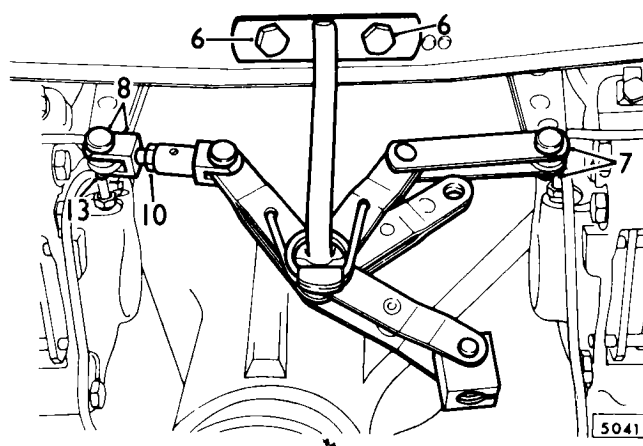


**HANDBRAKE COMPENSATOR COMPLETE****Remove and refit****70.35.21****Removing**

1. Remove rear suspension – 64.25.01.
2. Remove split pins securing clevis pin at each handbrake operating lever.
3. Remove clevis pins and plain washers.
4. Remove setscrews and spring washers securing compensator to crossmember.
5. While suspension unit is out of car it is advisable to check handbrake pads for wear and replace if necessary – 70.40.04.

**Refitting**

6. Secure compensator to crossmember using two setscrews and spring washers.
7. Secure left hand link to left hand handbrake operating lever using clevis pin (from top), plain washer and new split pin.
8. Position outer fork of right hand link over right hand handbrake operating lever. Clevis pin should drop through to secure without drawing handbrake lever towards centre-line of car.
9. If necessary, adjust link as follows:
  10. Slacken locknut.
  11. Screw outer fork end in or out.
  12. Secure locknut.
13. Secure clevis pin with plain washer and new split pin.
14. Refit rear suspension.





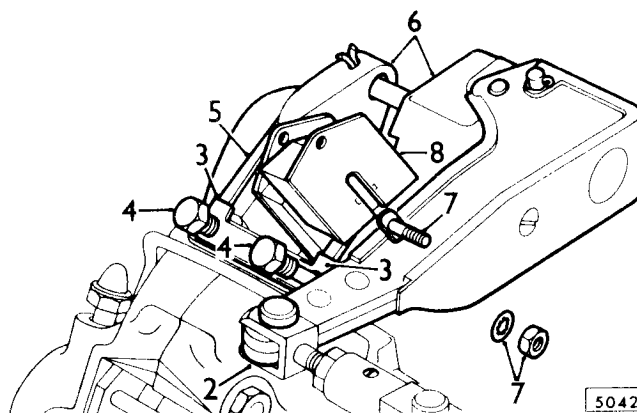
## HANDBRAKE PADS

### Remove and refit

70.40.04

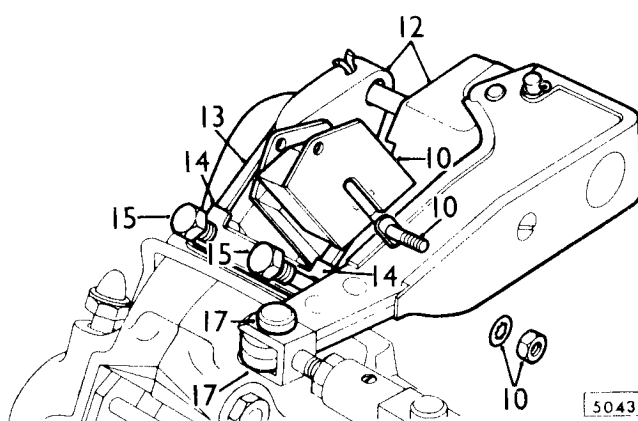
#### Removing

1. Remove rear suspension unit – 64.25.01.
2. Remove split pin securing clevis pin at handbrake operating lever.
3. Lift locking tabs.
4. Remove pivot bolts.
5. Remove retraction plate.
6. Withdraw handbrake pad carriers through top of suspension unit crossmember.
7. Remove nut and spring washer securing pad clamp bolts.
8. Remove worn pads.



#### Refitting

9. Wind pad carrier out along adjuster bolt two to three turns.
10. Use new clamp bolts, nuts and spring washers to secure new brake pads.
11. Wind carrier along adjuster bolt to give dimension of 19.05 mm. (.750 in.) between pad faces.
12. Place handbrake pad carriers in position on caliper.
13. Fit retraction plate ensuring tips engage with pad carriers.
14. Fit tab washer.
15. Secure pad carriers with two bolts. Turn up tab washer.
16. Move operating lever backwards and forwards until adjuster ratchet does not click. This sets pads to correct clearance.
17. Fit clevis pin and secure with plain washer and new split pin.
18. Refit rear suspension unit.



