JENSEN

WORKSHOP MANUAL

INTERCEPTOR AND FF

JENSEN

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WORKSHOP MANUAL
INTERCEPTOR & FF

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WORKSHOP MANUAL

INTERCEPTOR & FF

INTRODUCTION

Description of Car

INTERCEPTOR

The Jensen Interceptor is a four-seat saloon and is the latest of a [illegible] of high-performance cars that have earned for Jensen an enviable reputation for advanced engineering and British Coach-Building at its best.

The car is powered by the big, silent, performance-proved Chrysler V8 engine of over 6 litres capacity.

The steel body is mounted on a ladder type frame of large section steel tubes offering exceptional protection to the occupants in the event of a collision.

Front suspension is independent, incorporating vertical coil springs, transverse links, double acting dampers and an Anti-Roll bar.

The rear suspension employs a rigid axle and limited slip differential, thereby providing the safest method of rear suspension and drive known to date. On earlier models the rear dampers are double acting and driver-controlled. Extra stability is provided by means of a transverse radius [illegible]

Hydraulically-operated, self-adjusting Girling disc brakes are [illegible] all four wheels. Separate systems for front and rear brakes are used in conjunction with a direct-acting servo motor. A central hand lever operates self-adjusting brakes on the rear discs.

Steering gear is of the high-efficiency rack and pinion type with greaseless steering joints.

Both front seats are fully adjustable, including variable angle seat backs. Lap and diagonal belts are fitted to both front seats.

JENSEN FF

The body, frame and power unit of the Jensen FF are basically similar to those fitted on the Interceptor but the frame is a tubular perimeter type incorporating a detachable front suspension sub-frame.

WORKSHOP MANUAL
INTERCEPTOR & FF

HOW TO USE THE MANUAL

This manual is designed to assist in the maintenance and overhaul of the Interceptor Mk.II and FF Mk.II.

Details of routine maintenance and operating instructions will be found in the Owners Instruction Manual, a copy of which is supplied with each car.

Throughout the text, reference is made to 'L.H. and R.H.' sides of the car. 'L.H.' indicates 'left-hand side' when the car is viewed from the rear.

This manual is divided into seventeen sections under the general classifications as shown on the contents page. Each section is sub-divided into specific topics, these being shown in each section index.

In certain sections, the sub-sections do not start at 1. This has been done deliberately to avoid any confusion between Mk.I and II cars.

Where a section has been completely re-written or radically altered from the Mk.I specification, the sub-section numbers continue from where they finished in the Mk.I manual.

In the case of sections where the specification has not altered from Mk.I, these have been printed exactly as in that manual, thus numbering from 1. The same formula applies to the illustrations.

The white pages cover both vehicles, but any maintenance to the FF, where it differs from the Interceptor is covered in the pink pages.

The car serial number will be found on a plate attached to the inside of the Companion-box rear panel or on the left-hand front wheel-arch panel. This number should be quoted on all correspondence, and although other units also carry their individual serial numbers, these need not be quoted as we can identify them from our own records, provided the car serial number is given.

The first serial number of vehicles covered by this manual are:

Interceptor	-	R.H.D. 3551 - L.H.D. 5001
FF	-	201 (R.H.D. & L.H.D.)

The maintenance and overhaul of the Mk.I models is dealt with in Publication No.551.

An Illustrated Parts List is also available and can be used in conjunction with this manual.

INTRODUCTION

The majority of maintenance and overhaul instructions for S.P. and Interceptor III cars are the same as those for the Interceptor II.

This Supplement has been compiled to cover those items which differ.

The distinctive coloured sheets and the same numbering system with an additional suffix 'A' readily identifies the information particular to S.P. and Interceptor III cars.

ENGINE AND TRANSMISSION

INDEX

A.2 MAINTENANCE

This manual covers aspects of the Jensen Interceptor 11 and FF 11 other than the Chrysler made components. Full servicing details for the Chrysler components can be found in the relevant Chrysler Manual which can be determined from the last letter in the engine number. This can be interpreted thus:-

Last Letters	Engine Series	Manual Year
E	E	1969
F	F	1970
G	G	1971

A.3 REMOVE AND REFIT ENGINE

1. Disconnect battery.
2. Remove bonnet.
3. Remove air cleaner.
4. Remove fan assy. on mounting bar.
5. Drain coolant and remove top and bottom hoses and heater connections.
6. Remove alternator leads; LT ignition leads, oil warning light and gauge leads, water temp transmitter leads and earth leads to chassis.
7. Remove throttle cable from carburetter end and vacuum pipe from manifold - disconnect kick down rods.
8. Remove P.A.S. pump - 2 bolts thro' water pump.
9. On cars with air conditioning, remove compressor, - 4 bolts under base and disconnect lead. DO NOT disconnect the air conditioning pipe lines.
10. Remove rocker covers if alloy and fit fibre glass slave covers.
11. Disconnect 2 exhaust down pipes.
12. Ease speedometer cable out of clip on rear of manifold.
13. Disconnect 2 exhaust down pipes.
14. Remove torque-converter dust cover retained by 4 bolts.
15. Remove 4 torque converter mounting bolts. Access is gained thro' dust cover and rotating engine to position of each.

    It is important that the torque converter is left on the gearbox and NOT removed with the engine.
16. Remove 6 bell housing bolts; leave starter on gear box.
17. Remove lower engine mounting frame bolts, one each side.

18. Fit sling hooks in cylinder heads - refer to Chrysler manual for positions.
19. Support gear box.
20. Sling out engine thro' top.

A.4 REMOVE AND REFIT ENGINE AND GEAR BOX

Follow above procedure with exception of numbers 14, 15, 16 and 19, additional work:-

19. Remove radiator - 4 bolts.
20. Disconnect leads to inhibitor/reverse lamp switch.
21. Disconnect gear shift cable.
22. Disconnect speedometer cable.
23. Remove propeller shaft.
24. Remove 2 bolts from gear box mounting and withdraw cross member.
25. Remove rear gearbox cross member held in by 4 bolts.
26. Sling assy. out thro' top.

To refit reverse above procedure.

A.5 REMOVE AND REFIT GEAR BOX ONLY

It is possible to remove the gear box only on the Mk II cars.

1. Drain gear box oil.
2. Disconnect propeller shaft.
3. Disconnect leads to inhibitor/reverse lamp switch.
4. Disconnect speedometer cable.
5. Disconnect kick down linkage.
6. Disconnect gear shift linkage.
7. Remove torque converter dust cover, 4 bolts.
8. Remove 4 bolts holding torque converter to mounting plate, access can be gained to the bolts via the dust cover and rotating the engine.
   NB. the torque converter must be removed with the gear box.
9. Remove starter motor.
10. Remove dipstick and tube.
11. Remove 6 bolts around bell housing.
12. Place cradle under gearbox.

13. Remove 4 bolts in rear gear box cross member, 2 rear mounting bolts and remove cross member.
14. Withdraw gear box.

To refit gear box. - Reverse above procedure, noting that the torque converter must be fitted with the gear box.

NOTE:

Servicing details of all the Chrysler components used in the motor cars can be obtained from the appropriate Chrysler Workshop Manual. The engine series can be established from the final letter of the engine serial number.

Engine Series	Chrysler Manual Year
E	1969
F	1970
G	1971

A.6 REMOVE AND REFIT ENGINE AND GEARBOX.

The procedure for this operation is similar to that for the Interceptor with the following exceptions and additions:-

1. Fans may be left in situ.
2. Front propshafts to be disconnected together with bell housing bracket.
3. Bell housing cross member, four bolts, to be removed.

To refit, reverse above procedure.

A.3A ENGINE - REMOVAL AND INSTALLATION

1. Disconnect the battery.
2. Remove the bonnet (refer P22A).
3. Remove the air cleaner.
4. Remove the fan assembly.
5. Drain the coolant; remove the top and bottom hoses, and heater connections.
6. Remove the following leads: alternator, LT ignition, oil warning light and gauge, water temperature transmitter, and earth to chassis.
7. Remove the throttle cable from the carburettor, and vacuum pipe from the manifold.
8. Disconnect the kick down rods.
9. Remove the power steering pump, secured by two bolts passing through the water pump housing.
10. On cars with air conditioning, remove the compressor secured by four bolts; disconnect the electrical lead. DO NOT disconnect the air conditioning pipes.
11. Remove the rocker covers, if alloy, and fit fibre glass slave covers.
12. Disconnect the two exhause down pipes.
13. Ease the speedometer cable out of the clip on the rear of the manifold.
14. Remove the torque converter dust cover retained by four bolts.
15. Remove the four torque converter mounting bolts. Access is gained through the aperture over which the dust cover is secured, and by rotating the engine to bring each bolt into the required position for dismantling.

    Note: It is important that the torque converter is left on the gearbox and NOT removed with the engine.

16. Remove the six bell housing attachment bolts; leave the starter on the gearbox.
17. Remove the engine lower mounting frame bolts, one each on the left and right sides.
18. Fit sling hooks in the cylinder heads as indicated in the Chrysler manual.
19. Support the gearbox.
20. Lift out the engine.
21. Reverse the above removal procedure to install an engine.

A.4A ENGINE AND GEARBOX - REMOVAL AND INSTALLATION

1. Follow the procedure for the removal and installation of an engine, items 1 to 13 inclusive.
2. Remove the radiator, secured by four bolts.
3. Disconnect the leads to the inhibitor/reverse light switch.
4. Disconnect the gear shift cable.
5. Disconnect the speedometer cable.
6. Remove the propellor shaft.
7. Remove the two bolts from the gearbox mounting, and withdraw the crossmember.
8. Remove the gearbox rear crossmember, secured by four bolts.
9. Remove the engine lower mounting frame bolts, one each on the left and right sides.
10. Fit sling hooks in the cylinder heads as indicated in the Chrysler manual.
11. Lift out the engine and gearbox assembly.
12. Reverse the above removal procedure to install the engine and gearbox assembly.

A.5A GEARBOX - REMOVAL AND INSTALLATION

The gearbox only can be removed on MK III and S.P. cars as follows:-

1. Drain the oil in the gearbox.

2. Disconnect the propellor shaft.
3. Disconnect the leads to the inhibitor/reversing light switch.
4. Disconnect the speedometer cable.
5. Disconnect the kick down linkage.
6. Disconnect the gear shift linkage.
7. Remove the torque converter dust cover, retained by four bolts.
8. Remove the four torque converter mounting bolts. Access is gained through the aperture over which the dust cover is secured, and by rotating the engine to bring each bolt into the required position for dismantling.

   Note: The torque converter MUST be removed with the gearbox.
9. Remove the starter motor.
10. Remove the dipstick and tube.
11. Remove the six bell housing attachment bolts.
12. Position a cradle under the gearbox.
13. Remove the two bolts from the gearbox mounting, and withdraw the crossmember.
14. Remove the gearbox rear crossmember, secured by four bolts.
15. Withdraw the gearbox.
16. To install the gearbox, reverse the above removal procedure, ensuring that the torque converter is fitted with the gearbox.

   Note: Servicing details, for all Chrysler components used in the car, can be obtained from the appropriate Chrysler workshop manual. The engine series can be established from the final letter of the engine serial number.

ENGINE SERIES	CHRYSLER MANUAL YEAR
G	1971
H	1972
J	1973
4 series	1974

FOUR WHEEL DRIVE UNIT

INDEX

Green

B.1 DESCRIPTION OF UNIT

The central four-wheel-drive-unit or differential is of epicyclic form, with the input shaft from the Torqueflite gearbox coupled to the planet-wheel carrier. Output to the rear propeller shaft goes direct via the annulus, and the drive to the front goes through the sun wheel, which is mounted on a hollow shaft carrying three sprockets for the Morse Hyvo chains which drive the offset front propeller shaft.

Torque from the gearbox is split unequally between front and rear because of the differences in diameter of the sun wheel and annulus, so, in effect, applying a greater leverage on the rear propeller shaft than the front. This is deliberate as it is considered best to apply a greater share of the torque on the unsteered wheels: 63% goes to the rear and 37% to the front.

Apart from its unconventional form and unequal torque split, this epicyclic unit functions as a normal differential. When the car is travelling straight ahead, the planet wheels, sun wheel and annulus rotate together as a solid unit with the output shafts running at equal speeds. Differential action is permitted by the freedom of the planet wheels to rotate on their own axes and allow relative variations in the speeds of the sun wheel and the annulus. Such action, however, is limited by the control unit, the main shaft of which is driven from a gear mounted on the hollow shaft which also carries the sun wheel.

The essentials of the control unit are a pair of one-way clutches, which are driven by two gears on the input shaft from the gearbox. The ratios of these gears are different from each other and different again from the ratios of the gears driving the control unit main shaft. These differences are planned so that one clutch revolves faster than the main shaft and the other slower - and they can do this because the clutches, which work in opposite directions, are free.

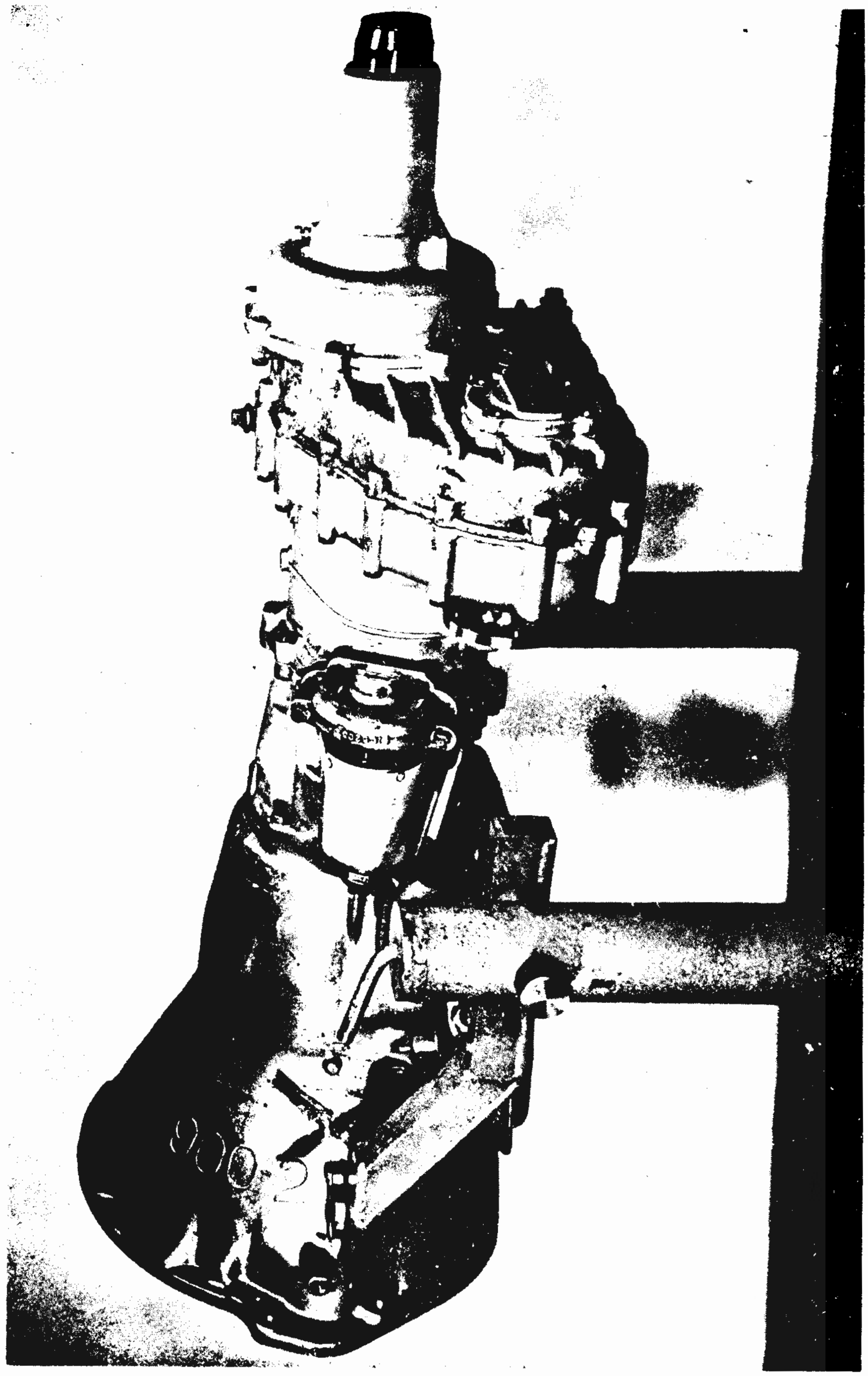
If the main differential begins to operate, the effect is to speed up or slow down the control unit main shaft and this in turn causes the appropriate clutch to engage. When this happens, the control unit main shaft becomes positively geared to the input shaft from the gearbox; it is already geared to the sun wheel but at a different ratio. The only way of resolving this condition is for the sun wheel and annulus to rotate at different speeds - but only up to the maximum percentage difference set by the gearing of the appropriate clutch and of the control unit main shaft.

In the Jensen FF application, gearing has been chosen to allow the front wheels to over-run the rear by 16.5% and the rear to over-run the front by 5.5%, the extra percentage at the front being to take care of steering movements.

The faster-running clutch, which controls wheel spin on the front, also serves to prevent the rear wheels locking under braking. The slower-running clutch similarly controls rear-wheel traction and front-wheel braking.

The clutches are of the multi-plate type, with the inner plates splined to the control unit main shaft and the outer held in a casing. Between the outer casing of each clutch and its control gear are three balls positioned in ramps formed on both faces. Light spring pressure holds the plates in contact with one another and the friction between them ensures that the outer casing lags behind the speeds of its control gear to an extent which ensures that the clutch remains free. When, however, the speed of the control gear tends to exceed that of the outer casing, the balls travel up their ramps and the clutch engages.

For reversing, means are provided for putting the one-way clutches out of action, so that the control unit ceases to function and the master differential operates freely.



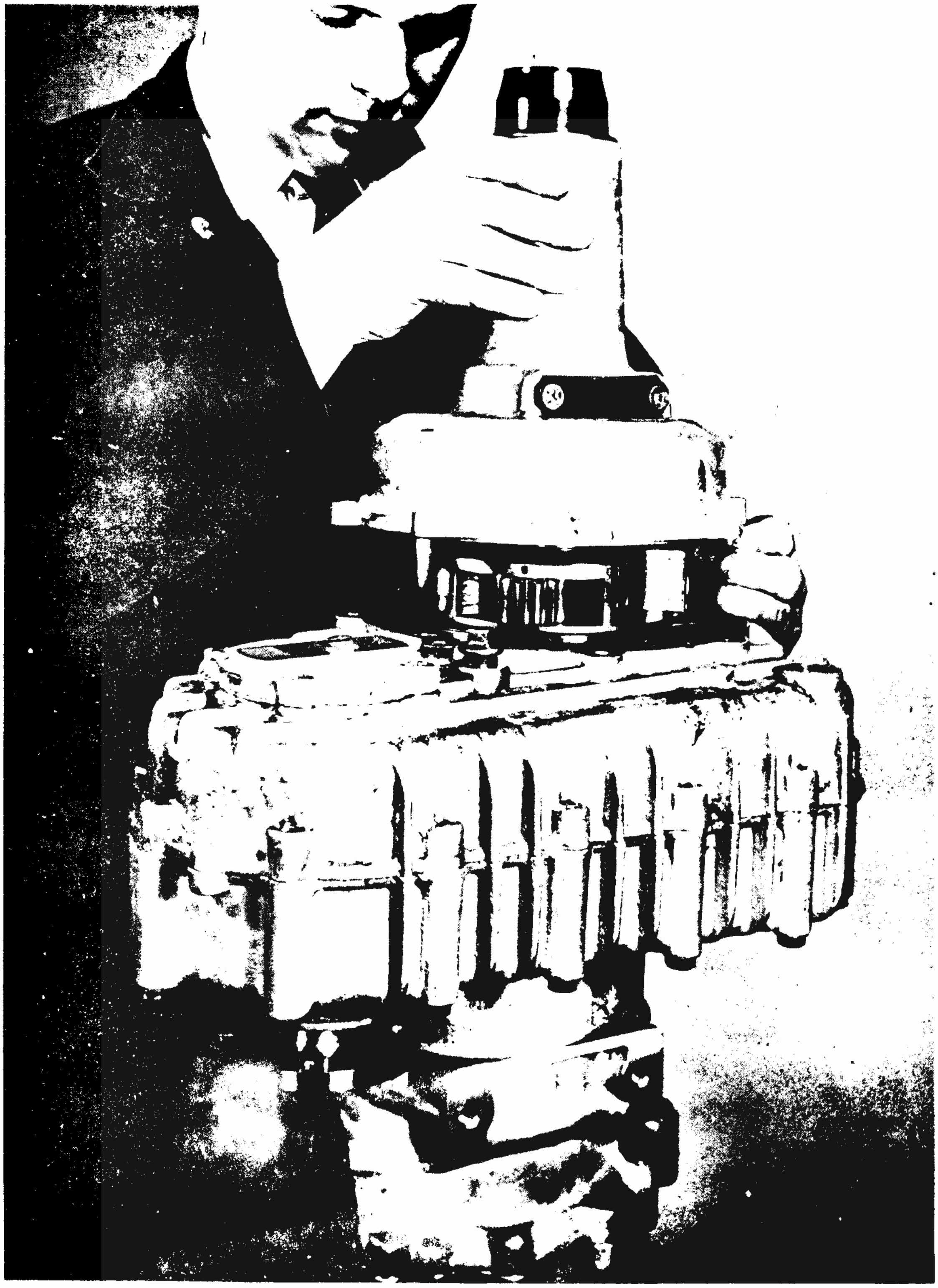


Fig. B.2 TAILSHAFT HOUSING ASSEMBLY REMOVAL.

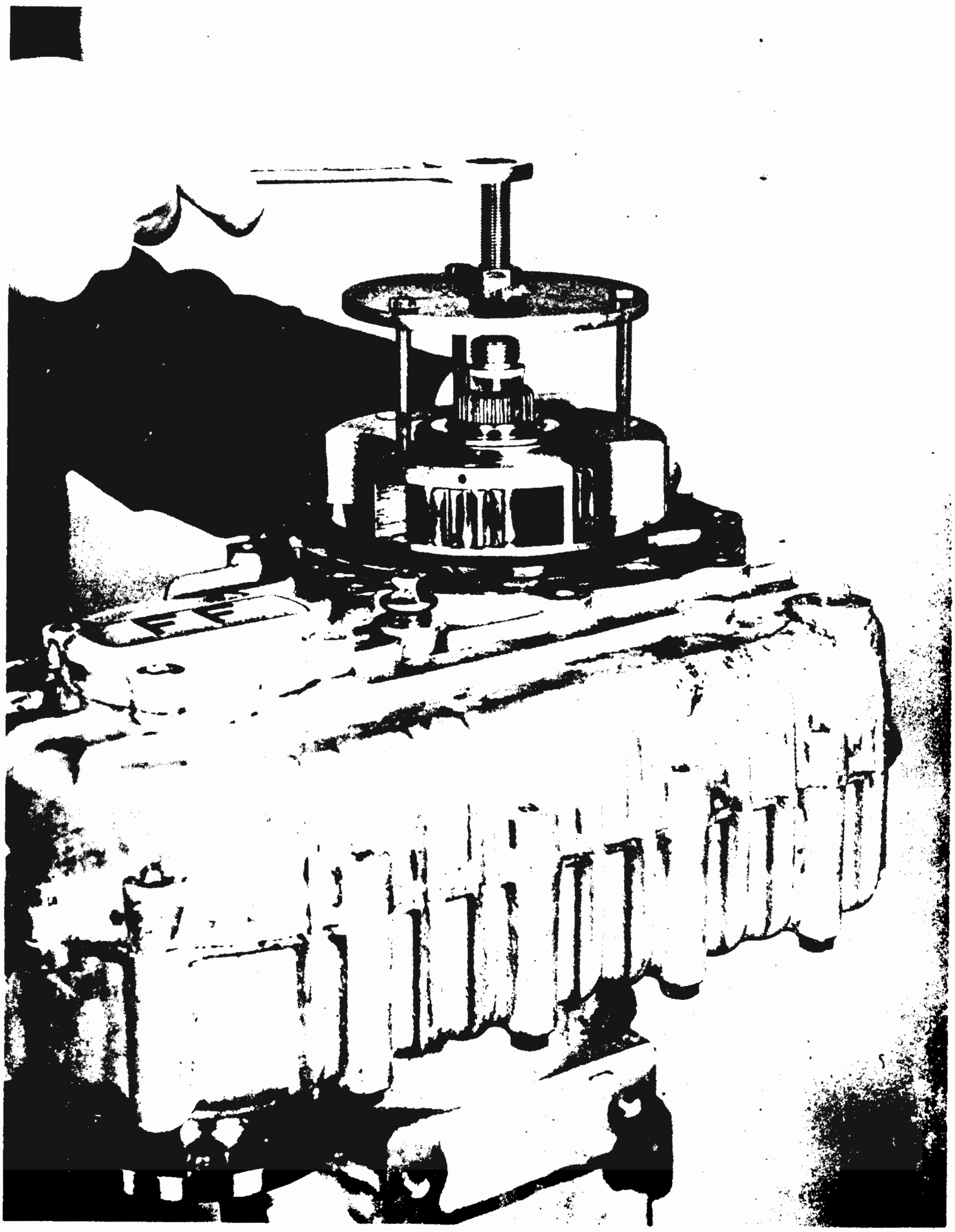


Fig. B.3 CARRIER ASSEMBLY REMOVAL.

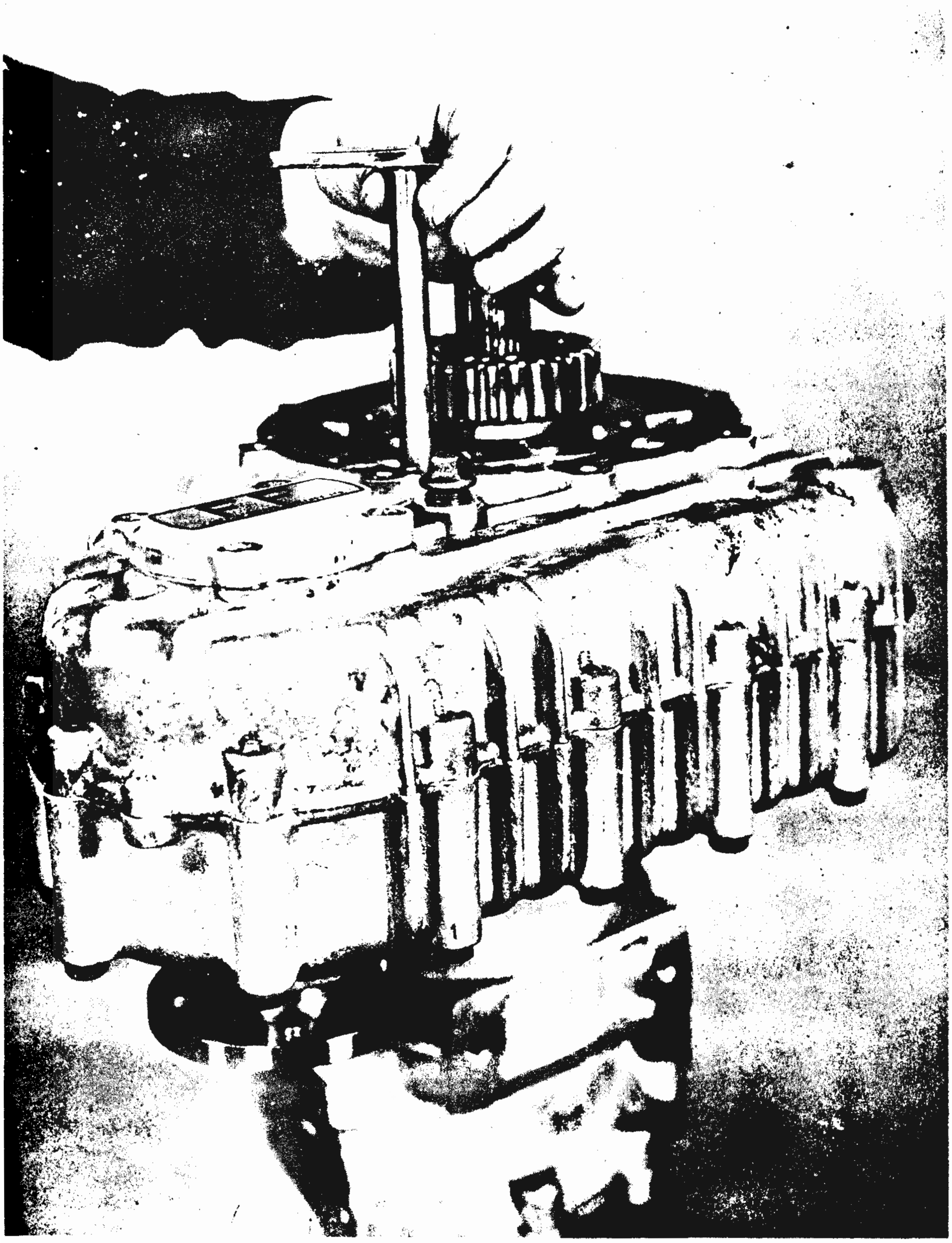


Fig. B.4 FEED TUBE REMOVAL.

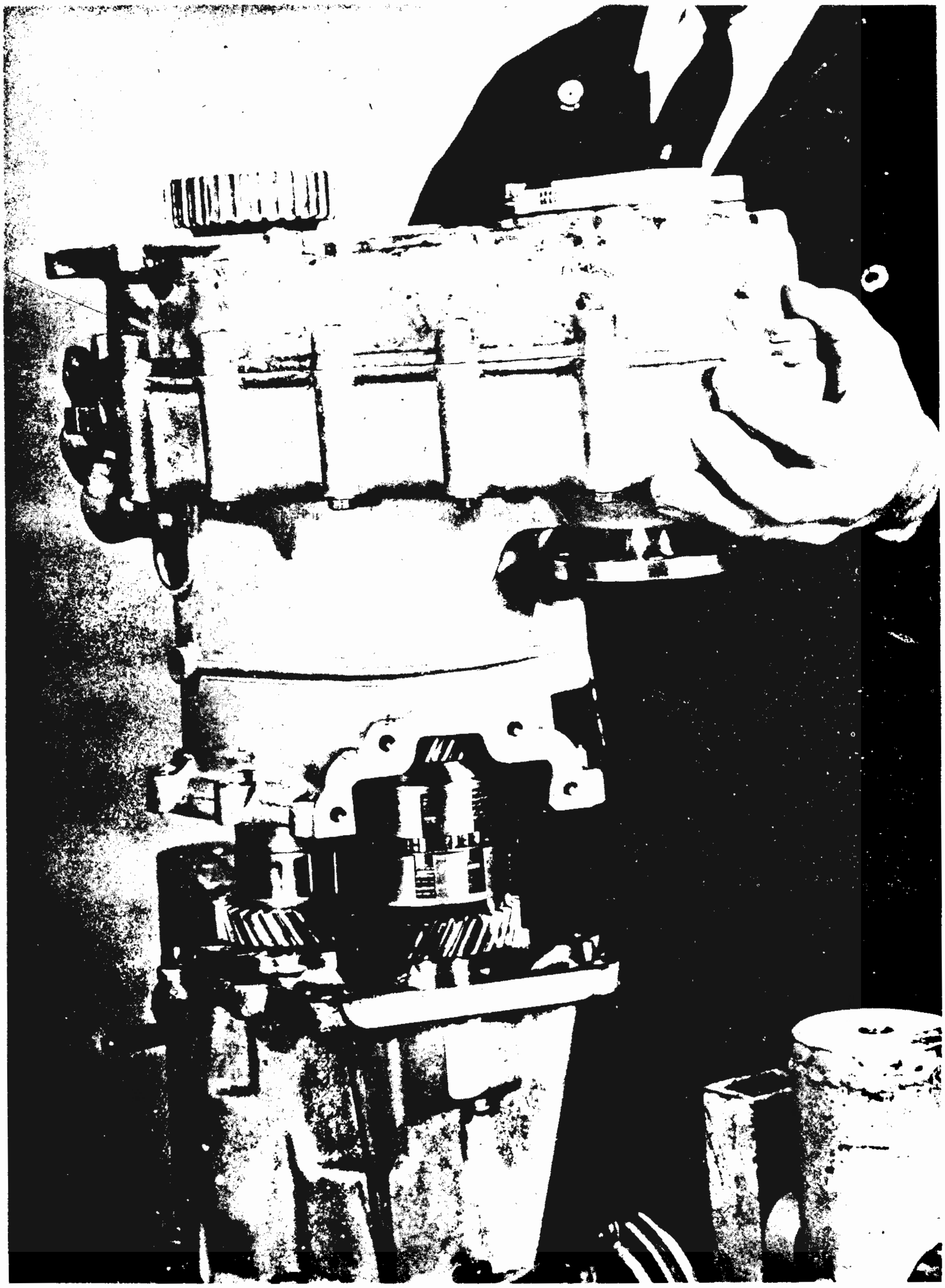


Fig. B.5 MAIN CASING ASSEMBLY REMOVAL.

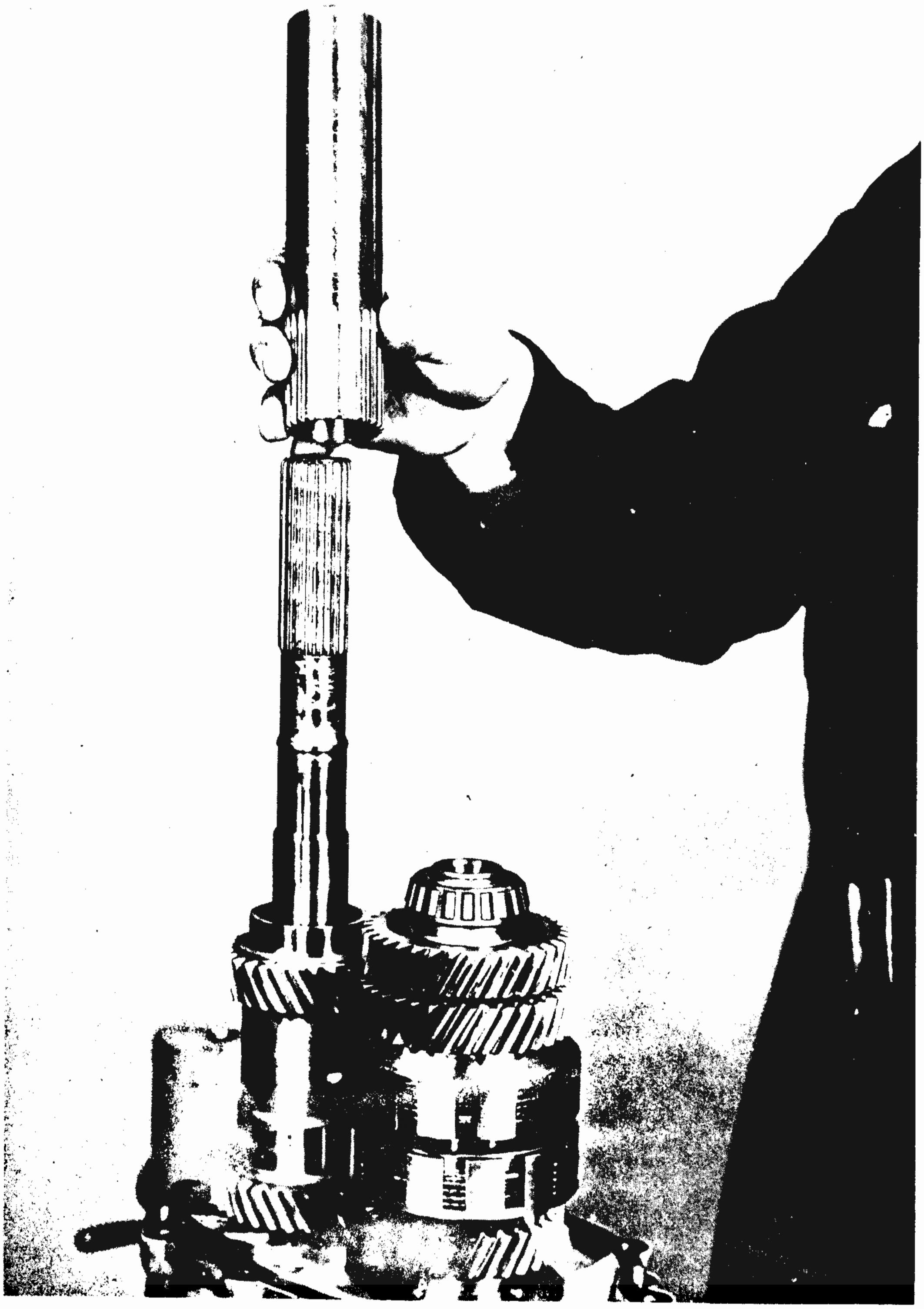


Fig. B.6 CONNECTING SLEEVE REMOVAL.

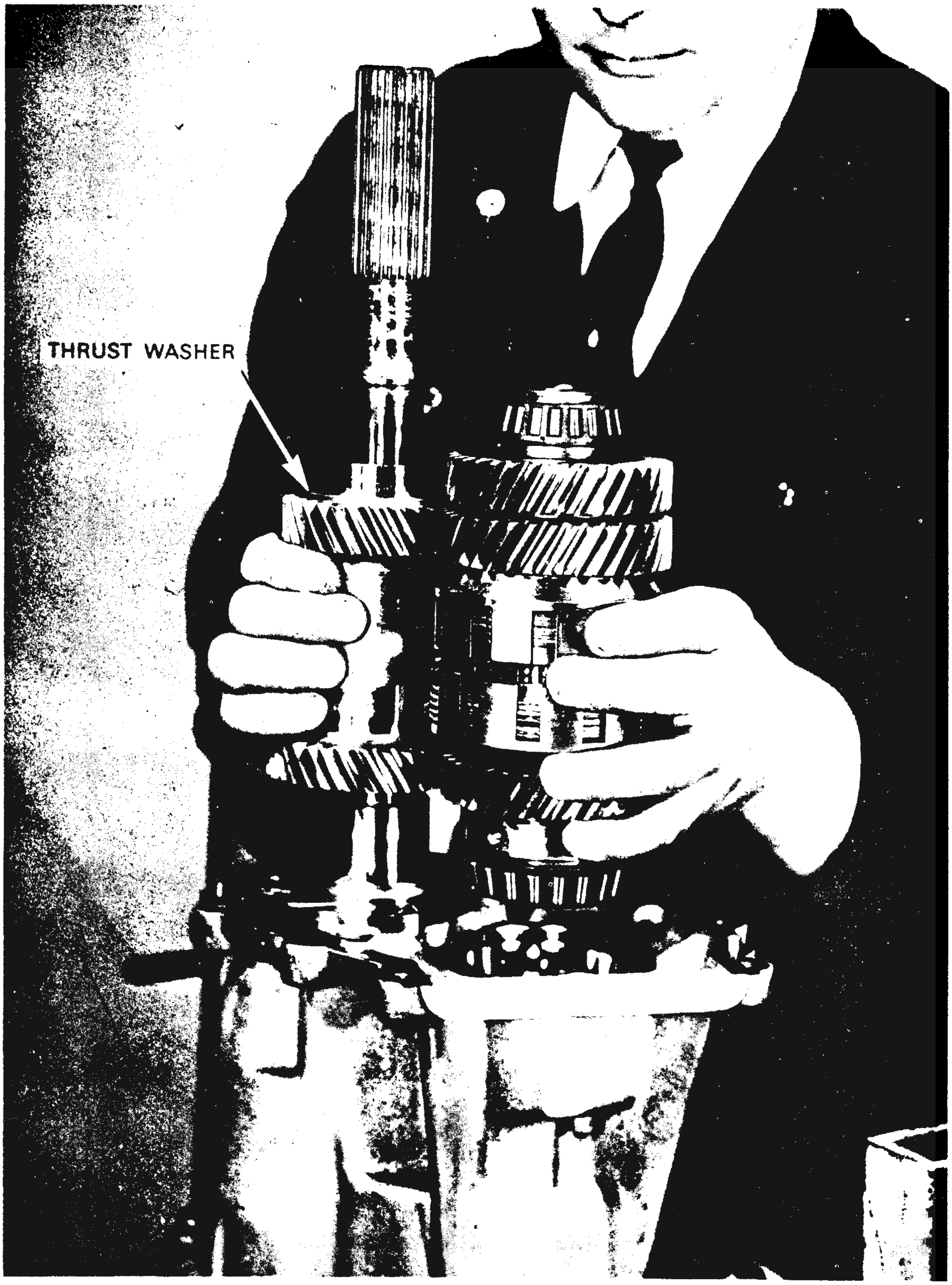


Fig. B.7 CONTROL UNIT ASSEMBLY AND CONTROL GEAR SLEEVE REMOVAL.