**BRAKE PADS – FRONT**

Special Tool – 64932392

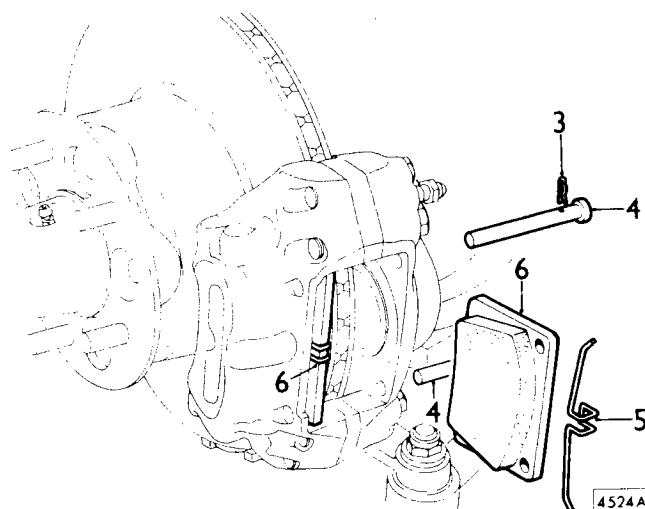
**Remove and refit****70.40.02****Removing**

1. Remove road wheel – 74.20.01.
2. Place a stand beneath the lower wishbone at a point adjacent to the damper.
3. Remove clips.
4. Remove retaining pins.
5. Recover anti-chatter springs.
6. Withdraw worn pads.

**Refitting**

It is advisable to half empty servo reservoir and master cylinder reservoir before fitting new pads.

7. Lever pistons back into bores using Girling Piston Retraction Tool Number 64932392.
8. Fit new brake pads.
9. Fit retaining pins.
10. Secure with clips.
11. Fit anti-chatter springs.
12. Top up reservoirs to correct level.
13. Apply brake several times until pedal feels solid.
14. Refit road wheel.

**BRAKE PADS – REAR****Remove and refit****70.40.03**

Special Tool 64932392

**Removing**

1. Remove rear seat lower squab – 76.70.40.
2. Remove eight drive screws securing each inspection plate and remove panels. Clean off all sealer.
3. Remove clips.
4. Remove retaining pins.

**NOTE:** Upper pins are removed towards centre line of car. Lower pins are removed away from centre line of car.

5. Withdraw worn pads.

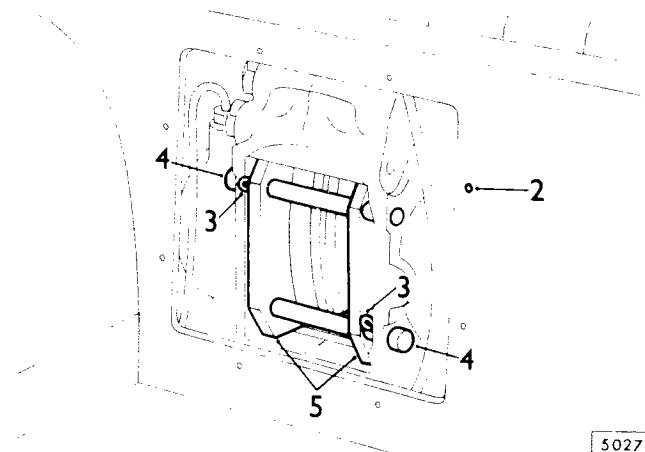
**Refitting**

It is advisable to half empty the servo reservoir before fitting new pads.

6. Lever pistons back into bores using Girling Piston Retraction Tool Number 64932392.
7. Fit new brake pads.
8. Fit retaining pins.

**NOTE:** Upper pins are fitted away from centre line of car. Lower pins are fitted towards centre line of car.

9. Secure with clips.
10. Apply suitable waterproof sealing compound around inspection plates. Fit new gaskets.
11. Secure each inspection plate in position using eight drive screws.
12. Replace rear seat lower squab.
13. Top up servo reservoir to correct level.