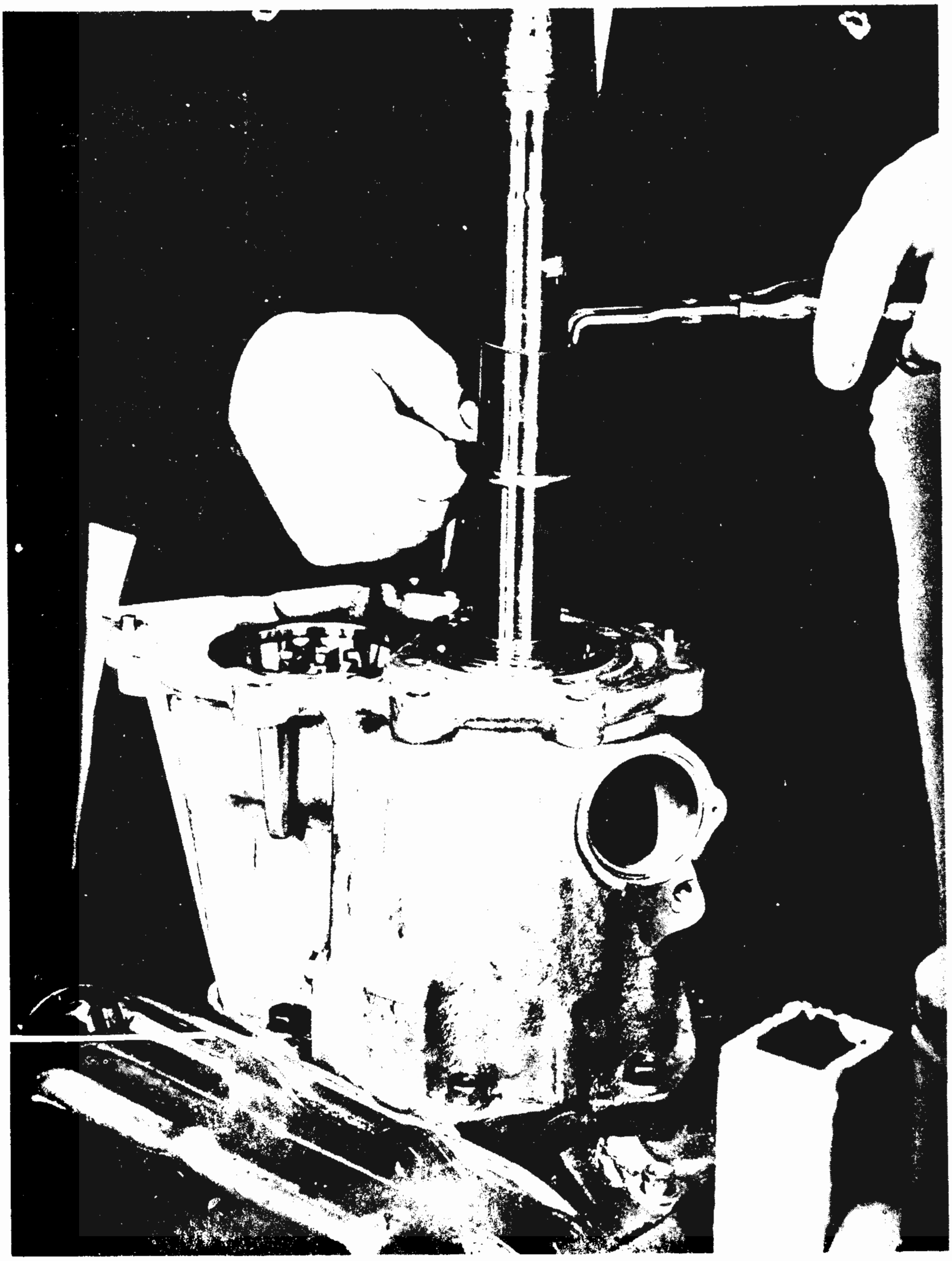


Fig. B.8 EXTERNAL CIRCLIP AND ABUTMENT RING REMOVAL.

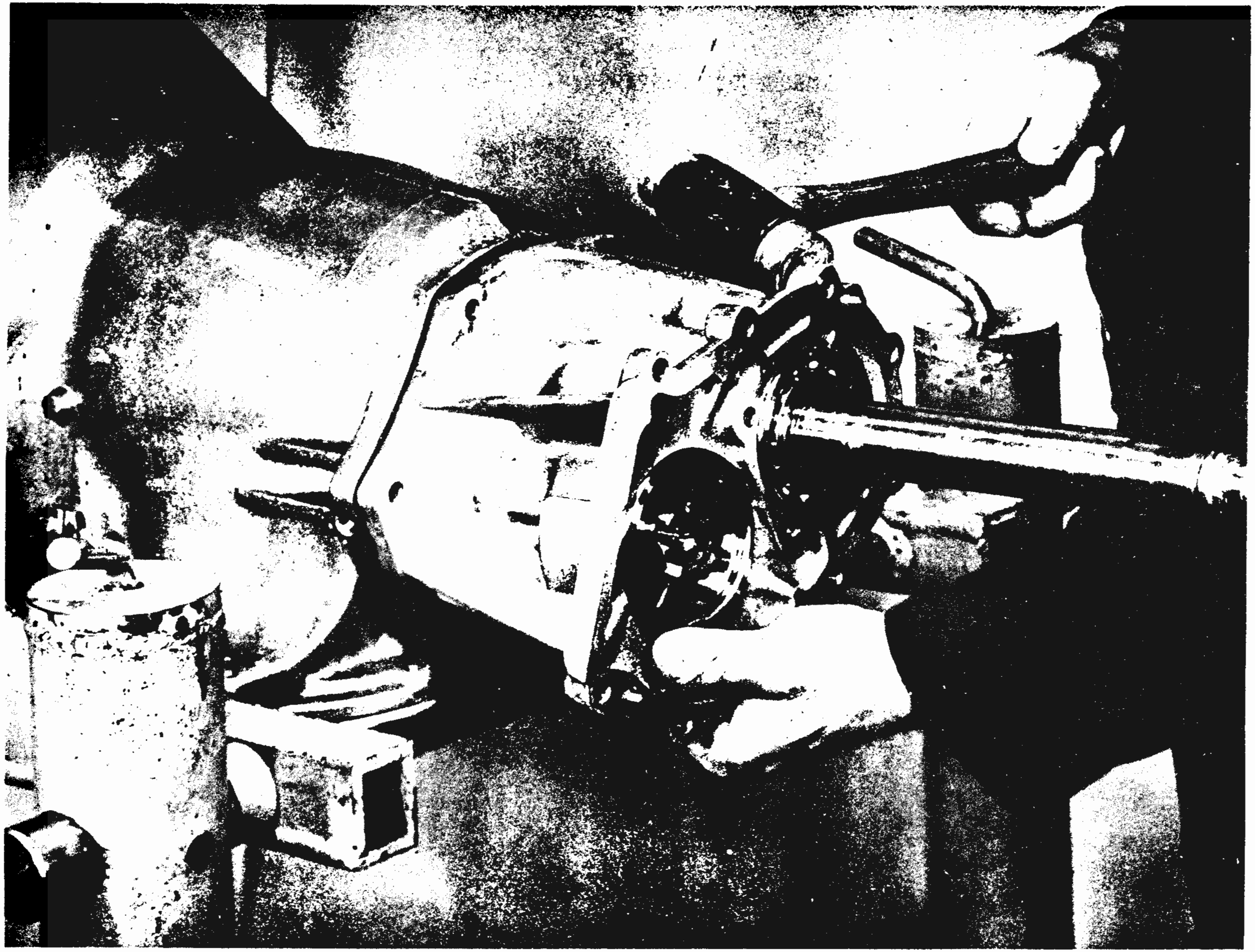


Fig. B.9 ADAPTER CASTING ASSEMBLY REMOVAL.

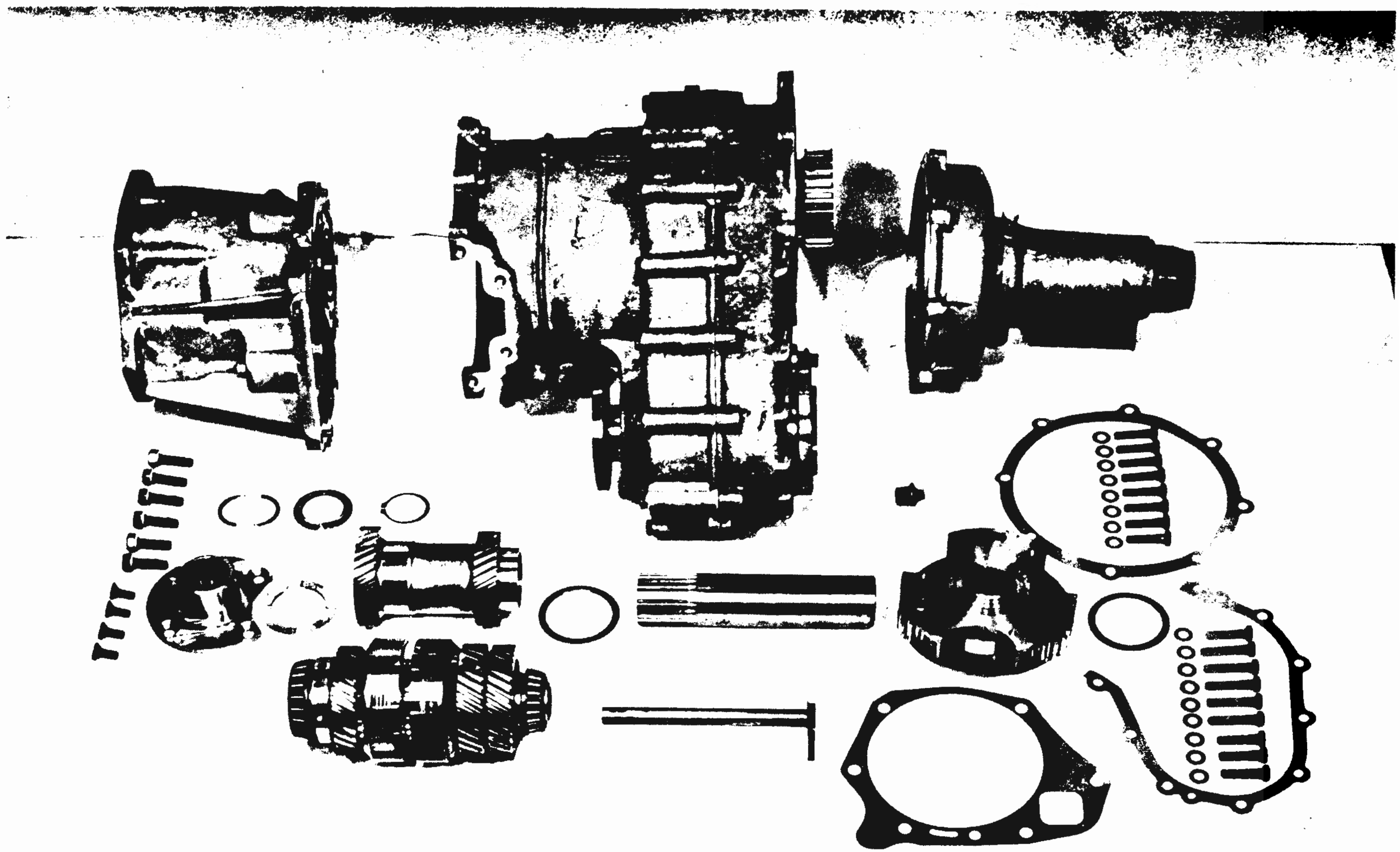


Fig. B.10 FERGUSON 4-W-D TRANSMISSION COMPONENTS DISASSEMBLED.

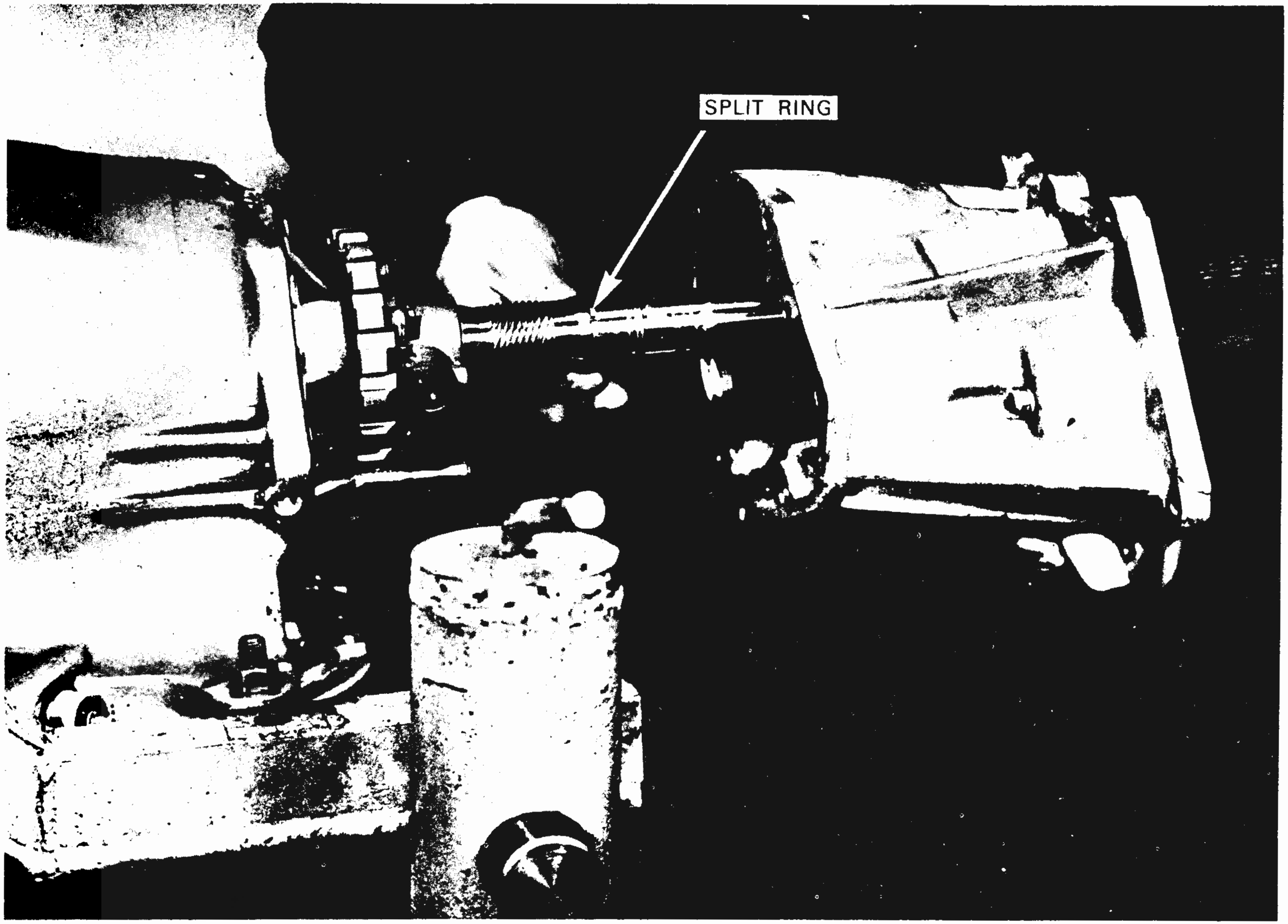


Fig. B.11 ADAPTER CASTING AND SPLIT RING INSTALLATION.

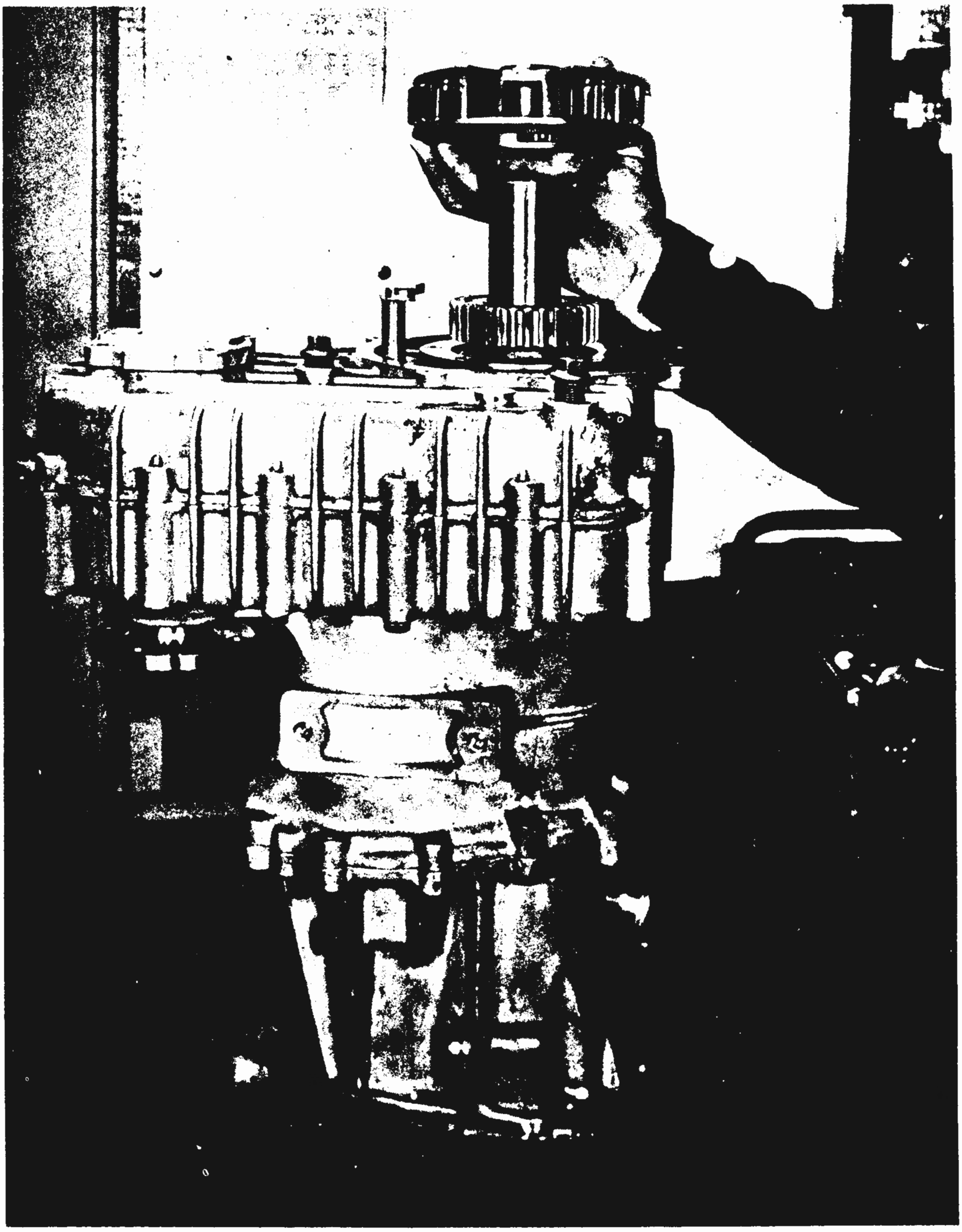


Fig. B.12 ABUTMENT RING AND NEEDLE BEARING TRACK ASSEMBLY.

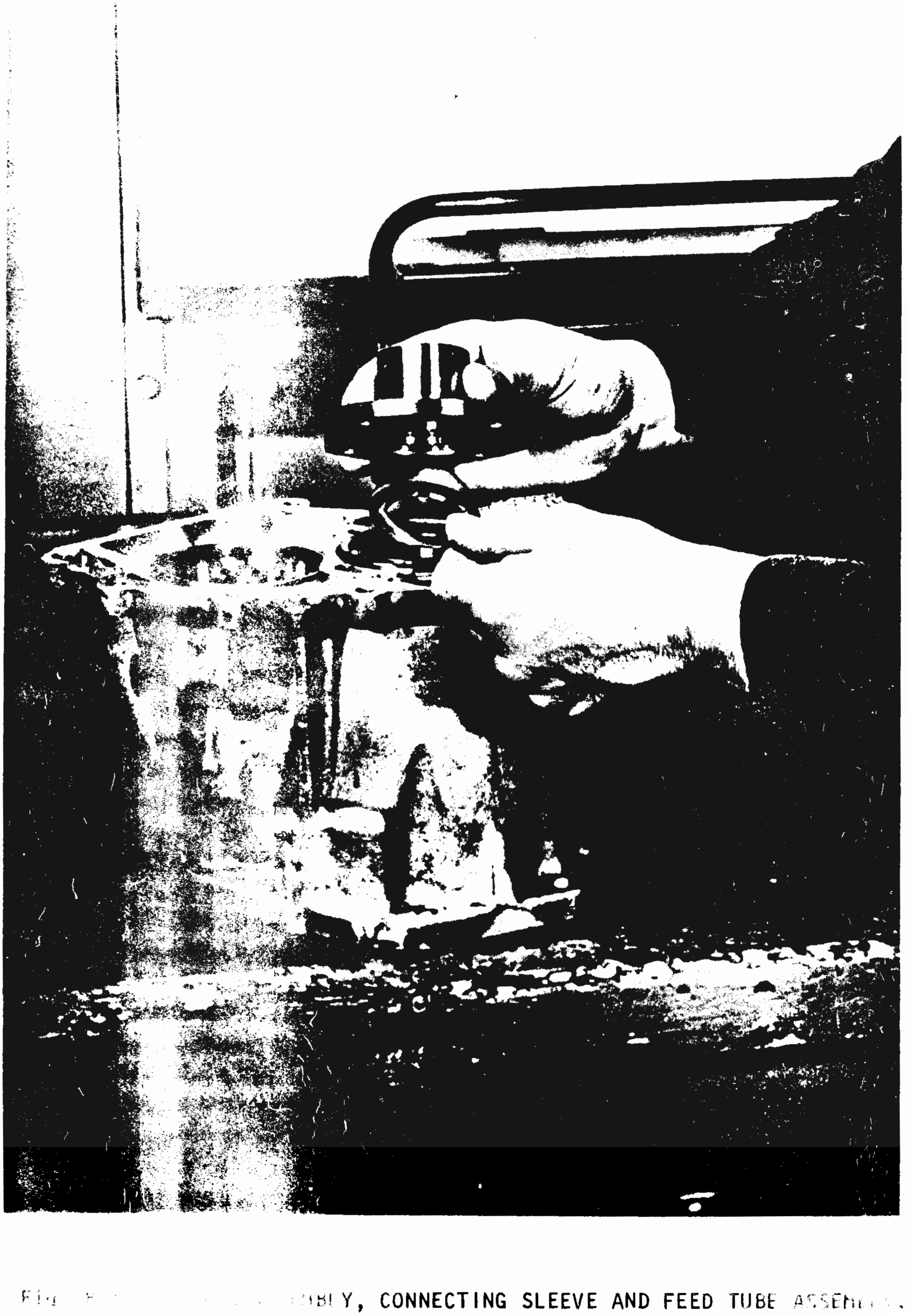


Fig. [illegible] ...BLY, CONNECTING SLEEVE AND FEED TUBE ASSEM[illegible].

3. Temperature

3.1 The running temperature of the unit is normally between 80° and 85°C, measured at a point near the drain plug. Any marked increase in temperature, unless caused by a very high ambient, should be dealt with as follows:

3.2 Check fluid level. If unit requires topping up, check for fluid leakage. Refill to correct level with Automatic Transmission Fluid, AQ-ATF, Suffix A.

3.3 Should signs of excessive heat persist, contact the Service Department of Jensen Motors.

B.3 SERVICE PROCEDURE

IMPORTANT:

Any removal, reconditioning or assembly of the Ferguson transmission must be carried out in clean dry surroundings and a dust-free atmosphere. Any rag or cloth used must be clean and lint free. Only those lubricants, cleaning fluids, solvents or sealing compounds specified may be used.

B.4 REMOVING FROM CHRYSLER TORQUEFLITE TRANSMISSION

It is assumed that the complete transmission assembly, including the converter, has been removed from the vehicle.

1. Remove converter and dipstick/filler pipe from transmission.
2. Place transmission assembly in the repair stand tool H.F.R. No. SKT.976 (Fig.B1).
3. Drain off all transmission fluid. This is best achieved by tilting the assembly into a vertical position in order to drain the Chrysler transmission, then back to the horizontal to drain the Ferguson transmission.
4. Tilt and lock transmission assembly in a vertical position.
5. Remove Dunlop Maxaret (see Sec.B7).
6. Remove speedometer pinion and adapter assembly (see Sec.B9 & B10).

7. Remove eight bolts securing tailshaft housing to chaincase. Remove tailshaft housing assembly (Fig.B2).

8. Assemble tool H.F.R. No. SKT.1096 on the planet carrier and remove carrier assembly and thrust washer (Fig.B3).

9. Remove oil feed tube (Fig.B4).

10. Remove nine bolts securing main casing to adapter casting.

11. Lift off main casing assembly, taking care to leave the control unit assembly and the control gear sleeve in position on the adapter casting (Fig.B5).

12. Remove connecting sleeve. This will have to be eased past the remaining LOCTITE on the Chrysler output shaft (Fig.B6).

13. Remove control unit assembly and control gear sleeve and thrust washer (Fig.B7).

14. Remove four countersunk screws from the needle bearing track. These screws will have been assembled with LOCTITE and may require some extra force in order to shear the sealant.

15. Remove needle bearing track and thrust washer (Fig.B7).

16. Remove external circlip and abutment ring from output shaft bearing (Fig.B8).

17. Tilt and lock transmission in a horizontal position.

18. Remove six bolts securing adapter casting to Chrysler transmission.

> IMPORTANT:
>
> Before removing or installing adapter casting (Step 19) the gear shift lever must be in "1" (low) position. This positions the parking lock control rod rearward so that it can be disengaged or engaged with the parking lock sprag.

19. Carefully pull adapter casting and ease the parking lock control rod knob past the parking sprag. At the same time assist the output shaft bearing sleeve to move on the shaft by tapping lightly on the casting flange with a hide hammer (Fig.B9). Once the control rod knob is past

the sprag and the bearing sleeve is free on the output shaft, lift off casing.

20. Remove split ring from Chrysler output shaft. A layout of the sub-assemblies and components as they now appear is shown in Fig.B10.

B.5 ASSEMBLY ONTO CHRYSLER TORQUEFLITE TRANSMISSION

The Ferguson transmission has been removed from the Chrysler transmission. Proceed as follows:-

1. Wash the control unit assembly, control gear sleeve, needle bearing track, planet carrier assembly, connecting sleeve and the three thrust washers in clean solvent or paraffin. Blow dry with an air blast.

2. Immerse the control unit assembly in clean transmission fluid and allow excess fluid to drain off.

3. In the event that any part of the Chrysler transmission has failed, the adapter casting must be washed out with clean solvent or paraffin. Blow dry with an air blast. Pour a small quantity of transmission fluid into the freewheel assembly and the output shaft bearing, allowing the excess to drain off.

4. Place Chrysler transmission in the repair stand tool H.F.R. No. SKT.976.

5. Tilt transmission into a horizontal position.

6. If the extension housing is in place, remove as follows:

a. Remove extension housing to transmission bolts.

CONSOLE SHIFT: Remove two bolts securing gearshift torque shaft lower bracket to extension housing. Swing bracket out of way for extension housing removal.

IMPORTANT:

In removing or installing extension housing (Step b), the gearshift lever must be in "1" (low) position. This positions the parking lock control rod rearward so it can be disengaged or engaged with the parking lock sprag.

b. Remove two screws, plate and gasket from bottom of extension housing mounting pad. Spread large snap ring from output shaft bearing with tool, Chrysler Part No. C-3301. With snap ring spread as far as possible, carefully tap extension housing off the output shaft bearing. Carefully pull extension housing rearward, to remove parking lock control rod knob past the parking sprag, then remove the housing.

c. Carefully unwind and slide yoke seal rear stop ring off the output shaft. Slide yoke seal and front stop ring off the shaft.

d. Remove output shaft bearing rear snap ring and remove bearing from the shaft.

7. Place a new extension housing joint (Chrysler Part No. 246954) on the transmission case. Fit split ring into forward groove on output shaft (Fig.B11). This is best retained in position, using petroleum jelly.

8. Spray output shaft, between split ring groove and circlip groove, with LOCQUIC primer grade N. After approximately four minutes remove excess by air blast and apply LOCTITE sealant grade AV (red) to this area. Install adapter casting assembly immediately, guiding the parking lock control knob past the parking sprag. Install abutment ring and external circlip.

NOTE:
If the circlip does not enter groove correctly it indicates that the split ring is misplaced. Remove adapter casting and replace split ring.

9. Install and tighten adapter casting bolts to 24-lb./ft.

10. Tilt and lock transmission into a vertical position.

11. Install needle bearing track. Spray into four screw holes with LOCQUIC primer grade N. After four minutes remove excess fluid by air blast. Smear LOCTITE sealant grade JV (clear) onto countersunk headed screws and tighten to 15 lb./ft.

12. Smear MOLYKOTE compound onto both sides of thrust washer before fitting onto needle bearing track.

13. Install control unit assembly and control gear sleeve. Place thrust washer onto control gear sleeve.

> NOTE:
>
> The thrust washers on both control gear sleeve and planet carrier assembly are of the same thickness to avoid error. Install connecting sleeve.

14. Place a new joint in position on the adapter casting (H.F.R. part No. B15163) and lower main casing assembly into position. Check that the dowels have entered their respective holes correctly. Install and tighten nine bolts to 13 lb./ft.

15. Install oil feed pipe.

16. Remove all oil and grease from output shaft splines and spray with LOCQUIC primer grade N. Repeat for the internal splines in the hub of the planet carrier assembly. After four minutes remove excess by air blast.

17. Install new joint (H.F.R. part No. B15165).

18. Apply LOCTITE sealant grade AV (red) to internal splines of planet carrier assembly and install on output shaft. Place thrust washer in position on planet carrier assembly.

19. Install tailshaft housing assembly immediately.

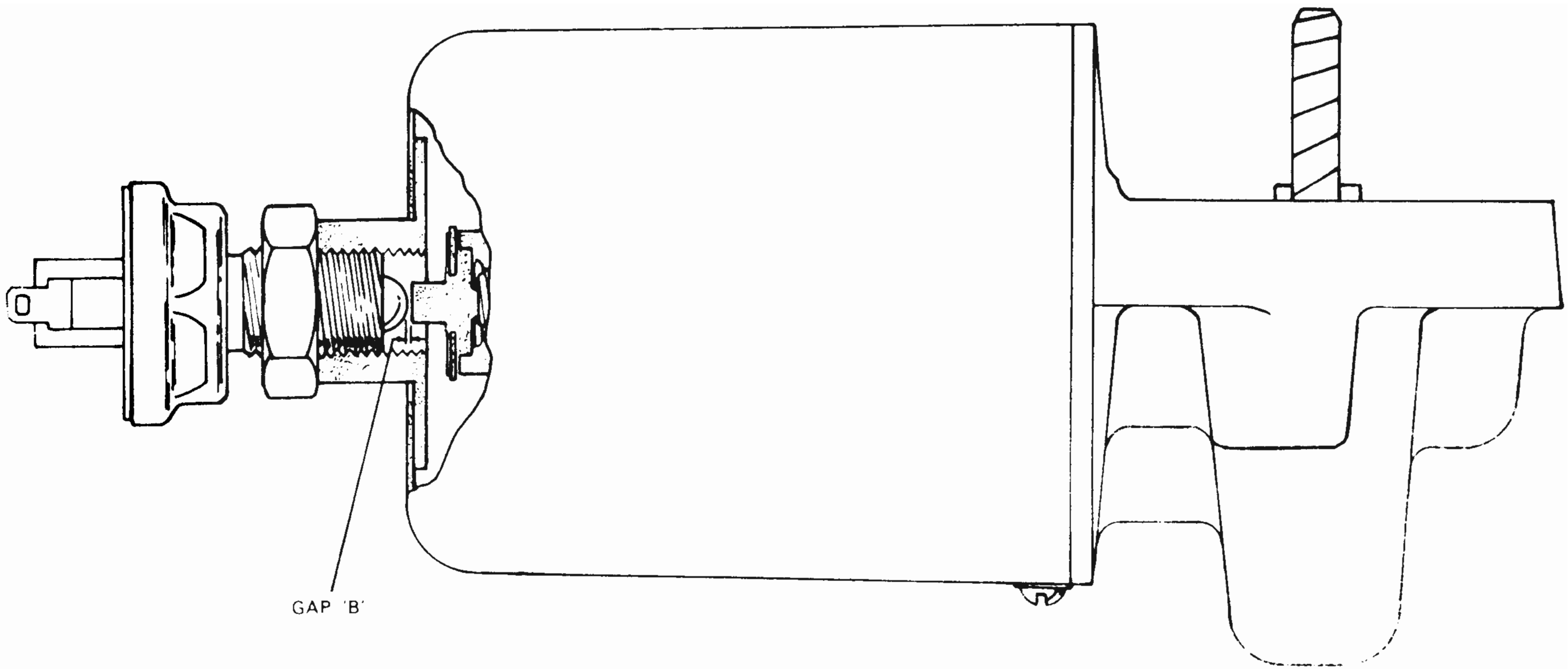
20. Install and tighten eight bolts to 13 lb./ft.

21. Install Dunlop Maxaret (see Sec.B7).

22. Install speedometer pinion and adapter (see Sec.B9 & B10).

23. Install dipstick/filler pipe and converter.

> IMPORTANT:
>
> At least four hours is needed for the LOCTITE sealant to harden completely. During this period there should be no attempt made to turn the output shafts by hand, to manoeuvre the car with either or both of the propeller shafts connected, or to drive the car.



SET GAP 'B' TO 0·005 in. BY SCREWING IN SWITCH UNTIL ELECTRICAL CONTACT IS MADE AND THEN UNSCREWING **EXACTLY** HALF A TURN.

SWITCH TO BE HELD FIRMLY AGAINST ROTATION BY ITS HEXAGON WHEN TIGHTENING LOCKNUT TO A TORQUE OF 22-24 lb/ft

Fig. B.14 MAXARET UNIT

B.6 ASSEMBLY FOR DESPATCHING TO JENSEN MOTORS

1. Place adapter casting face down on a bench (freewheel assembly uppermost).
2. Place abutment ring into bore of output shaft bearing, install needle bearing track (Fig.B12) and tighten screws.
3. Replace thrust washer
4. Refit control gear sleeve, control unit assembly and thrust washer.
5. Place connecting sleeve in position.
6. Lower main casing assembly into position and replace bolts.

> NOTE:
>
> It is not necessary to fit a new gasket if the old one has been damaged during dismantling.

7. Replace carrier assembly (Fig.B13).
8. Replace oil feed pipe.
9. Place thrust washer in position and refit tailshaft housing assembly.
10. Replace Dunlop Maxaret and joint (with the four 0.10 in. thick 5/16 washers) taking care not to damage the fibre gear with the mating gear on the control unit.
11. Parcel the external circlip and split ring separately and affix to transmission.

B.7 DUNLOP MAXARET, REMOVAL & INSTALLATION

Removal

1. Remove four screws and carefully lift off complete unit, (Fig.B14) taking care not to damage the special oil-resistant rubber joint or to drop or misplace the four 0.10 in. thick 5/16 steel washers. It may be that the unit has adhered to the transmission, in which case the seal will have to be "broken" by tapping gently with a hide hammer in the vicinity of the four screw bosses.

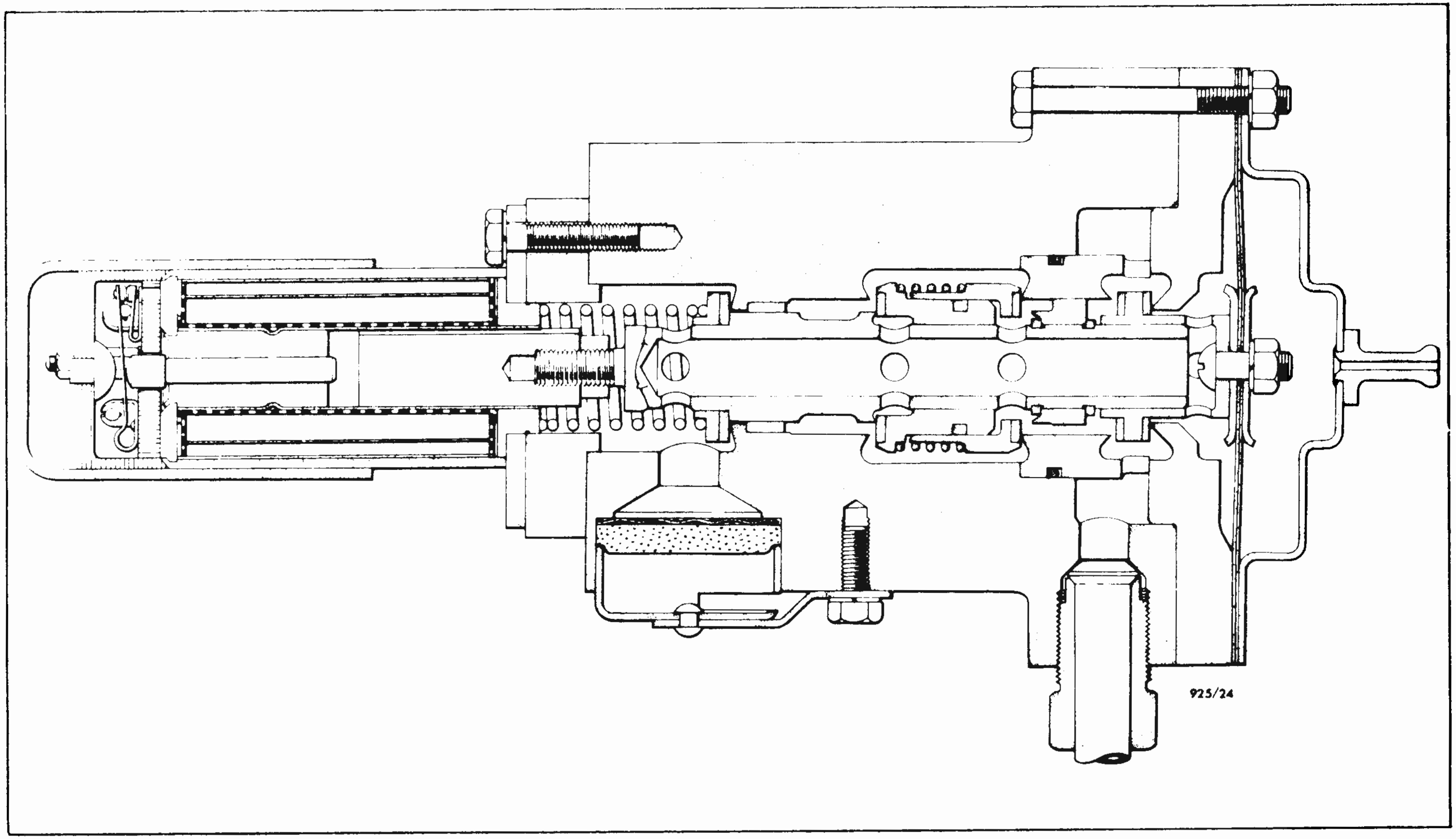


Fig. B.15 CROSS-SECTION OF SERVO CONTROL U

IMPORTANT:

No force to be applied to the Maxaret body. If the unit is dropped or damaged in any way it must be returned to Jensen Motors.

Installation

1. Remove all traces of jointing compound from the joint faces of the Maxaret and transmission.

2. Apply HYLOMAR universal jointing compound to the joint face of the transmission and to one side of the rubber joint. Allow to air-dry for at least ten minutes.

3. Carefully place the rubber joint in position on the transmission (compound treated faces together) and install 0.10 in. thick steel washers.

4. Place Maxaret in position, install four screws with washers and tighten to 13 lb./ft.

B.8 SERVO CONTROL VALVE REMOVAL AND REPLACEMENT

1. Remove solenoid lead and four pipe connections.

2. Remove two bolts securing bracket to wheel arch.

3. For refitting reverse the above procedure.

B.9 RECONDITIONING SUB-ASSEMBLIES

Adapter Casting Oil Seal

Removal

The Transmission will have to be removed from the car and dismantled following the procedure given in Section B4.

1. Warm the adapter casting to 80 - 90°C by placing in an oven and press out bearing assembly using tool H.F.R. No. SKT.1098.

2. Remove and discard oil seal.

Replacement and Installation

1. Install new oil seal H.F.R. part No. SD11/173.

> IMPORTANT:
>
> Using tool H.F.R. No. SKT.1097 ensure that the tool just contacts the machined face of the adapter casting.

2. Replace casting in oven and warm to a temperature not less than 70°C and not more than 85°C.

> WARNING:
>
> Should this temperature be exceeded for any reason the seal will be rendered useless and must be replaced.

Install bearing assembly, using tool H.F.R. No. SKT.1098.

3. Apply petroleum jelly between the lips of the oil seal.
4. Rebuild transmission following the procedure given in Section B.5.

Tailshaft Housing Bushing and Oil Seal

Removal

> NOTE:
>
> The tailshaft housing can be removed without removing the transmission from vehicle.

1. Disconnect rear propeller shaft at rear universal joint. Carefully pull shaft assembly out of the tailshaft housing.
2. Remove eight bolts securing tailshaft housing to chain case, then remove tailshaft housing assembly. Remove and discard joint.

Replacement

1. Prise or drive oil seal out of tailshaft housing with a long blunt drift. Be sure not to mar oil seal surface in the housing.
2. Press or drive out bushing with tool Chrysler part no. C-3974.

3. Slide a new bushing on installing end of tool C-3974. Align oil hole in bushing with oil slot in housing, then press or drive bushing into place.

4. Carefully check the internal diameter of the new bush. It should be 1.687/1.688. If it is less than this the bearing will have to be bored out to these dimensions.

5. Drive a new oil seal into housing with Tool Chrysler No. C-3972.

Installation

1. Place a new tailshaft housing joint on the tailshaft housing.

> NOTE:
>
> On later transmissions the spigot is on the chaincase in which case the joint will be placed on the chaincase. Install tailshaft housing assembly.

2. Install and tighten extension housing bolts to 13 lb./ft.

3. Smear petroleum jelly around oil seal lips.

4. Carefully guide front universal joint yoke into tailshaft housing and onto the output shaft splines. Connect propeller shaft to rear axle pinion shaft yoke. Tighten screws to 170 lb./in.

5. Add fluid to transmission to bring up to proper level.

> NOTE:
>
> This must be done when the transmission is cold, prior to test running vehicle.

B.10 SPEEDOMETER PINION

Removal and Installation

Rear axle gear ratio and tyre size determined pinion gear size requirements. In the case of the Jensen FF, the pinion has 30 teeth meshing with 13 teeth on the Chrysler output shaft.