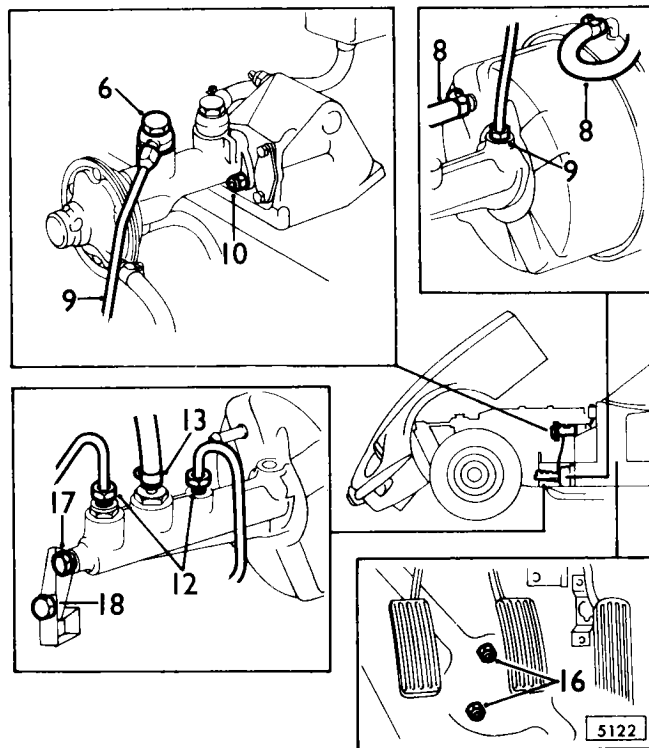
## SERVO ASSEMBLY

### Left hand steering – remove and refit

70.50.01

#### Removing

1. Disconnect battery – 86.15.19.
2. Remove reservac tank – 70.50.04.
3. Remove windscreen washer reservoir and bracket – 84.10.01 – 84.10.02.
4. Remove servo fluid reservoir – 70.30.17.
5. Remove left hand air cleaner – 19.10.01.
6. Remove banjo bolt from master cylinder outlet. Temporarily replace bolt to retain trap valve assembly
7. Remove petrol pipe clip and pull off flexible hose.
8. Disconnect air hoses at servo.
9. Release connector and remove pipe.
10. Remove two nyloc nuts securing brake master cylinder to pedal box studs.
11. Draw master cylinder from studs. Disengage push rod, and suspend master cylinder beneath rear carburettor using soft wire loops.
12. Release two connectors on slave cylinder. Plug each pipe to prevent fluid loss.
13. Remove fluid feed hose from top of slave cylinder.
14. Inside vehicle, pull carpet from left hand front toeboard.
15. Remove insulation material.
16. Remove three nyloc nuts and plain washers.
17. Under bonnet, release setscrew and shakeproof washer at bracket on front of slave cylinder.
18. Loosen setscrew, nut and plain washer securing bracket to clip.
19. Draw servo from bulkhead and manoeuvre clear.

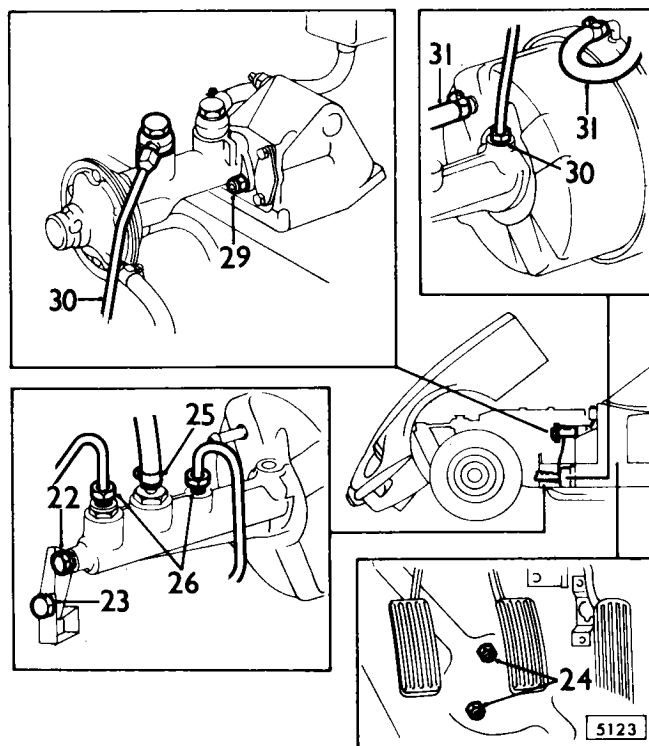


#### Refitting

20. Fit polyurethane washers to servo studs.
21. Manoeuvre servo into position, and pass studs through bulkhead.
22. Secure bracket to front of slave cylinder with one setscrew and shakeproof washer.
23. Tighten setscrew, nut and plain washer.
24. Fit plain washer and nyloc nut to each servo stud.
25. Fit fluid feed hose to top of slave cylinder.
26. Fit front two connectors to slave cylinder.
27. Release master cylinder.
28. Pass push rod through rubber boot and engage flange with two studs on pedal box.
29. Secure with two nyloc nuts.
30. Fit master cylinder output pipe between banjo connector and rear connector on slave cylinder.
31. Fit air hoses to servo.

**CAUTION:** Ensure correct connections made.

32. Fit flexible petrol hose to pipe at bulkhead and make new connection.
33. Fit servo fluid reservoir.
34. Fit windscreen washer reservoir and bracket.
35. Fit reservac tank.
36. Fill servo fluid reservoir to correct level.
37. Bleed brakes – 70.25.02.
38. Connect battery.
39. Fit insulation material at toeboard.
40. Fit carpet.



**SERVO ASSEMBLY****Right hand steering – remove and refit****70.50.02****Removing**

1. Disconnect battery – 86.15.07.
2. Remove reservac tank – 70.50.04.
3. Remove windscreen washer reservoir and bracket – 84.10.01 – 84.10.02.
4. Remove servo fluid reservoir – 70.30.17.
5. Release pipe clips and pull off air hoses at bulkhead.

**NOTE:** Make note of connections.

6. Remove petrol pipe clip and pull off flexible hose.
7. Disconnect air hoses at servo.
8. Release three connectors at top of slave cylinder. Plug each pipe to prevent fluid loss.
9. Remove fluid feed hose from top of slave cylinder.
10. Inside vehicle pull carpet from left hand front toeboard.
11. Remove insulation material.
12. Remove three nyloc nuts and plain washers.
13. Under bonnet release setscrew and shakeproof washer at bracket on front of slave cylinder.
14. Loosen setscrew, nut and plain washer securing bracket to clip.
15. Draw servo from bulkhead and manoeuvre clear.

**Refitting**

16. Fit polyurethane washers to servo studs.
17. Manoeuvre servo into position, and pass studs through bulkhead.
18. Secure bracket to front of slave cylinder with one setscrew and shakeproof washer.
19. Tighten setscrew, nut and plain washer.
20. Fit plain washer and nyloc nut to each servo stud.
21. Fit fluid feed hose to top of slave cylinder.
22. Fit three connectors to top of slave cylinder.
23. Fit air hoses to servo.
24. Fit air hose to pipe at bulkhead.

**CAUTION:** Ensure correct connections made.

25. Fit flexible petrol hose to pipe at bulkhead and make new connection.
26. Fit servo fluid reservoir.
27. Fit windscreen washer reservoir and bracket.
28. Fit reservac tank.
29. Fill servo fluid reservoir to correct level.
30. Bleed brakes – 70.25.02.
31. Connect battery.
32. Fit insulation material at toeboard.
33. Fit carpet.

## RESERVOIR TANK

### Remove and refit

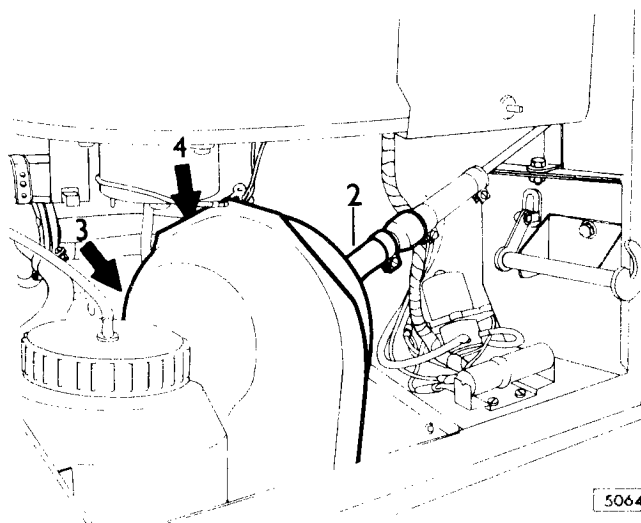
70.50.04

#### Removing

1. Remove windscreen washer reservoir – 84.10.01.
2. Disconnect hose at check valve.
3. Disconnect hose to front of servo.
4. Disconnect hose to rear of reaction valve.
5. Remove setscrew and shakeproof washer securing tank to body.
6. Remove nyloc nut and plain washer securing tank to sill.
7. Manoeuvre tank from car.

#### Refitting

8. Reverse operations 1 to 7.



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## SERVO ASSEMBLY

### Overhaul

70.50.06

#### General

Before dismantling the vacuum servo assembly and slave cylinder it is advisable to obtain the repair kit containing all parts necessary during overhaul. The kit is:-

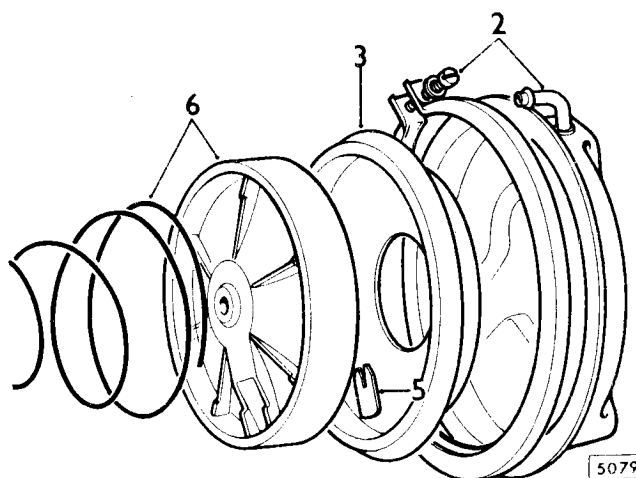
- (a) Vacuum servo repair kit.

#### Dismantling

1. Support servo slave cylinder in the padded jaws of a vice.
2. Loosen clamping ring screw to release end cover assembly.