1. Remove bolt and retainer securing speedometer pinion adapter in the extension housing.

2. With cable housing connected, carefully work adapter and pinion out of the extension housing.

3. If transmission fluid is found in cable housing, replace seal in the adapter.

> CAUTION:
>
> Before installing pinion and adapter assembly make sure adapter flange and its mating area on extension housing are perfectly clean. Dirt or sand will cause mis-alignment, resulting in speedometer pinion gear noise.

4. Select pinion range numbers on outside of adapter to correspond with number of pinion teeth.

5. Install adapter in pinion housing with pinion range numbers aligned with 6 o'clock position.

6. Install retainer and bolt with retainer tangs in adapter positioning slots. Tap adapter firmly into the extension housing and tighten retainer bolt to 100 lb./in.

B.11 LIST OF TOOLS AND FIXTURES NEEDED TO SERVICE THE FERGUSON 4-WHEEL DRIVE TRANSMISSION

Part No.	Description
H.F.R. SKT. 976	Repair stand
H.F.R. SKT.1096	Extractor - planet carrier assembly
H.F.R. SKT.1097	Dummy shaft - oil seal - adapter casting assembly
H.F.R. SKT.1098	Extractor/installation - bearing assembly - adapter casting assembly
Chrysler C-3972	Dummy shaft - oil seal - tailshaft housing assembly
Chrysler C-3974	Extractor/Installation - bushing - tailshaft housing assembly

FRONT AXLE AND SUSPENSION

INDEX

C.6 GENERAL DATA

Hub Bearings

	Inner:	Timken LM67010/LM67048
	Outer:	Timken LM11910/LM11949

Castor Angle

2° "Positive"

Camber Angle

1° "Positive"

Swivel Pillar Inclination

6° - 30'

Toe-in

1/16 in. at wheel rim

Front Road Spring

Rate	488 lb. in.
Free length	12.54 in.
Compressed length	8.68 in.
Number of effective coils	6.1/16
Diameter of wire	0.685 in.
Outside diameter of coil	5.43 in.

Front Dampers

Girling hydraulic - Piston type. Double acting.

C.7 TIGHTENING TORQUES

*Upper Fulcrum to chassis	3/8 - 24	30 lb. ft.
Upper Fulcrum Pin (fit split pin)	1/2 - 20	70 lb. ft.
Damper Top fixing - Std. nut	3/8 - 24	20 lb. ft.
- Locknut	3/8 - 24	30 lb. ft.
Rebound rubber	3/8 - 24	30 lb. ft.
*Upper B/J to Swivel Pillar	1/2 - 20	50 lb. ft.
*Upper B/J to Upper Wishbone	3/8 - 24	30 lb. ft.
*Caliper Mtg. Plate to Swivel Pillar	3/8 - 24	30 lb. ft.
*Steering Arm	7/16 - 20 (T)	65 lb. ft.
*Disc to Hub	7/16 - 20	50 lb. ft.
*Wheel Stud Nut	7/16 - 20	50 lb. ft.

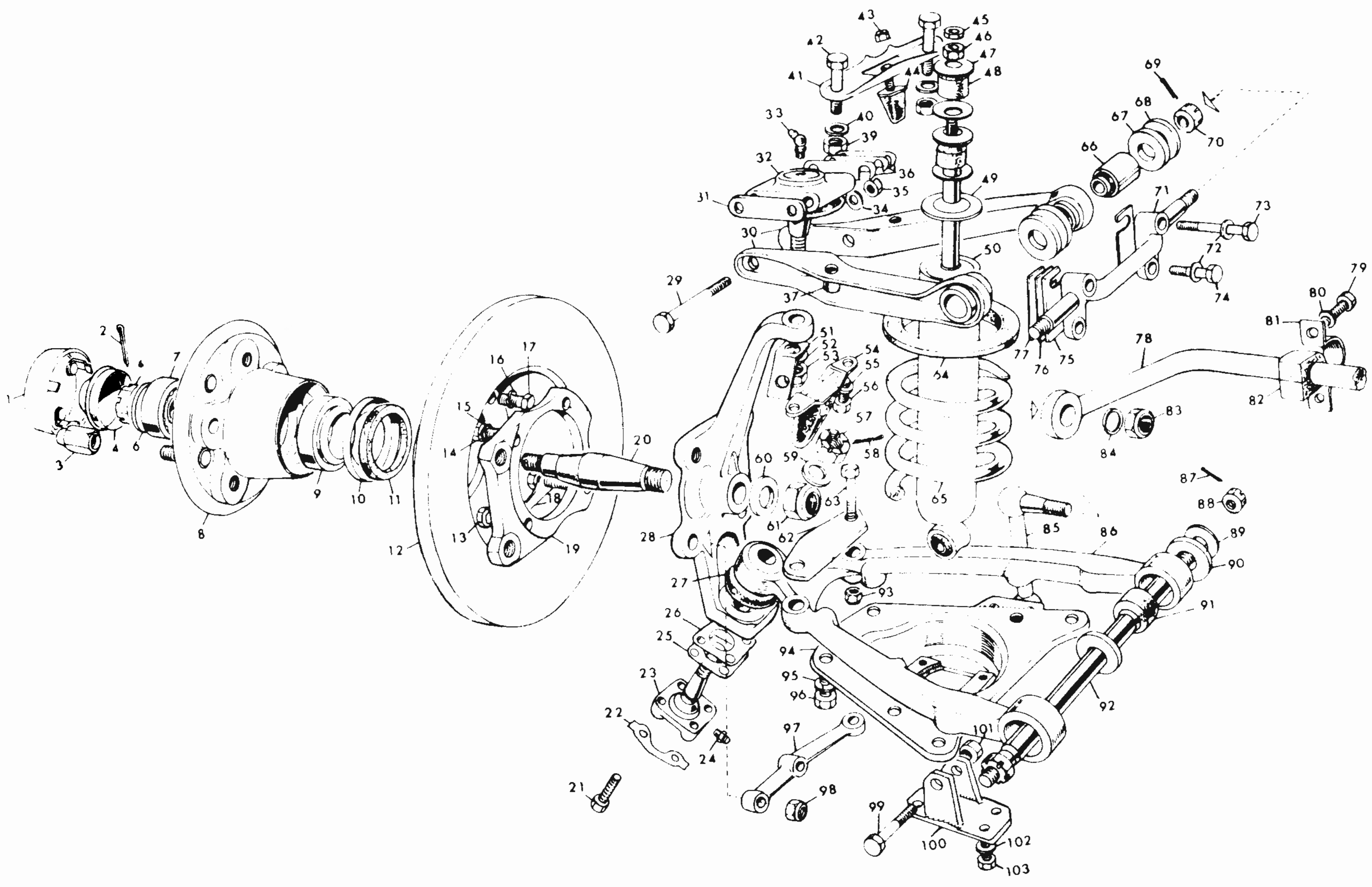


Fig. 6.5 SUSPENSION - INTERCEPTOR

1. Hub cap.
2. Split pin.
3. Wheel nut
4. Grease cap.
5. Hub nut.
6. Hub nut washer.
7. Hub bearing (outer).
8. Front hub c/w studs
9. Hub bearing (inner).
10. Oil Seal Cover.
11. Hub oil seal.
12. Brake disc.
13. Bolt.
14. Bolt.
15. Spring washer.
16. Spring washer.
17. Bolt.
18. Lock plate.
19. Caliper adaptor plate.
20. Stub axle.
21. Bolt.
22. Locking plate
23. Lower ball joint.
24. Shim.
26. Shim.
27. Rubber gaiter
28. Swivel pillar.
29. Bolt.
30. Upper wishbone arm
31. Distance piece.
32. Upper ball joint.
33. Grease nipple.
34. Washer.
35. Nut.
36. Shims.
37. Spacer.
38.
39. Nut.
40. Washer.
41. Rebound stop bracket.
42. Bolt
43. Nut.
44. Rebound rubber.
45. Locknut.
46. Nut.
47. Dished washer.
48. Rubber buffer.
49. Washer.
50. Front damper.
51. Bracket.
52. Washer.
53. Nut.
54. Bump rubber.
55. Washer.
56. Screw.
57. Slotted nut.
58. Split pin.
59. Washer.
60. Washer.
61. Nut.
62. Bump plate.
63. Bolt.
64. Seating rubber.
65. Front road spring
66. Upper wishbone bush.
67. Washer.
68. Washer.
69. Split pin.
70. Slotted nut.
71. Fulcrum shaft.
72. Washer.
73. Bolt.
74. Bolt.
75. Shim.
76. Shim.
77. Shim.
78. Anti-roll bar.
79. Screw.
80. Washer.
81. Bracket.
82. Anti-roll bar bush.
83. Nut.
84. Washer.
85. Vertical link-anti-roll bar.
86. Lower wishbone.
87. Split pin.
88. Slotted nut.
89. Washer.
90. Washer.
91. Lower wishbone bush.
92. Fulcrum shaft.
93. Nut.
94. Spring seat pan.
95. Spring washer.
96. Screw.
97. Steering arm.
98. Nut.
99.
100.
101. Nut.
102. Washer.
103. Screw

Fig. [illegible] - INTERCEPTOR

C.7 TIGHTENING TORQUES (cont.)

*Lower B/J (fit split pin)	9/16 - 18	60 lb. ft.
Bump rubber	3/8 - 24	30 lb. ft.
Bump rubber bkt.	5/16 - 24	20 lb. ft.
*Spring Pan to Wishbone	3/8 - 24	30 lb. ft.
Damper Brkt. to Spring Pan	5/16 - 24	20 lb. ft.
Damper Lower Fixing	7/16 - 20	50 lb. ft.
Lower Link Spindle (fit split pin)	9/16 - 18	70 lb. ft.
Caliper to Adaptor Plate	7/16 - 20 (T)	65 lb. ft.
Stub to Swivel Pillar	5/8 - 18	160 lb. ft.
**Hub to Stub	9/16 - 18	90 lb. in.

* Extra care must be taken to ensure that the correct torque figures are maintained.

** Tighten whilst rotating hub to specified torque. Back off nut to next hole/slot alignment and fit split pin. This should give the 0.002 in. - 0.006 in. permissible end play.

C.8 BRIEF DESCRIPTION

The independent front suspension comprises the following components.

Top and bottom, unequal length, double transverse links, connected to the stub carriers by spherical bearings.

Vertical coil springs.

Double acting telescopic type dampers, co-axial with springs.

Torsional anti-roll bar.

C.9 FRONT HUB

Remove

1. Slacken road wheel nuts.
2. Jack-up car and place block under suspension spring plate and lower onto block
3. Remove road wheel.
4. Remove brake caliper and brake pipe bracket at top of vertical link and suspend the caliper with a suitable piece of wire to avoid damage to the brake hose.

5. Remove grease cap, split pin, axle nut and flat washer.

6. Withdraw front hub, complete with both bearings and oil seal.

7. Insert a drift through the outer bearing and gently tap out the inner bearing outer race and oil seal.

8. Remove outer bearing outer race in similar manner to above.

9. For brake disc removal see Section G.

Refit

1. Refit hub end, tighten axle nut with a torque wrench to 90 lb. in. while hub is rotated.

2. Back off nut to the nearest slot/hole position and insert new cotter pin.

3. Check the brake disc run-out and end float with a dial test gauge. This should not exceed 0.005 in. If the run-out is excessive the disc should be repositioned on the hub.

4. Repack grease cap with recommended grease. Refit.

5. Fit the brake caliper using a new lock plate and tighten the securing bolts to 55 lb. ft. torque.

6. Fit road wheel and jack down. The wheel nuts should be finally tightened when the wheels are on the ground.

C.10 FRONT SUSPENSION - SERVICING

Front Dampers

The telescopic hydraulic dampers are of the sealed type with no provision for adjustment or "topping up" with fluid. Therefore, in the event of a damper being unserviceable a replacement must be fitted.

Removal

Removal of the hydraulic dampers will be facilitated if the wishbone levers are kept approximately horizontal, by interposing a fibre packing piece between the upper wishbone levers and the cross-member turret.

Jack up the car under the front suspension cross-member until the wheels are clear of the ground. Remove the road wheel.

Remove the locknut and nut from the top mounting of the damper and withdraw the outer washer, rubber buffer and inner washer; note the difference between the inner and outer washer.

Remove the four set-bolts and washers attaching the hydraulic damper mounting bracket to the coil spring seat, when the damper can be withdrawn.

Refitting

Refitting is the reverse of the removal procedure.

C.11 COIL SPRING REMOVAL

Remove the hydraulic damper as described in section C.10.

Insert the coil spring compressor (Part No. JMJD6D/2) through the centre of the spring and compress the spring sufficiently to relieve the load on the spring seat pan screws.

Detach the anti-roll bar link arm from the bracket welded to the rear edge of the spring pan by withdrawing the pin.

Remove the six setscrews and spring washers which secure the seat pan to the lower wishbone.

Release the coil spring compressor until the load of the spring is completely relieved. Completely unscrew the compressor when the coil spring, packing piece and seat pan can be removed.

Refitting

Refitting is the reverse of the removal procedure. Alignment of the seat pan holes with the tapped holes in the lower wishbone will be facilitated if two 8 in. (20 cm) long pilot studs (threaded 3/8 in. UNF) are fitted diagonally.

C.12 STUB AXLE CARRIERS

Removal

Jack-up under the lower wishbone lever and remove the road wheel.

Remove the caliper from the stub axle carrier, noting the shims fitted at the mounting points, and remove the front wheel hub complete with disc brake as described in section C.9.

Remove the self-locking nut and plain washer securing the upper ball joint to the stub axle carrier in which it is a taper fit.

Remove the split pin, nut and plain washer which secure the ball joint to the lower wishbone.

Drift out the ball pin from the lower wishbone, in which it is a taper fit, when the stub axle carrier can be removed.

Refitting

Refitting is the reverse of the removal procedure.

C.13 LOWER WISHBONE

Removal

Remove the coil spring as described in section C.11.

Remove the stub axle carrier as described in section C.12.

Withdraw the split pins, slotted nuts and washers from both ends of the lower wishbone fulcrum shaft.

Attach withdrawal adaptor to front of shaft and use compression tool, Part No. JD6D/2JML to withdraw the shaft.

Fitting the Rubber/Steel Bushes

Drift out or press out the bush from the wishbone eye. Press the new bush into the eye, ensuring that the bush projects from each side by an equal amount. Fitting of the bush will be facilitated if a lubricant, made up of twelve parts of water to one part of liquid soap, is used.

Refitting

Refitting is the reverse of the removal procedure. When refitting the fulcrum shaft the car should be in the normal riding position before the units at each end of the shaft are fully tightened. Omitting to carry out this procedure will result in undue torsional loading of the rubber bushes with possible premature failure.

LOWER WISHBONE BALL JOINT

Removal

Remove the stub axle carrier complete with the lower wishbone ball joint as described in section C.12.

Dismantling

Release the wire clip and remove the rubber gaiter. Withdraw the retainer from the top of the ball pin.

Tap back the tab washer and unscrew the four setscrews securing the ball pin cap to the stub axle carrier.

Remove the cap, shims, ball pin socket, spigot and ball pin.

Reassembling

Reassembling is the reverse of the dismantling procedure but, if necessary, re-shim the ball joint to obtain the correct clearance of 0.004 in. - 0.006 in. (0.10 mm - 0.15 mm).

NOTE:

Shims should not be removed to take up excessive wear in the ball pin and socket; if these parts are badly worn, replacements should be fitted.

Adjustment of the Ball Joint

The correct clearance of the ball pin in its sockets is 0.004 in. - 0.006 in. (0.10 mm - 0.15 mm). Shims for adjustment of the ball joint are available in 0.002 in. (0.05 mm) and 0.004 in. (0.10 mm) thicknesses.

To adjust the ball pin clearance to the correct figure, remove shims one by one until, with ball cap fully tightened, the ball is tight in its sockets. Fit shims to the value of 0.004 in. - 0.006 in. (0.10 mm - 0.15 mm) which should enable the shank of the ball pin to be moved by hand.

Refitting

Refit the stub axle carrier complete with the lower wishbone ball joint as described in section C.12.

UPPER WISHBONE

Removal

Jack up under the lower wishbone and remove the road wheel.

Remove the two bolts, nuts and plain washers securing the ball joint to the upper wishbone levers. Note the relative positions of the packing piece and shims as these control the castor angle. Alternatively, remove the self-locking nut and drift out the ball joint from the stub axle carrier. Tie-up the stub axle carrier to the suspension cross-member so that the flexible brake hose does not become extended.

Remove the four set bolts which secure the upper wishbone fulcrum shaft to the suspension cross-member turret. Note the relative positions of the shims as these control the camber angle.

The upper wishbone assembly can now be removed.

Dismantling

Remove the nuts, bolts and distance pieces securing the rebound stop bracket to the upper wishbone levers.

Extract the split pin and remove the slotted nuts and plain washers which secure the wishbone levers to the fulcrum shaft. The wishbone levers can now be removed from the fulcrum shaft.

Fitting the Rubber/Steel Bushes

Drift out or press out the bush from the wishbone eye. Press the new bush into the eye, ensuring that the bush projects from each side by an equal amount. Fitting of the bush will be facilitated if a lubricant, made up of twelve parts of water to one part of liquid soap is used.

Reassembling

The reassembly of the upper wishbone assembly is the reverse of the dismantling procedure but the slotted nuts securing the wishbone levers to the fulcrum shaft must not be tightened until the upper wishbone assembly has been refitted and the full weight of the car is on the suspension. Omitting to carry out the procedure will result in undue torsional loading of the rubber bushes with possible premature failure.

Refitting

Refitting is the reverse of the removal procedure.

Upper Wishbone Ball Joint

The upper wishbone ball joint cannot be dismantled and, if worn, the complete assembly must be replaced.

Removal

Jack up the car under the lower wishbone and remove the road wheel.

Remove the two bolts, nuts and plain washers securing the ball joint to the upper wishbone levers. Note the relative positions of the packing piece and shims as these control the castor angle.

Remove the self-locking nut and plain washer which secure the ball joint to the stub axle carrier.

The ball joint can now be drifted out of the stub axle carrier in which it is a taper fit.

> NOTE:
>
> When carrying out the above operation do not allow the flexible brake hose to become extended: tie up the stub axle carrier to the cross-member turret.

Refitting

Refitting is the reverse of the removal procedure. Ensure that the packing piece and shims are refitted in their original positions otherwise the castor angle will be upset.

C.14 CASTOR ANGLE ADJUSTMENT

When carrying out this adjustment both front seats should be occupied (or equivalent weights added) and the fuel tank half full.

Ensure that the tyre pressures are correct and that the car is standing on a level surface.

Using an approved gauge, check the castor angle. Castor Angle ... $2^\circ \pm \frac{1}{4}^\circ$.

> NOTE:
>
> The two front wheels must be within a $\frac{1}{4}^\circ$ of each other.

Adjustment is effected by either transposing the shims from the rear of the upper wishbone ball joint to the front, or transposing the packing piece and shim(s).

To decrease negative castor or increase positive castor transpose shims from the rear of the upper wishbone ball joint to the front, the holes in the shims are slotted and therefore it will only be necessary to slacken the two bolts securing the upper wishbone members to enable the shims to be removed.

To increase negative castor or decrease positive castor, transpose the packing piece and shims as necessary. As the holes in the packing piece are not slotted it will be necessary to remove the two bolts after first having placed a support under the brake disc or lower wishbone.

The shims are 1/16 in. (1.6 mm) thick and it should be noted that 1/16 in. (1.6 mm) of shimming will alter the castor angle by approximately 1/4°.

The front of the car should be jacked up when turning the wheels from lock to lock during checking.

If any adjustment is made to the castor angle, the front wheel alignment should be checked, and, if necessary, re-set.

> NOTE:
>
> A packing piece and 3 shims must be always fitted between the wishbone levers and the upper ball joint; their relative positions may, of course, not always be the same.

Camber Angle Adjustment

When carrying out the adjustment both front seats should be occupied (or equivalent weights added) and the fuel tank half full.

Ensure that the tyre pressures are correct and that the car is standing on a level surface.

Line up the front wheel being checked parallel to the centre line of the car. Using an approved gauge, check the camber angle. Rotate the wheel being checked through 180° and re-check.

Camber angle .... 1° + 1/4 ° positive.

> NOTE:
>
> The two front wheels must be within a 1/4 ° of each other.

Adjustment is effected by removing or adding shims at the front suspension top of wishbone bracket; the holes in the shims are slotted and it is therefore only necessary to slacken the setscrews securing the bracket to enable the shims to be removed. Inserting shims decreases positive camber - removing shims decreases negative camber or increases positive camber. Remove or add an equal thickness of shims from each position, otherwise the castor angle will be affected. Shims for the adjustment of camber are available in 1/4 in. (6.4 mm) 1/8 in. (3.2 mm) and 1/16 in (1.6 mm) thicknesses and it should be noted that 1/16 in. (1.6 mm) of shimming will alter the camber angle by approximately 1/4 °.

Check the other front wheel in a similar manner. If any adjustment is made to the camber angle, the front wheel alignment should be checked, and, if necessary re-set.