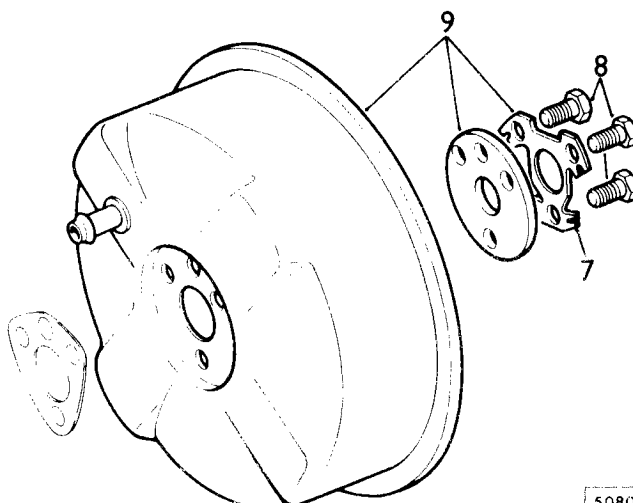
**NOTE:** Hold end cover against spring pressure while releasing screw.

3. Remove diaphragm from diaphragm support.
4. Remove servo from vice.
5. Press and gently shake diaphragm support until key drops out.
6. Remove diaphragm support and return spring.



5079

7. Bend down tabs on locking plate.
8. Remove three setscrews.
9. Withdraw locking plate, abutment plate and shell assembly.



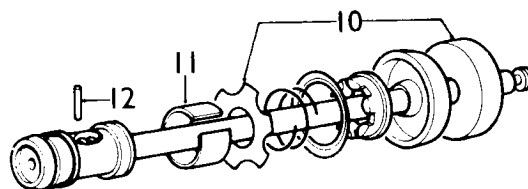
5080

10. Gently pull servo push rod and withdraw primary piston, seal and bearing assembly.
11. Slide back spring steel clip on piston.
12. Press out pin and remove push rod.

**NOTE:** It is not necessary to remove cup from primary piston, as repair kit contains replacement primary piston with cup assembled.

13. Remove fluid inlet connector and extract stop pin.

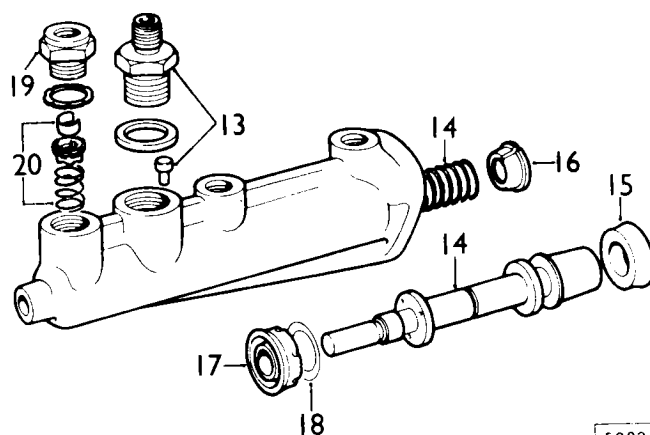
**NOTE:** Apply gentle pressure to secondary piston down bore to release pin.



14. Tap mouth of slave cylinder with soft hammer to extract secondary piston and spring.
15. Remove rubber seal.
16. Remove plastic spring retainer.

**NOTE:** This will probably be damaged during removal, but a replacement is provided in repair kit.

17. Remove seal.
18. Remove piston washer.
19. Remove adaptor from outlet port.
20. Remove trap valve assembly.



### Inspection

21. Check bores and pistons for scoring or pitting.
22. Wash all components in Girling Brake Cleaner.
23. Thoroughly dry with lint free cloth.
24. Liberally smear seal and bearing assembly with disc brake lubricant.

### Reassembling

25. Assemble trap valve and outlet adaptor to servo slave cylinder body. Use new copper gasket. Torque to 4.01 – 4.98 kg.m (29 – 36 lb.ft.).
26. Fit piston washer to secondary piston.
27. Moisten secondary piston front seal with clean brake fluid.
28. Press seal on to piston.
29. Fit retainer.
30. Moisten secondary piston cup with clean brake fluid.
31. Press cup on to piston.
32. Press return spring on to secondary piston and slide assembly into bore of slave cylinder.

**NOTE:** Ensure front seal is not damaged or turned back.

## BRAKES

33. Press piston down bore and retain with piston stop pin through inlet port.
34. Retain stop pin by fitting inlet adaptor on new copper gasket.
35. Insert push rod through rear of primary piston assembly.
36. Use a small screwdriver to press coil spring to heel of piston and insert pin.

**NOTE:** Ensure spring presses push rod towards crown of piston, and that pin is not through coils.

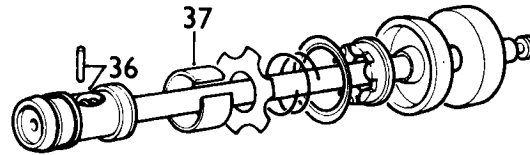
37. Fit spring retaining clip. Ensure it does not stand proud of largest piston diameter.
38. Moisten piston cup with clean brake fluid and assemble primary piston to slave cylinder bore.