C.15 ACCIDENTAL DAMAGE

The following dimensioned drawings are provided to assist in assessing accidental damage. A component suspected of being damaged should be removed from the car, cleaned off, the dimensions checked and compared with those given in the appropriate illustration.

Fig. C.7 Top Link
Fig. C.8 Lower Wishbone
Fig. C.9 Swivel pillar

C.15a JACKING-UP

When jacking up the car at the front end precautions are necessary to avoid damage to the cross-member.

For this purpose, it is recommended that a steel bar measuring 3" x 5/8" x 23" be placed between the jack-pad and the cross-member.

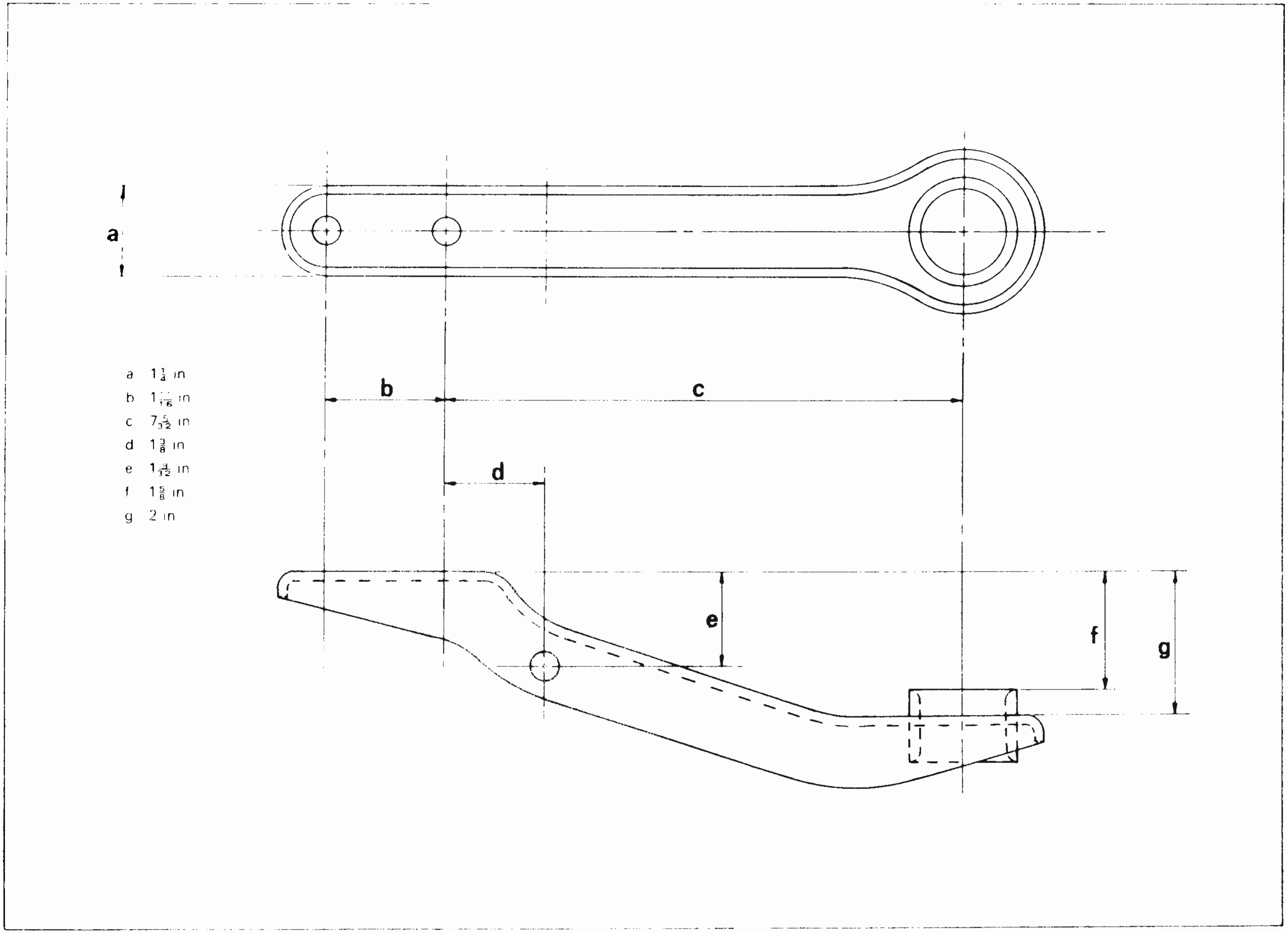
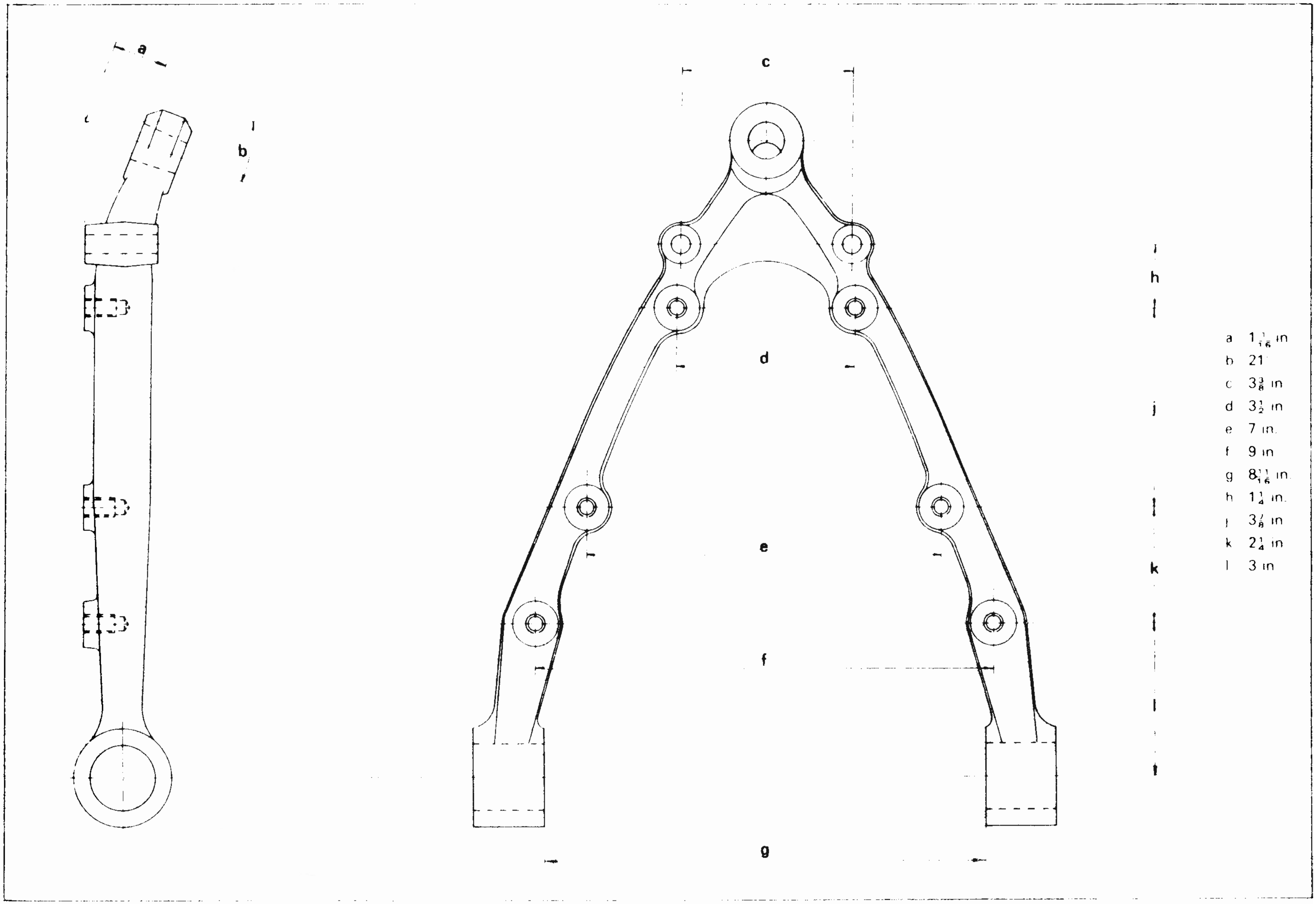
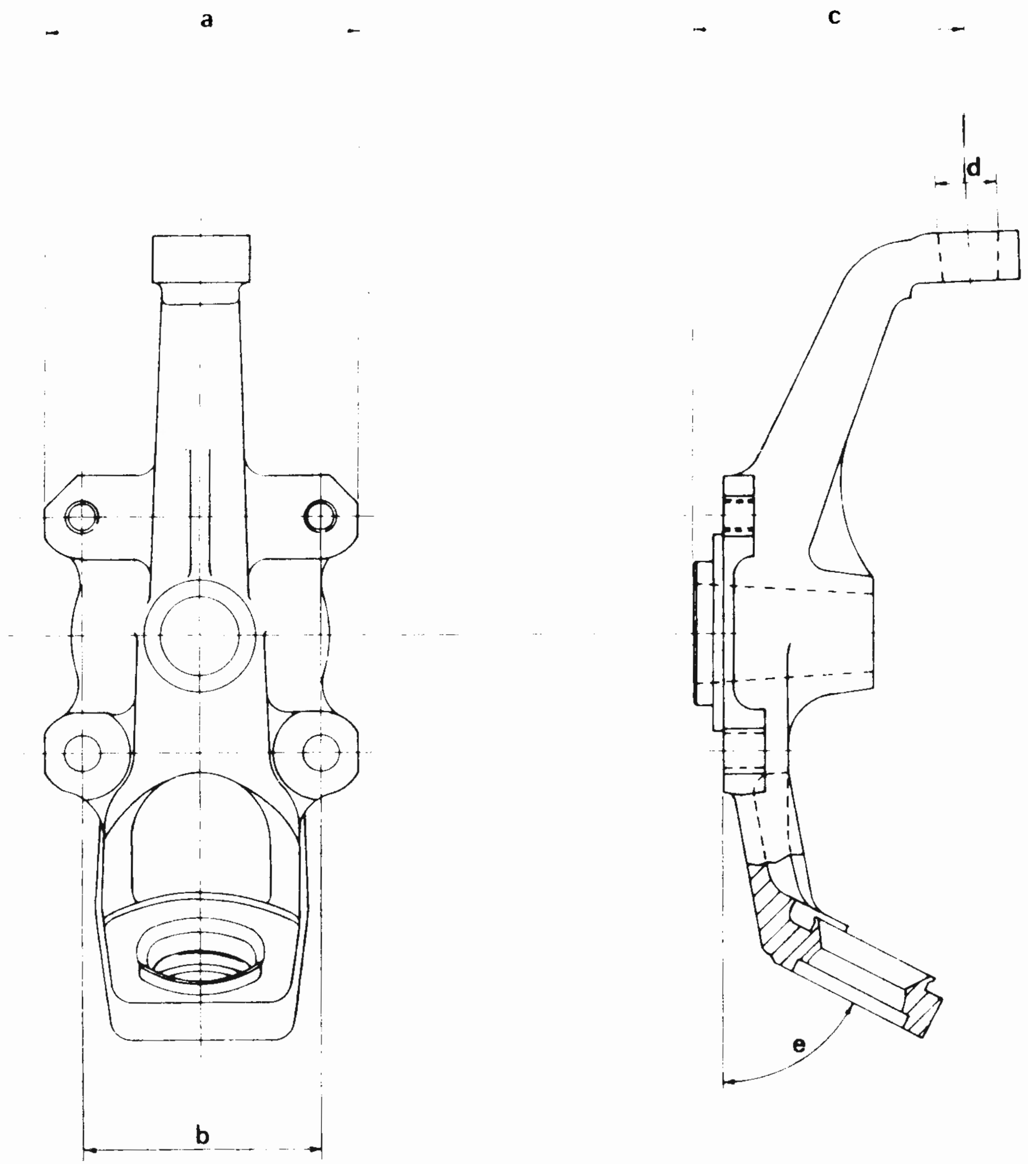


Fig. C.7 UPPER WISHBONE LEVER


a 1 1/16 in
b 21°
c 3 3/8 in
d 3 1/2 in
e 7 in.
f 9 in
g 8 11/16 in.
h 1 1/4 in.
j 3 7/8 in
k 2 1/4 in
l 3 in



a $3\frac{15}{16}$ in
b 3 in
c 3 414 in
d $\frac{3}{4}$ in
e $62\frac{1}{2}$

Fig. C.9 SWIVEL PILLAR

C.16 GENERAL DATA

Hub Bearings:	
Inner and Outer	Timkin No. LM.29749/LM.29710
	Bore 1.50. Outside Dia.2.5625
Castor Angle:	1° Positive
Camber Angle:	1° Positive
Swivel Axis Inclination:	7°
Front Road Springs	
Free length	14.18 in.
Compressed length (static load)	8.72 in.
Number of effective coils	12.5
Diameter of Wire	0.43 in.
Inside Diameter of Coil	2.62 in.
Outside Diameter of Coil	3.48 in.
Dampers	Armstrong Type AT 7
Type	Telescopic - Double Acting
Mounting	Rubber Bushes
Front Differential Unit	
Manufacturer	Salisbury Transmission
Type	4HA. Frame-Mounted
Ratio	3.07:1 Cross ply tyres
	2.88:1 Radial ply tyres
Oil Capacity	3-pints (IMP) 3.6 (U.S.)
	1.7-litres
Drive Gears	Hypoid Bevel
Drive Gear Teeth	43 - 3.07:1 49 - 2.88:1
Drive Pinion Teeth	14 - 3.07:1 17 - 2.88:1
Drive Gear & Pinion Backlash	Approx. 0.005 in. - 0.007 in.
	The correct setting is etched on Drive Gears for each matched assembly.

TIGHTENING TORQUES

Position	Size	Torque
Upper link pivot	7/16 - 20 (T)	50 lb.ft.
* Upper link B/J block	5/16 - 24	20 lb.ft.

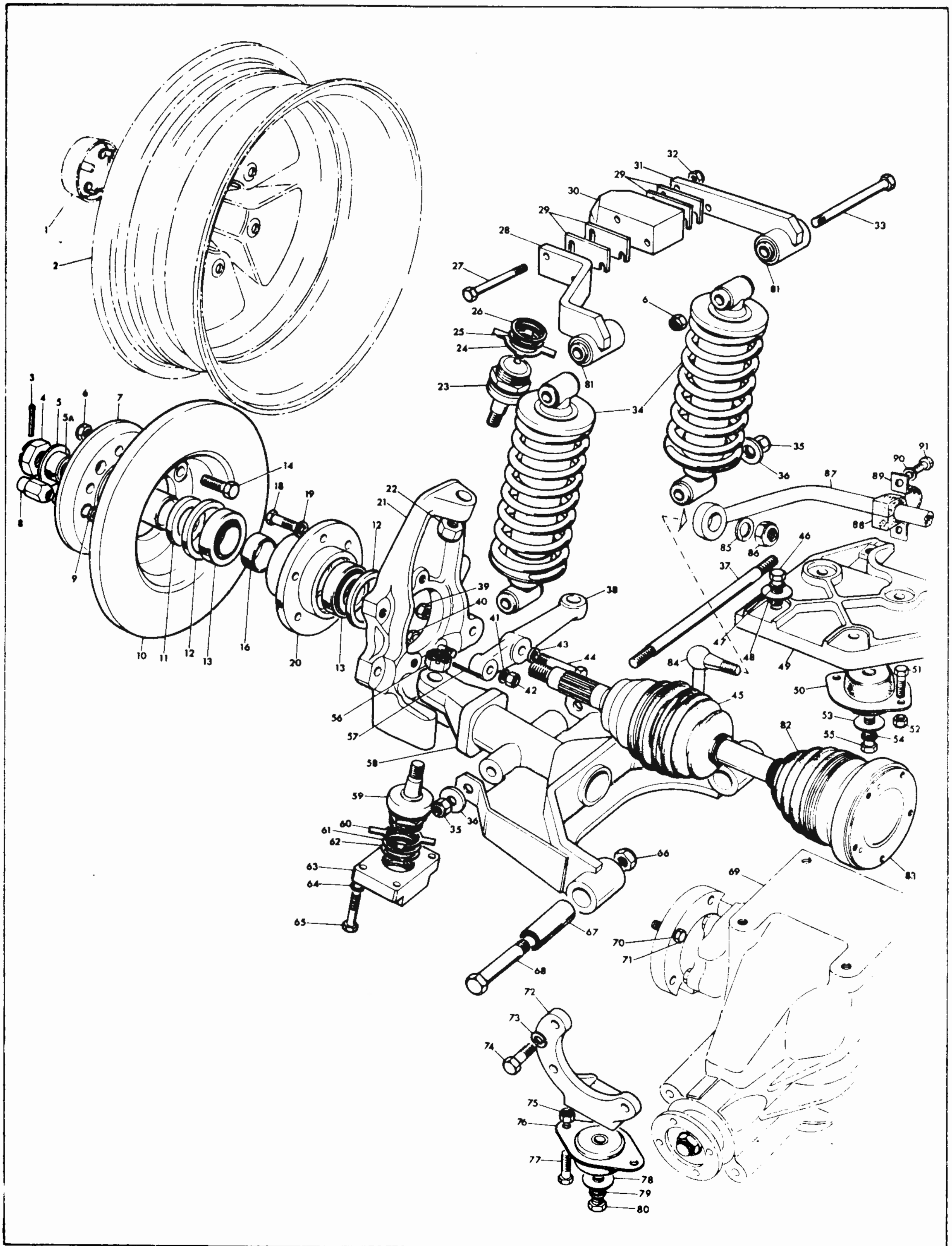


Fig. C.10 FRONT SUSPENSION - FF

1. Road wheel motif.
2. Road wheel.
3. Split pin.
4. Axle nut.
5. Axle nut washer.
5a. Spacer
6. Nut
7. Hub flange.
8. Road wheel nut.
9. Road wheel stud
10. Brake disc.
11. Spacer.
12. Oil seal.
13. Front hub bearing.
14. Bolt.
15.
16. Collapsible spacer.
17.
18. Bolt.
19. Washer.
20. Front hub.
21. Swivel pillar.
22. Nut.
23. Suspension ball joint. upper.
24. Lock plate.
25. Shims.
26. Shims.
27. Bolt.
28. Upper link arm rear.
29. Shims.
30. Housing for suspension ball joint upper.
31. Upper link arm front.
32. Nut.
33. Bolt.
34. Front spring - damper.
35. Nut.
36. Washer.
37. Spindle - lower link - outer.
38. Steering arm.
39. Nut.
40. Bolt.
41. Washer.
42. Nut.
43. Washer.
44. Bolt.
45. Rubber boot for inner C/V joint.
46. Bolt.
47. Spring washer.
48. Flange washer.
49. Support bracket for front differential.
50. Rubber mounting for front differential.
51. Bolt.
52. Nut.
53. Flange washer.
54. Spring washer.
55. Bolt.
56. Slotted nut-suspension lower ball joint.
57. Split pin.
58. Lower suspension link.
59. Suspension lower ball joint.
60. Lock washer.
61. Shims.
62. Shims.
63. Housing for suspension ball. joint - lower.
64. Washer.
65. Bolt.
66. Nut.
67. Bush.
68. Bolt.
69. Front differential unit.
70. Spring washer.
71. Bolt.
72. Support bracket for front differential.
73. Spring washer.
74. Bolt.
75. Nut.
76. Rubber mounting.
77. Bolt.
78. Spring washer.
79. Spring washer.
80. Bolt.
81. Bush.
82. Rubber boot for inner C/V joint.
83. Front driving shaft, assembly.