**NOTE:** Ensure cup is not damaged or turned back.

39. Assemble spacer to push rod.
40. Lubricate seal with Lockheed Disc Brake Lubricant and assemble to push rod, concave side first.
41. Lubricate bearing with Lockheed Disc Brake Lubricant and assemble to push rod, plain face first.
42. Fit gasket to end face of slave cylinder.
43. Assemble shell assembly, abutment plate and **\*\*new\*\*** locking plate to plastic bearing spigot.
44. Secure with three setscrews. Torque to 1.70 – 1.94 kg.m (12.2 – 14 lb.ft.). Turn up locking tabs.
45. Locate spring over abutment plate, and slide diaphragm support over push rod.
46. Secure by dropping key into slot.
47. Fit bead around inside diameter of diaphragm into groove in diaphragm support.

**NOTE:** Diaphragm must be completely dry.

48. Fit bead around outside diameter of diaphragm into lip round shell assembly.
49. Place end cover assembly in position, pipe connector in line with connectors on slave cylinder, and secure with clamping ring.



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## CHECK VALVE

### Remove and refit

70.50.15

#### Removing

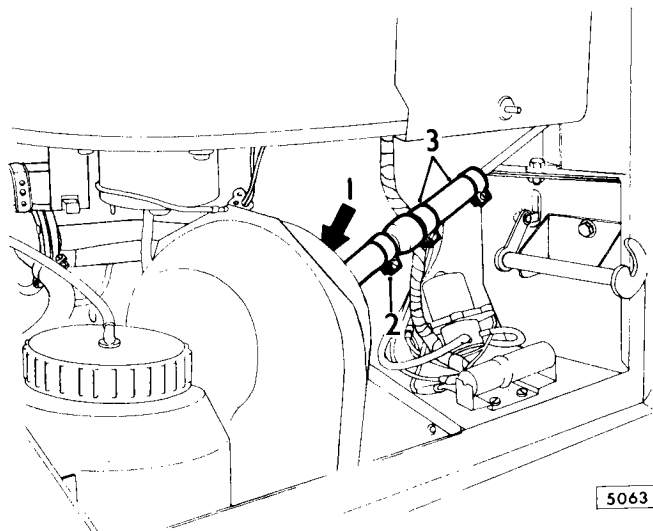
1. Release pipe clip and pull pipe from reservac tank.
2. Release pipe clip and pull check valve from hose.
3. Release pipe clip and pull hose from check valve.

#### Refitting

4. Fit hose to check valve and secure clip.

**NOTE:** Fit check valve with head of arrow towards reservac tank.

5. Push check valve into rubber hose and secure.
6. Push hose on to reservac tank and secure.



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## FRONT CALIPER

## Remove and refit

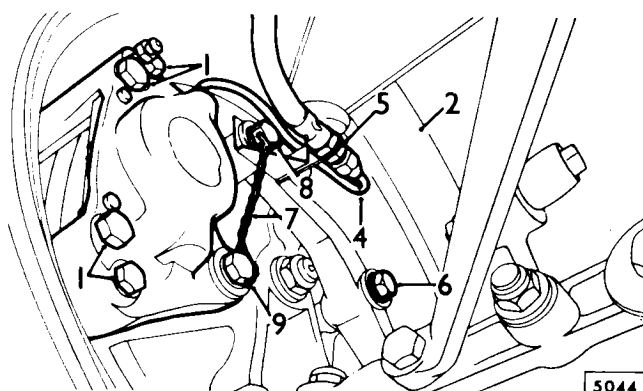
70.55.02

## Removing

1. Do not, under any circumstances, remove four setscrews securing two halves of caliper and distance pieces. If a weep of fluid appears at the joints, the caliper MUST be replaced.
2. Remove road wheel – 74.20.01.
3. Place a stand beneath the lower wishbone at a point adjacent to the damper.
4. Remove pipe between caliper port and bracket. Immediately plug hose to prevent fluid loss.
5. Release locknut and pull flexible hose from bracket.
6. Loosen bolt securing steering arm to stub axle carrier.
7. Remove locking wire from caliper bolts.
8. Remove bolt through steering arm and caliper.

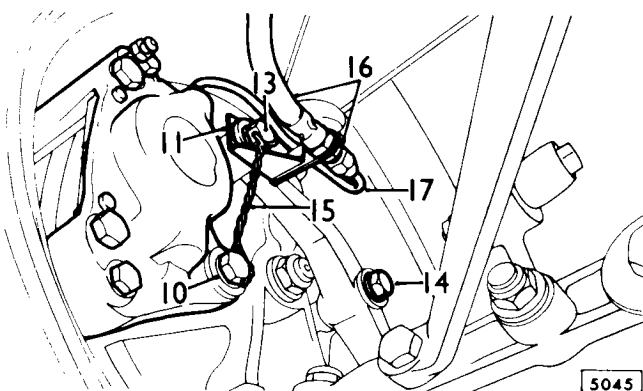
**NOTE:** Note position and number of shims between steering arm and caliper.

9. Remove lower caliper bolt and withdraw caliper from disc.



## Refitting

10. Offer caliper into position and loosely secure with lower bolt, plain washer and spring washer.
11. Place spring washer, plain washer and brake pipe bracket on upper bolt.
12. Position shims, removed in operation 8, between steering arm boss and caliper.
13. Fit upper bolt to trap disc shield bracket beneath brake pipe bracket.
14. Tighten both caliper and steering arm bolt to torque of 6.91 – 8.30 kg.m. (50 – 60 lb.ft.).
15. Wire lock caliper bolts.
16. Fit flexible hose to bracket and secure locknut.
17. Fit pipe between caliper port and bracket.
18. Fit road wheel.
19. Bleed brakes – 70.25.02.





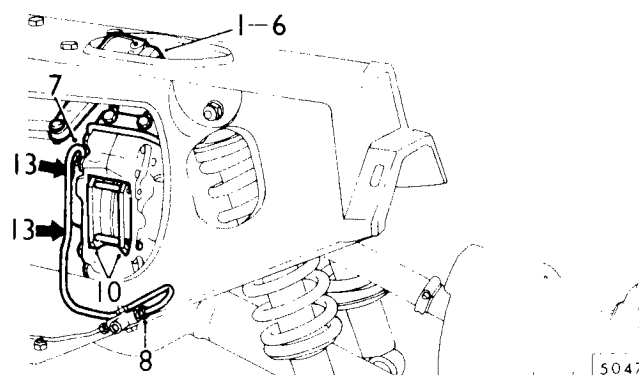
## REAR CALIPER

### Remove and refit

70.55.03

#### Removing

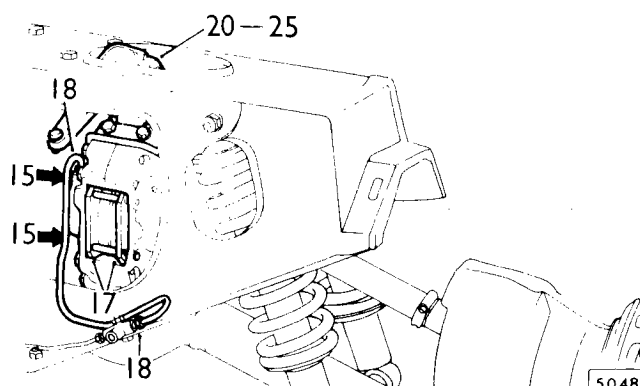
1. Remove rear suspension unit — 64.25.01.
2. Remove split pin securing clevis pin at handbrake operating lever.
3. Lift pivot bolt locking tabs.
4. Remove pivot bolts.
5. Remove retraction plate.
6. Withdraw handbrake mechanism through top of suspension unit.
7. Release brake pipe feed connector at caliper.
8. Loosen pipe connector at three way union.
9. If right hand caliper being removed, also release clip on centre bolt of suspension unit bottom plate.
10. Remove friction pads — 70.40.03.
11. Remove locking wire from caliper bolts.
12. Do not, under any circumstances, remove four setscrews securing two halves of caliper.
13. Remove two securing bolts and spring washers.
14. Withdraw caliper through front of suspension unit.



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#### Refitting

15. Offer caliper into position and secure with two bolts and spring washers. Torque 6.77 - 7.60 kg.m. (49 - 55 lb.ft.). Check disc is central between jaws of caliper. If necessary, adjust shims between drive flange and disc. If adjustment is made rear wheel camber must be checked as final operation.
16. Wire lock caliper bolts.
17. Fit friction pads.
18. Fit brake feed pipe to caliper. Tighten connector at three way union.
19. If necessary, resecure clip.
20. Place handbrake pad carriers in position on caliper.
21. Fit retraction plate, ensuring tips engage with pad carriers.
22. Fit tab washer.
23. Secure pad carriers with two bolts. Turn up tab washer.
24. Move operating lever backwards and forwards until adjuster ratchet does not click. This sets pads to correct clearance.
25. Fit clevis pin and secure with plain washer and new split pin.
26. Refit rear suspension.
27. Bleed brakes — 70.25.02.



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**HANDBRAKE CALIPER PAD CARRIERS****Remove and refit** 70.55.04**Removing**

1. Follow procedure given for renewing handbrake pads – 70.40.04.

**Refitting**

2. Follow procedure given for renewing handbrake pads – 70.40.04.

**NOTE:** If pad carriers or retraction plate are new it is advisable to ensure that fingers of retraction plate will fit into pad carrier holes before assembly. If necessary, lightly dress retraction plate fingers with a fine file.

**BRAKE CALIPER -- FRONT****Overhaul** 70.55.13**Service Tool** 18G672 Piston Clamp

1. Remove front brake caliper – 70.55.02.
2. Thoroughly clean caliper using methylated spirit only.

**Dismantling**

**CAUTION:** Under no circumstances must the two caliper halves be separated. Piston seals can be changed without splitting the caliper.