Fig. C.10 FRONT SUSPENSION FF

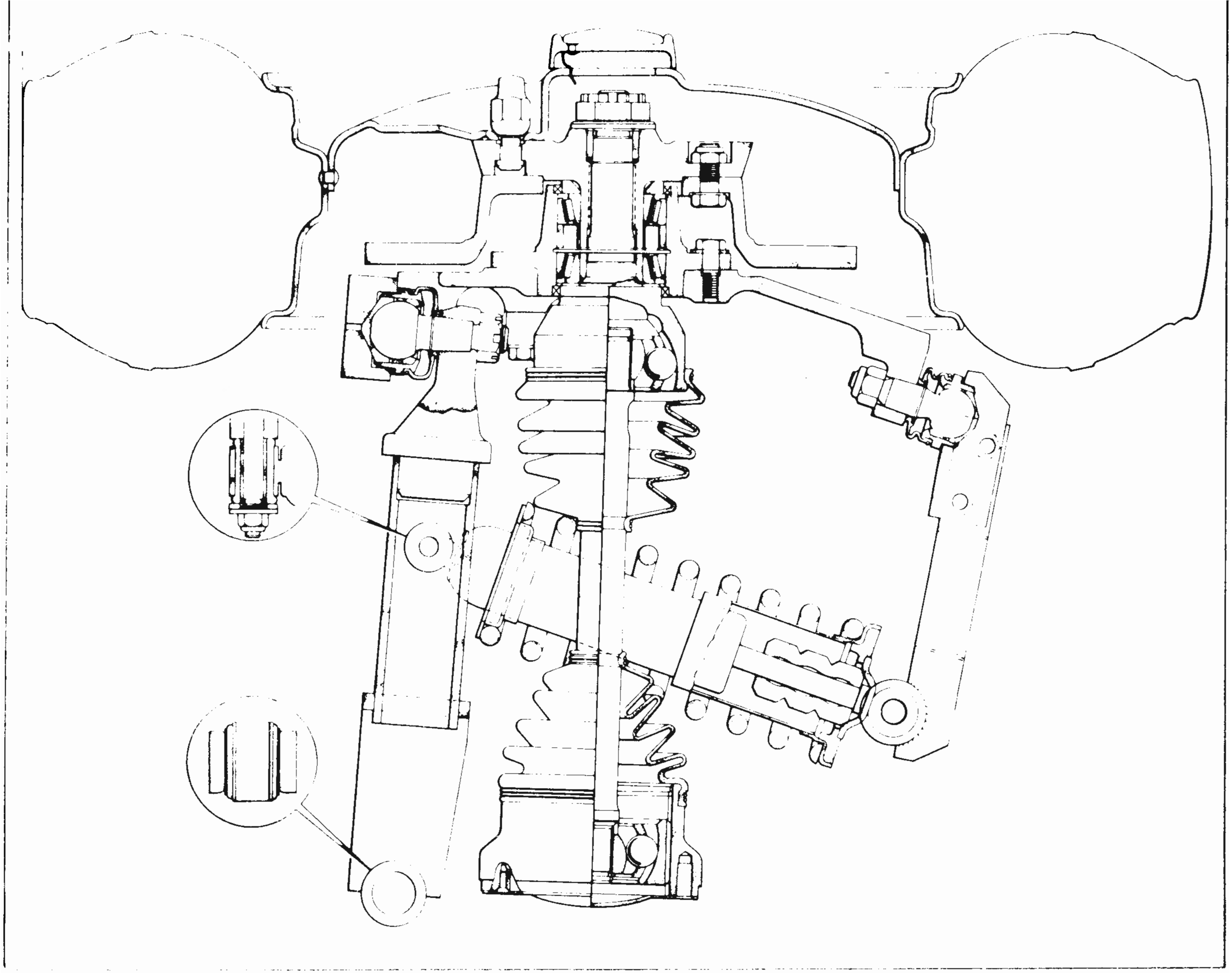


Fig. C.11 FRONT SUSPENSION - CROSS SECTION

TIGHTENING TORQUES (cont:)

*	Upper link B/J	1/2 - 20	35 lb.ft.
	Lower link pivot	1/2 - 20 (T)	50 lb.ft.
*	Lower link S/A spindle	3/8 - 24	30 lb.ft.
*	Lower link B/J block	5/16 - 24	20 lb.ft.
*	Lower link B/J	5/8 - 18	50 lb.ft.
	B/J upper to block		80 lb.ft.
	B/J lower to block		85 lb.ft.
	Bearing carrier to carrier	3/8 - 24	25 lb.ft.
*	Steering arm to carrier	1/2 - 20	50 lb.ft.
*	Steering arm to brg. carrier	3/8 - 24	30 lb.ft.
*	Caliper mtg. - Girling	1/2 - 20	55 lb.ft.
*	Caliper mtg.- Dunlop	1/2 - 20	85 lb.ft.
*	Disc to hub	7/16 - 20	50 lb.ft.
§	Hub to drive shaft		10 - 20 in.lb. (see below)
	Wheel nut	7/16 - 20	50 lb.ft.

§ NOTE:

Refer to Service News Bulletin dated 7th November, 1969 for correct tightening procedure. Tolerance is now 0.004 in. end float to 0.001 in. nip.

N.B.

Initial assembly of B/J's upper and lower to blocks for shim requirements should be at 20 lb.ft.

* NOTE:

Those items indicated by an asterisk are regarded as lethal and should be examined closely on all cars.

C.17 BRIEF DESCRIPTION

The FF independent front suspension comprises an offset frame-mounted differential unit which transmits drive to the front wheels via two extensile shafts. These shafts are fitted with constant velocity joints at both ends so that the angular velocity of the input shaft is faithfully reproduced at the steered road wheels. The inboard shaft joints are fitted with large diameter sliding couplings.

The frame-mounted differential unit for the front drive is offset to the left and is not fitted with a slip limiting device.

Twin helical spring damper units are fitted for each front wheel with the drive shafts passing between them and the swivel pillars are supported by widely separated ball joints. Taper roller bearings, separated by collapsible spacers support the road wheels which are secured to the hub flanges by five studs and nuts.

C.18 JACKING-UP FRONT END

When jacking up the car at the front end precautions are necessary to avoid damage to the sub frame.

For this purpose it is recommended that a steel bar measuring 3 in. x $^5/_8$ in. x 23 in. be placed between the jack pad and the sub frame in line with the front upper suspension link.

C.19 SUSPENSION GEOMETRY

There is no adjustment on camber angles although provision is made for castor adjustment. This is achieved by arrangement of shimming each side of the upper ball joint housing.

C.20 SWIVEL PILLAR BALL JOINTS

The Ball Joints are pre-loaded by shimming during manufacture. Should the setting become disturbed or should it be necessary to fit new joints the following procedure must be adopted:

1. Screw joint assembly into swivel bearing block until ball is 'nipped' in its housing.
2. Measure distance between joint hexagon and blocks and select shims to give 0.005 in. less than the measurement obtained.
3. Fit shims selected and tighten housing nuts to:

   80 lb. ft. Upper Joint
   85 lb. ft. Lower Joint

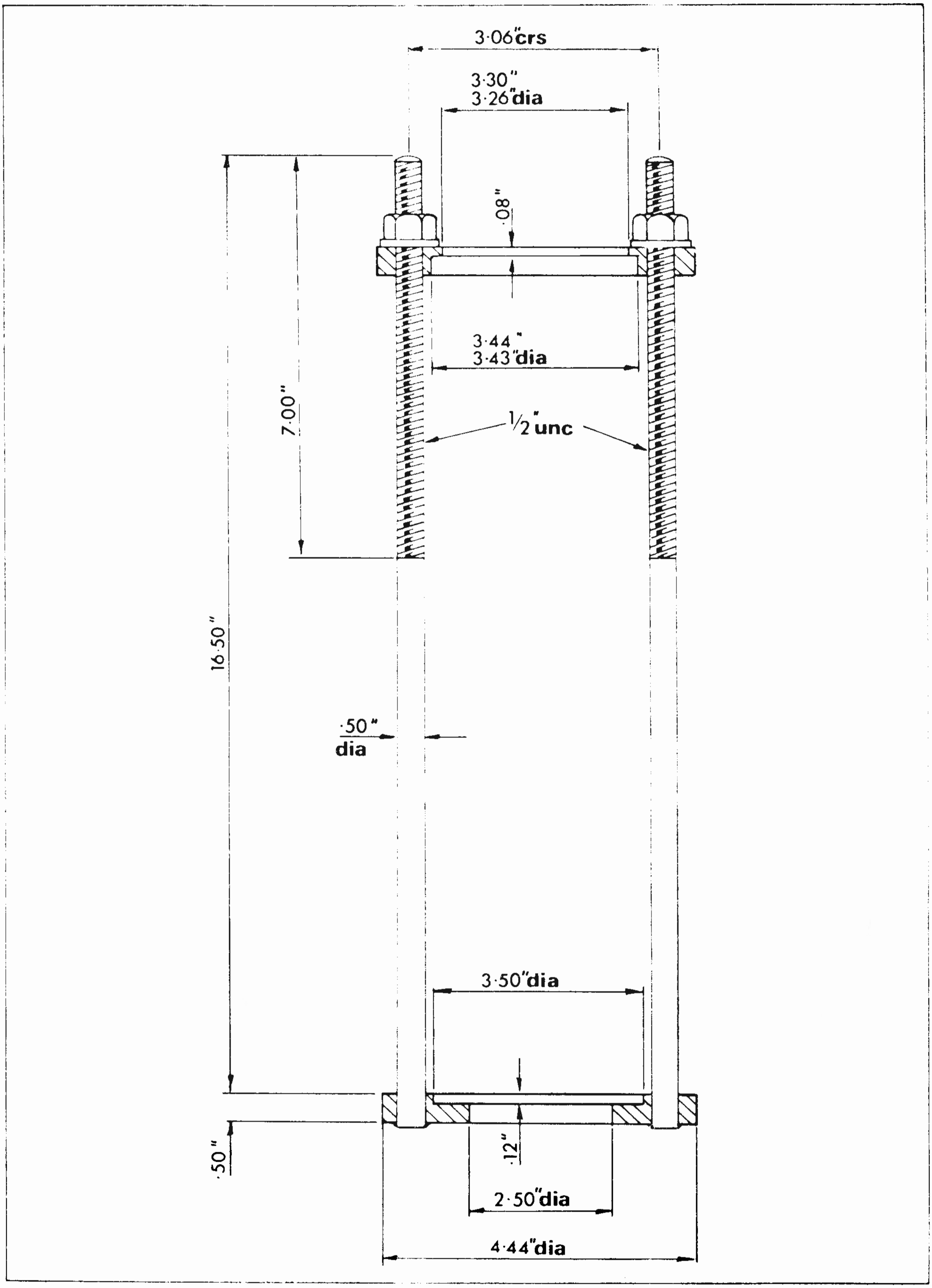


Fig. C.12 TOOL FOR REMOVING ROAD SPRING FROM DAMPER

C.21 SPRING DAMPER UNITS - REMOVE AND REFIT

Spring Damper Unit - Remove

1. Slacken Road Wheel nuts.
2. Jack up front of car, remove road wheel and support hub assembly in rebound position.
3. Remove the two Simmons nuts and bolts securing top of dampers and top links to frame.
4. Remove one Simmons nut from spindle securing dampers to lower link and remove spindle.
5. Withdraw spring units.
6. To separate spring from damper, compress spring and withdraw split collets using special tool shown in Fig. C.12. The dampers are sealed units and when defective they must be replaced with new units.
7. To refit, reverse removal procedure.

C.22 FRONT HUB AND BRAKE DISC ASSEMBLY - REMOVE

To remove hub and disc assembly:

1. Release lock plate and remove two bolts securing caliper to torque plate. Also remove shims and note value for replacement purposes.
2. Suspend the caliper to avoid damage to the brake hose, with a suitable piece of wire, and swing caliper clear of the disc.
3. Disconnect steering ball joint from steering arm.
4. Remove split pin, drive shaft nut and washer and withdraw hub assembly from splined drive shaft.

C.23 FRONT HUB BEARINGS - REMOVE AND REFIT

1. Remove hub assembly as described in Sec. C.22.
2. Remove both oil seals.
3. Remove bearings and collapsible spacer.
4. Drift out of hub both inner and outer bearing cases.

5. Pack new bearings with recommended grease and fit together with collapsible spacer and new oil seals and re-assemble by reversing the above procedure. When re-assembling, fit new lock plates and split pin.

6. To obtain the required pre-load on the hub bearings, the load of the collapsible spacer must be overcome. Use the hub nut to draw hub and shaft together, at the same time rotating the hub assembly. Tolerance is between 0.004 in. end float and 0.001 in. nip and it is most important that these tolerances are not exceeded.

7. Check the brake disc run-out with a dial test gauge which should not be more than 0.005 in. If the run-out is excessive the disc should be re-positioned on the hub.

C.24 REMOVE FRONT DRIVE SHAFT AND JOINT ASSEMBLY

1. Remove Front Hub Assembly, as described in Section C.22.

2. Remove Spring Damper Units, as detailed in Section C.21.

3. Disconnect upper and lower ball joint taper pins and remove vertical link.

4. Remove five screws and spring washers from inner companion flange and withdraw shaft assembly.

C.25 CONSTANT VELOCITY JOINTS

The Constant Velocity joints of the driving shaft must not be dismantled. Should the joints become unserviceable, a replacement shaft assembly must be fitted.

If a rubber boot, enclosing a joint, shows signs of damage or deterioration, it must be removed and a new boot fitted.

C.26 REPLACING RUBBER BOOTS FOR C/V JOINTS

1. Remove shaft assembly as detailed in section C.24.

2. Disengage splined end of drive shaft from inner C/V joint. This is held in position by a lightly loaded circlip which can be freed by applying a sharp blow on the joint assembly with a hammer.

3. Remove rubber boot and clean all traces of rubber from the shaft and carefully wipe the old contaminated grease from the joint itself. It is

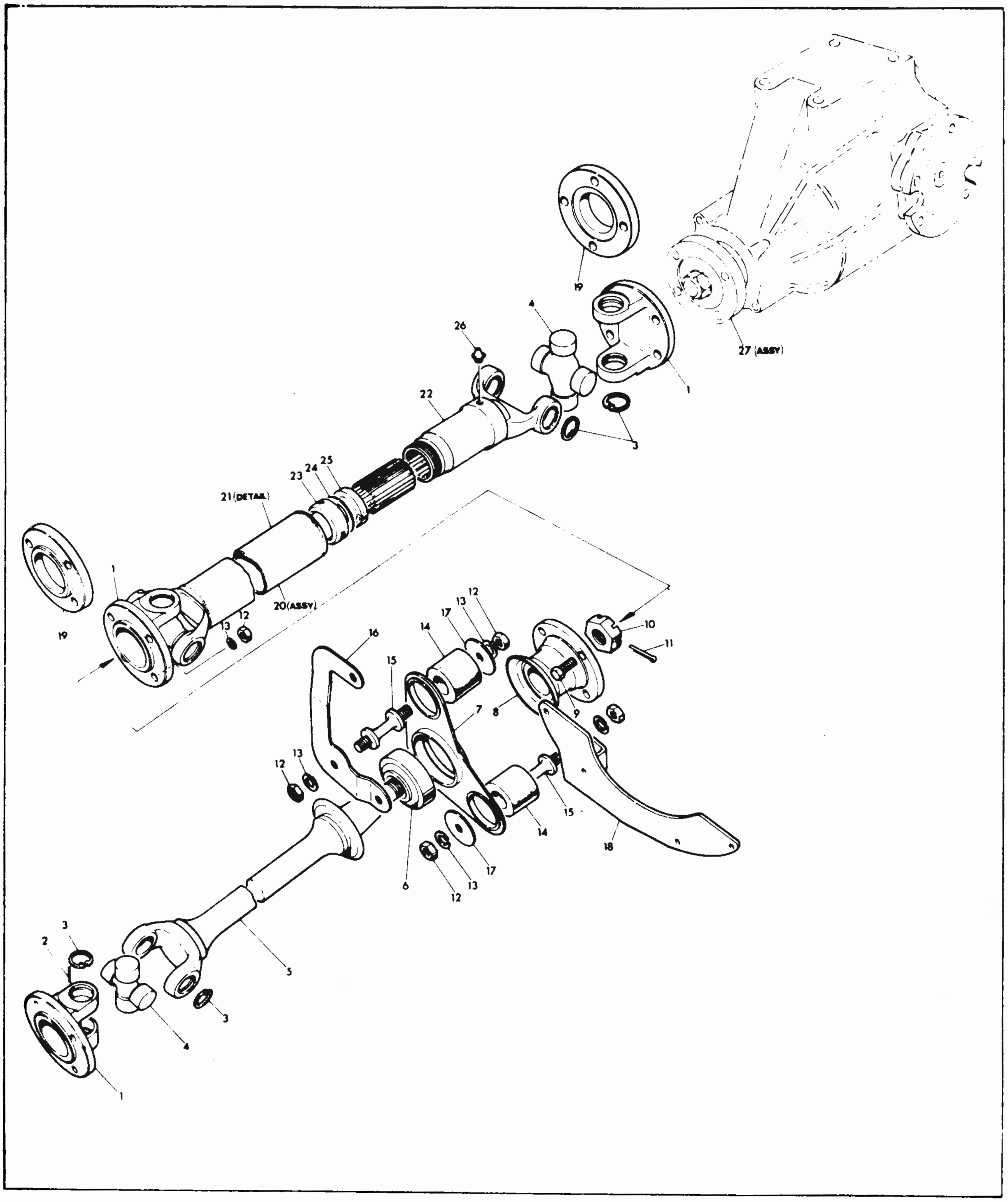


Fig. C.13 FRONT DRIVE SHAFTS - FF

1. Flange yoke.
2. Needle roller.
3. Circlip.
4. Spider.
5. Secondary shaft.
6. Steady bearing.
7. Steady bearing housing.
8. Flange coupling.
9. Screw.
10. Slotted nut.
11. Split pin.
12. Nut.
13. Spring washer.
14. Rubber bush.
15. Support stud.
16. Mounting bracket.
17. Plain washer.
18. Bracket.
19. Spacer (up to chassis number 119/050 only).
20. Primary propshaft assembly.
22. Sleeve yoke.
23. Dust cap.
24. Washer.
25. Cork washer.
26. Grease nipple.
27. Front differential unit.

Fig. C.13 FRONT DRIVE SHAFTS-FF

C.26 (cont.)

important that all the work carried out is undertaken in conditions of extreme cleanliness. Do not flush the grease out of the joint. Should the joint have suffered obvious damage through the entry of road dirt, etc., a new drive shaft assembly must be fitted.

4. Lubricate the splined end of the drive shaft and the small internal diameter of the rubber boot and carefully slide the boot over the spacer onto the shaft. Recharge the constant velocity joint or joints with Edgar Vaughan's ML2, obtainable in special packs.

   Outboard joint requires 3-oz.
   Inboard joint requires 4½-oz.

5. Replace inner C/V joint by sliding it along shaft spline until the circlip engages.

6. Pull the rubber boot over the joint, making sure that the moulded rib of the rubber boot is seating in the retaining grooves of the shaft and joint.

7. Secure both the large and small diameters of the boot in position with two turns of 18-s.w.g. soft iron wire, twisting the ends and bending them neatly in the opposite direction to forward rotation. Make certain that the ends of the wire do not damage the rubber boot.

C.27 REFITTING SHAFT

Refitting is a reversal of the removal procedure in section C.24.

C.28 FRONT SUSPENSION LINKS

Both upper and lower wishbones are fabricated and have metalastic rubber bushes pressed into the inboard ends. It is required that these are locked up with pinch bolts when the car is in the static position.

C.29 FORWARD PROPSHAFTS

Removal of Primary Shaft

1. Disconnect front and rear joint flanges, also spacers where fitted.
2. Disconnect rubber mountings from bell housing bracket.
3. Withdraw shaft assembly complete with steady bearing and bracket.

Replace Primary Shaft

To replace shaft reverse the above sequence of operations.

Removal of Secondary Shaft

Disconnect the rear universal coupling flange and withdraw the shaft from the sliding coupling at front end.

When re-assembling, which should be done in the reverse order, the following torque ratings should be used:-

Clamp bolts on universal joints - 170 lb. in.

C.30 FRONT DIFFERENTIAL UNIT

Remove and Replace Front Differential Unit

1. Disconnect 4 - 3/8 in. bolts at input shaft flange.
2. Disconnect 5 - 3/8 in. bolts at each output shaft flange.
3. Remove Wedgelok nut and washers and withdraw 3/8 in. bolt from rubber mounting at rear of unit.
4. Place support under unit.
5. Remove four 7/16 in. set screws, complete with plain and spring washers, from top of differential unit and withdraw unit.
6. To replace, reverse above sequence of operation.

Removing Output Shafts

1. Unscrew and remove the five bolts securing the output shaft bearing housings, bearings and adjustment shims, noting the number of pre-load shims.
2. Unlock the tab washer and remove the nut, tab washer and plain washer.
3. Press the output shaft with the inner bearing inner race, spacing sleeve and end float shims in position through the flange and bearings housing. If it is necessary to replace the bearings housing, remove the end float shims and spacing collar and using a suitable extractor withdraw the inner bearing race from the shaft.
4. Drift out the inner bearing outer race and using a suitable sized tube on the outer race, press out the complete outer bearing and the oil seal

If it is necessary to re-set the output shaft end float, withdraw the oil seal and the outer bearing inner race.

Re-assembling Output Shafts

1. Press in the new inner and outer bearing outer races ensuring that they are fully home in the recesses. The races must be fitted so that the bearings will be opposed.
2. Press the inner bearing inner race on the shaft ensuring that it is fully home against the shoulder and that the race is fitted the correct way round.
3. Fit the spacing sleeve and the end float shims.
4. Fit the output shaft into the bearing housing and place the outer bearing inner race on the shaft from the opposite end. Do not fit the oil seal at this stage.
5. Fit the output shaft flange with the plain washer and a new tab washer, fit the nut and tighten.
6. Check the endfloat with a dial gauge, this should be 0.001 in. - 0.003 in. (0.025 - 0.076-mm). Should adjustment be necessary, remove the flange nut, tab and plain washers and withdraw the flange and outer bearings inner race. Add or remove shims to obtain the correct clearance. Adding shims increases the endfloat and removing decreases it. When the correct endfloat is obtained, replace the outer bearing inner race and press a new oil seal into position, flush with the casing and with the lip inwards.
7. Refit the flange and the plain tab washers, ensuring that the two tags on the tab washer locate in the holes on the flange.
8. Tighten the nut and turn one or more tabs upwards to secure the nut. Ensure that these tabs lie as flat on the nut as possible.