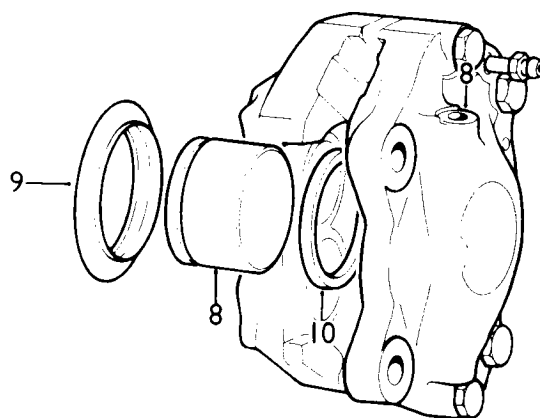
3. Remove clips.
4. Remove retaining pins.
5. Recover anti-chatter springs.
6. Withdraw friction pads.
7. Fit piston clamp to retain two outboard pistons.
8. Carefully use a compressed air jet through feed port to expel large inboard piston.
9. Pull dust seal from piston and cylinder bore groove.

**CAUTION:** Do not scratch pistons or cylinder bores. Use extreme care when removing seals.

10. Carefully prise seal from groove in cylinder wall.

**Inspection**

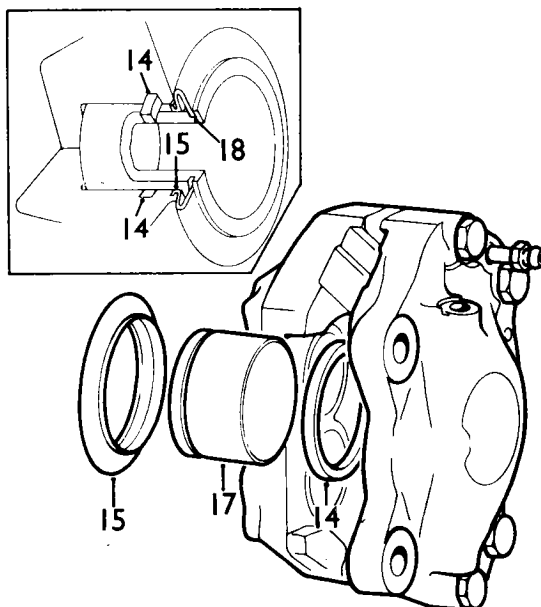
11. Using Girling Brake Cleaner or methylated spirit only, thoroughly clean piston, cylinder bore and seal groove.
12. Examine cylinder bore and piston for scratches or signs of corrosion. Defective components must be changed.



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## Assembling

13. Coat new seal with Lockheed Disc Brake Lubricant.
14. Ease seal into its groove using fingers only.
15. Fit dust seal into outer groove in cylinder bore.
16. Coat piston with Lockheed Disc Brake Lubricant.
17. Carefully enter piston into bore through dust seal.
18. Fit dust seal lip into groove in piston.
19. Release piston clamp, and refit to press inboard piston fully into cylinder.
20. Overhaul pistons, seals and dust seals in outboard half of caliper as detailed in operations 8 to 18. Continue with operation 21.
21. Fit piston clamp to outboard pistons and press fully home.
22. Locate friction pads in position.
23. Fit retaining pins.
24. Fit clips.
25. Fit anti-chatter springs.
26. Fit front brake caliper to vehicle.



## BRAKE CALIPER – REAR

Overhaul 70.55.14

Service Tool 18G672 Piston Clamp

1. Remove rear brake caliper – 70.55.03.
2. Thoroughly clean caliper using methylated spirit only.

## Dismantling

**CAUTION:** Under no circumstances must the two caliper halves be separated. Piston seals can be changed without splitting the caliper.

3. Fit piston clamp to retain one piston.
4. Carefully use a compressed air jet through feed port to expel one piston.
5. Pull dust seal from piston and cylinder bore groove.

**CAUTION:** Do not scratch pistons or cylinder bores. Use extreme care when removing seals.

6. Carefully prise seal from groove in cylinder wall.

## Inspection

7. Using Girling Brake Cleaner or methylated spirit only, thoroughly clean piston, cylinder bore and seal groove.
8. Examine cylinder bore and piston for scratches or signs of corrosion. Defective components must be changed.

## Assembling

9. Coat new seal with Lockheed Disc Brake Lubricant.
10. Ease seal into its groove using fingers only.
11. Fit dust seal into outer groove in cylinder bore.
12. Coat piston with Lockheed Disc Brake Lubricant.
13. Carefully enter piston into bore through dust seal.
14. Fit dust seal lip into groove in piston.
15. Release piston clamp and use it to press piston fully into bore.
16. Overhaul piston, seal and dust seal in other half of caliper as described in operations 4 to 15. Continue with operation 17.
17. Remove piston clamp.
18. Fit rear brake caliper to vehicle.

70.55.13  
70.55.14