To Dismantle Differential Unit with Service Tools

First drain the lubricant from the gear carrier housing and then remove the gear carrier cover. Flush out the unit thoroughly so that the parts can be carefully inspected. Remove the axle shafts as previously detailed.

Remove the differential

1. Withdraw the four bolts securing the two differential bearing caps and remove the two caps.

2. Before attempting to remove the differential assembly, fit the stretching fixture, Tool No. SE. 104, in the Service Tools List. The fixture should be adjusted to suit the model being serviced, a series of holes being provided in the member opposite the turnbuckle for this purpose. Open the fixture by means of the turnbuckle until it is hand tight, then spread the case by using a spanner. DO NOT OVER-SPREAD OR THE AXLE CASING WILL BE DAMAGED BEYOND REPAIR. The correct spread does not exceed the half turn on the turnbuckle and this figure should not be exceeded even if the differential is still stiff to remove.

3. The differential assembly may now be prised out by means of two levers, one on each side of the differential case opening. During this operation use suitable packing between the levers and the gear carrier.

To Dismantle Differential Unit - Emergency Method

First drain the lubricant from the gear carrier housing and then remove the gear carrier cover. Flush out the unit thoroughly so that the parts can be carefully inspected. Remove the axle shafts as previously detailed.

To Remove the Differential

1. Withdraw the four bolts securing the two differential bearing caps and remove the two caps.

2. The differential assembly should now be prised out by means of two levers, one on each side of the differential case opening, taking care not to tilt the assembly and so wedge it more tightly than it is held by the pre-load. During this operation, use suitable protective packing between the levers and the gear carrier.

Stripping Differential Assembly

1. Bend down the tabs on the drive gear screws locking straps and remove the drive gear screws.

2. Remove the drive gear from the differential case by tapping with a rawhide mallet.

3. Using a small punch, drive out the pinion mate shaft locking pin from the left-hand side. The pin is secured in place by peening the case. Remove the pinion mate shaft.

4. Remove the axle shaft spacer.

5. Rotate the side gears by hand until the pinions are opposite the openings in the differential case, then remove the differential gears, care being taken not to lose the thrust washers fitted behind them.

6. If the drive gear setting is to be altered, it will be necessary to withdraw the differential bearings, using the extractor, Tool No. SE.103 In the Service Tool List, to gain access to the shims located between the bearing and the abutment face on the differential case.

Re-assembly of Differential

1. Assemble the side gears with the thrust washers in position.

2. Insert the differential pinions, through the openings in the differential case, and mesh them with the side gears. Hold the pinion thrust washers in the spherical thrust faces of the pinions, whilst rotating the differential gear assembly into its operating position by hand.

3. Line up the pinions and thrust washers, then install the pinion mate shaft with the axle shaft spacer in position.

4. Line up the cross hole in the shaft with the hole in the differential case, then fit the pinion mate shaft lock pin.

5. Using a punch, peen some of the metal of the differential case over the end of the lock pin to prevent its working loose and thereby causing extensive damage to the axle assembly.

6. Clean the drive gear and differential case contacting surfaces and carefully examine same for burrs.

7. Align the drive gear attaching bolt holes with those in the flange of the case, and gently tap the drive gear home on the case, with a hide or lead hammer.

8. Insert the drive gear bolts with NEW locking straps and tighten them uniformly, preferably with a torque spanner to 60 lb. ft. Then bend the locking tabs round the bolt heads to prevent their working loose.

The procedure for fitting the differential case assembly into the gear carrier is given below under the heading "Differential Bearing Adjustment".

Removing Pinion

1. Remove the pinion split pin, nut and washer.

2. Withdraw the universal joint companion flange with a puller.

3. PRESS the pinion out of the outer bearing. It is important that the pinion should be pressed and not driven out, to prevent damage to the outer bearing. The pinion, having been pressed from its outer bearing may now be removed from the gear carrier housing.

> NOTE:
>
> Keep all shims intact.

4. Remove the pinion oil seal, together with the oil slinger and outer bearing cone.

5. Examine the outer bearing for wear and, if replacement is required, extract the bearing cup, using Tool No. SE. 105 in the Service Tool List. The extractor plate should be installed behind the cup and then the drawbar may be fitted together with the extractor bar which seats on the hose of the gear carrier. The bearing cup may then be withdrawn by tightening the nut on the drawbar.

5a. If the correct service tool is not available and the oil bearing cup is to be scrapped, it is possible to drive out the cup, the shoulder locating the bearing being recessed to facilitate the operation.

6. Remove the pinion inner bearing cup, using Tool No. SE. 105 in the Service Tool List, if the bearing requires replacement or adjustment of the pinion setting is to be undertaken. Take care of the shims fitted between the bearing cup and the housing abutment face.

6a. If the inner bearing is to be replaced it may be driven out, but the correct Service Tool should be used when the bearing is removed in order to carry out pinion setting adjustment.

Differential Bearing Adjustment

The thickness of shims required in the installation of the differential bearings is determined as follows:

1. Fit the differential bearings, without shims on the differential case, making sure that the bearing cones and cups and the housing are perfectly clean.
2. Place the differential assembly, with the bearing cups in their housing, within the gear carrier, the pinion not being assembled.
3. Install the dial indicator set, Tool No. SE. 101 in the Service Tool List on the gear carrier, with the button against the back face of the drive gear.
4. Inserting two levers between the housing and the bearing cup, move the differential assembly to one side of the carrier, as shown in Fig. D.8.
5. Set the indicator to zero.
6. Move the assembly to the other side and record the indicator reading, which gives the total clearance between the bearings as now assembled and the abutment faces of the gear carrier housing. Add 0.008 in. more to the clearance reading to give pre-load; this thickness of shims to be used in the installation of the differential bearings, the shims being divided to give the gear position with correct backlash as detailed under "Drive Gear Mesh Adjustment" (Section D.10).
7. Remove the differential assembly from the gear carrier.
8. Re-install the pinion outer bearing cup with Tool No. SE. 106.
9. Re-install the pinion bearing inner cup with the original adjusting shims positioning same.
10. Press the inner bearing cone on the pinion, using the arbor press and a length of tube, contacting the inner race only and not the roller retainer.

Pinion Adjustment, etc.

See Section D.10.

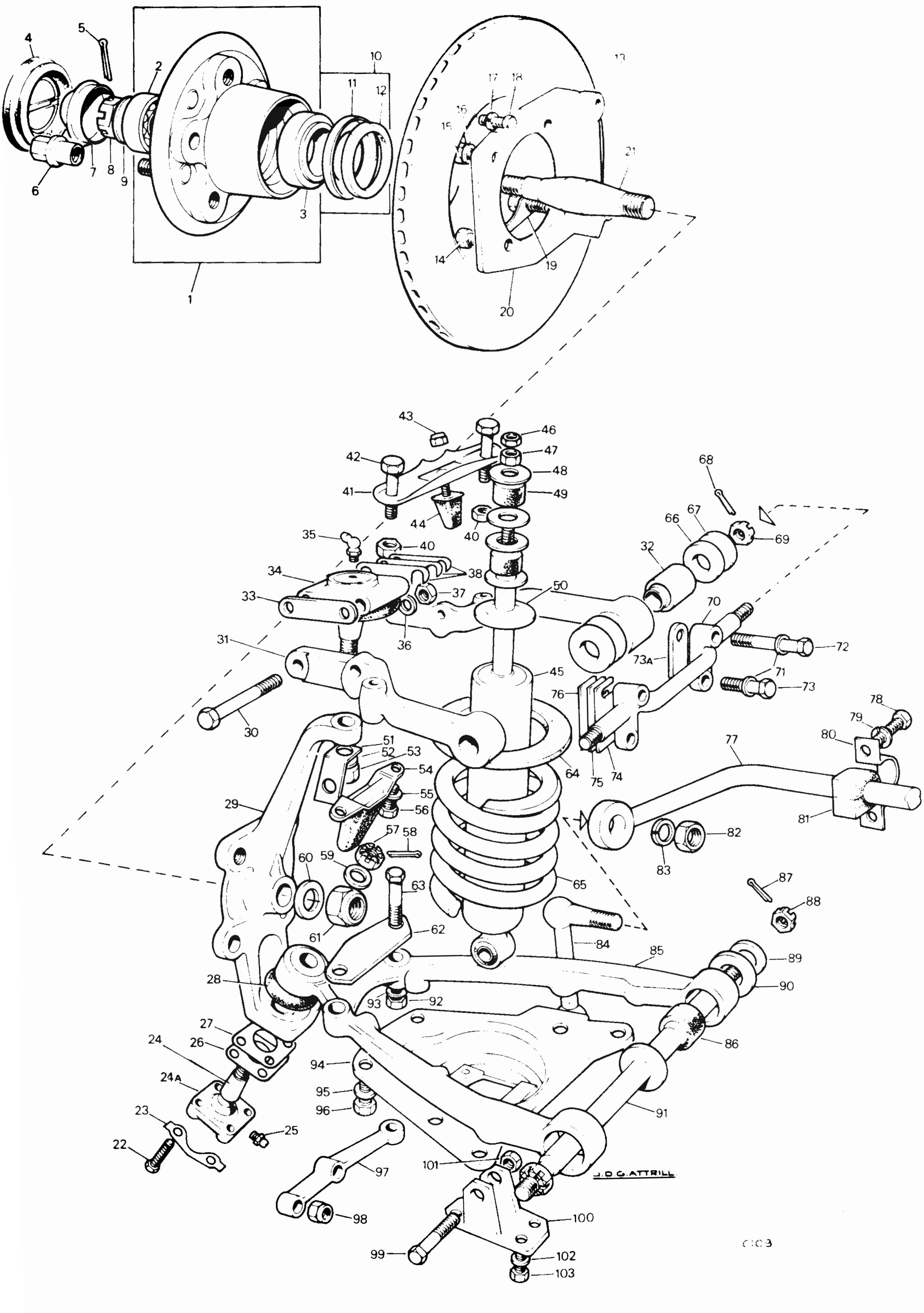
Final Assembly

Remove the pinion flange nut, washer and the companion flange and fit the oil slinger. Place the oil seal gasket into position in the oil seal recess, then fit the oil seal so that the lip of the seal faces inwards and the dust excluder flange is uppermost. Tighten down the pinion nut and washer to drive the assembly home. Fit the companion flange, washer and pinion nut and tighten to a torque of 120 to 130 lb. ft. (16.6 to 18.0-kg.).

Fit the differential carrier rear cover gasket, renewing if necessary. Fit the rear cover and secure with set screws and spring washers.

1. Hub assembly.
2. Outer hub bearing.
3. Inner hub bearing.
4. Road wheel medallion.
5. Hub nut split pin.
6. Wheel nut.
7. Hub cap.
8. Hub nut.
9. Hub nut washer.
10. Oil seal assembly.
11. Seal retainer.
12. Felt washer.
13. Front brake disc.
14. Bolt.
15. Screw.
16. Spring washer.
17. Spring washer.
18. Bolt.
19. Tab washer.
20. Caliper adaptor plate.
21. Stub axle.
22. Bolt.
23. Tab washer.
24. Lower ball pin.
24A. Cap and socket assembly.
25. Cap and socket grease nipple.
26. 0.002 in. shim.
27. 0.004 in. shim.
28. Ball joint rubber gaiter assembly.
29. Vertical link.
30. Ball joint to upper wishbone bolt.
31. Upper wishbone arm.
32. Rubber bush.
33. Upper ball joint to link distance piece.
34. Upper ball joint.
35. Ball joint grease nipple.
36. Plain washer.
37. Nyloc nut.
38. Packing piece.
39.
40. Nyloc nut.
41. Rebound rubber mounting bracket.
42. Bolt.
43. Nyloc nut.
44. Rebound rubber.
45. Front shock absorber.
46. Lock nut.
47. Nut.
48. Dished washer.
49. Rubber buffer.
50. Washer.
51. Brake hose support bracket.
52. Plain washer.
53. Nyloc nut.
54. Bump rubber stop.
55. Spring washer.
56. Screw.
57. Slotted nut.
58. Split pin.
59. Plain washer.
60. Plain washer.
61. Nyloc nut.
62. Platform bump plate.
63. Bolt.
64. Front coil spring insulator.
65. Front coil spring.
66. Inner washer.
67. Perscollan washer.
68. Split pin.
69. Slotted nut.
70. Upper fulcrum shaft.
71. Spring washer.
72. Upper fulcrum shaft bolt.
73. Upper fulcrum shaft bolt.
73A. Fulcrum zero camber spacer.
74. Packing plate (¼ in).
75. Packing plate (⅛ in).
76. Packing plate (1/16 in).
77. Anti-roll bar.
78. Screw.
79. Spring washer.
80. Anti-roll bar mounting strap.
81. Rubber mounting.
82. Nut.
83. Spring washer.
84. Anti-roll bar link.
85. Lower wishbone arm assembly.
86. Lower wishbone arm bush.
87. Split pin.
88. Slotted nut.
89. Plain washer.
90. Perscollan washer.
91. Lower fulcrum shaft.
92. Nut.
93. Washer.
94. Front spring pan assembly.
95. Spring washer.
96. Screw.
97. Steering side arm.
98. Nyloc nut.
99. Bolt.
100. Shock absorber mounting bracket.
101. Nyloc nut.
102. Spring washer.
103. Screw.

Fig. C.5A - FRONT SUSPENSION



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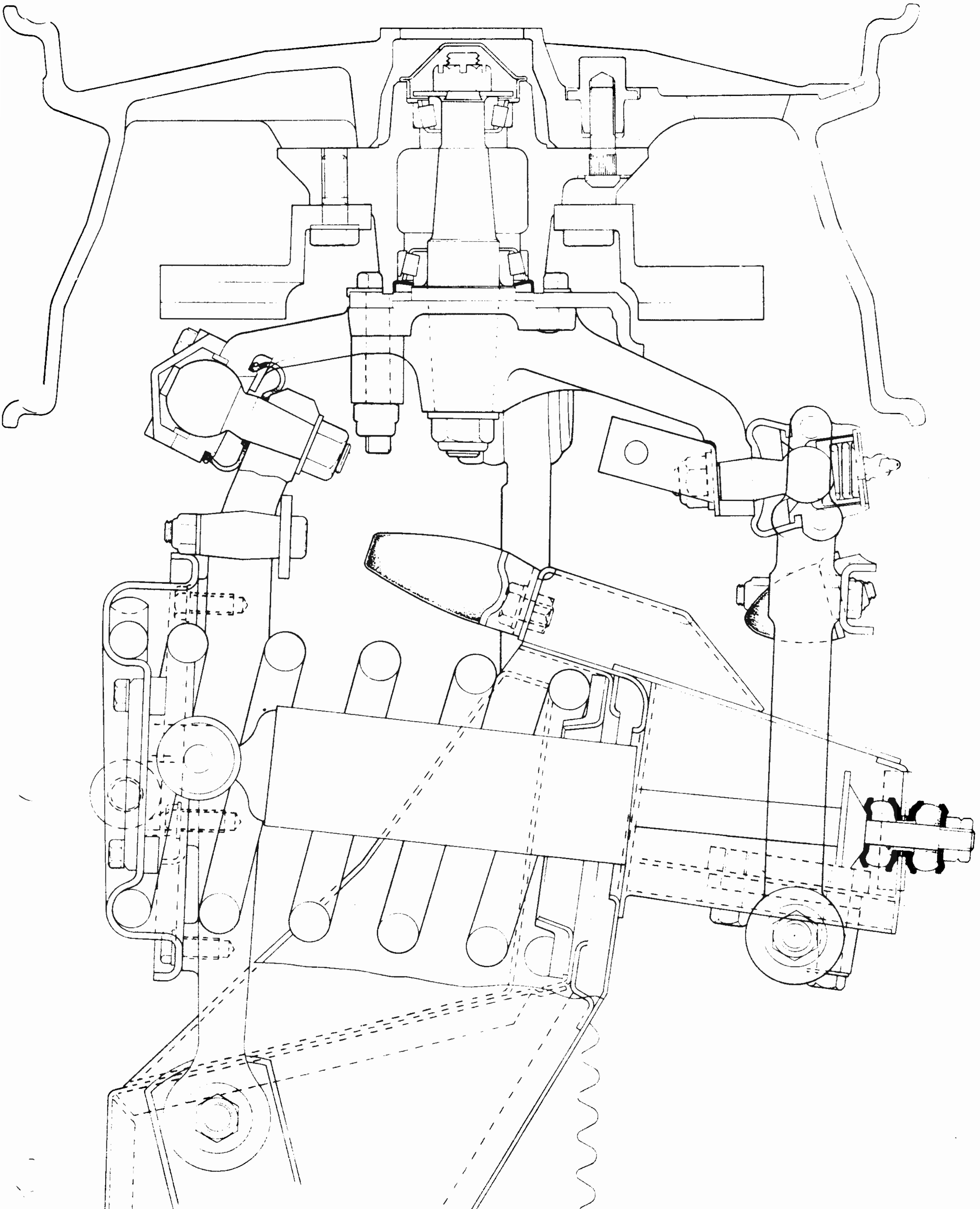
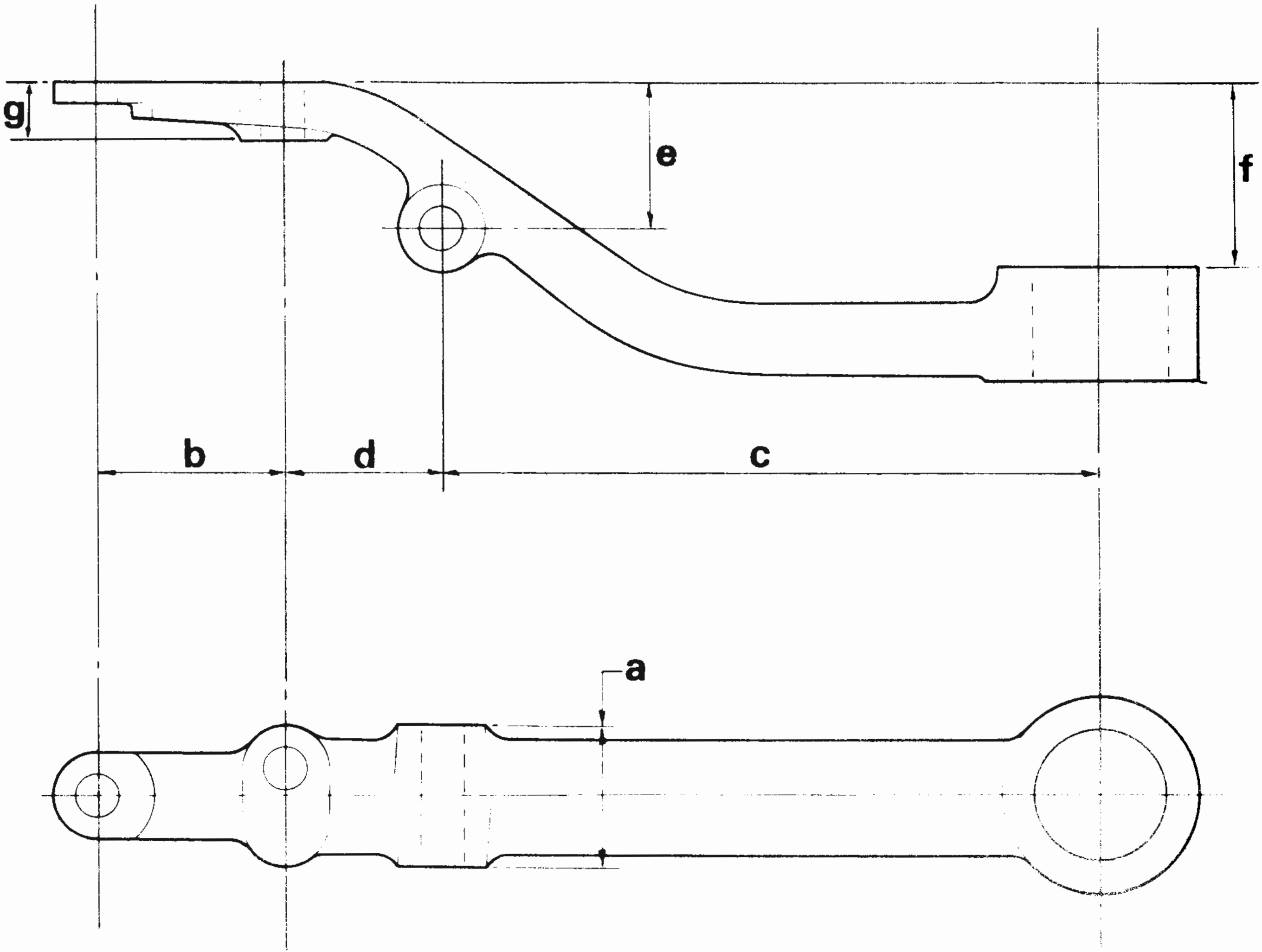




a.	1·25 in.	31·75 mm
b.	1·672 / 1·662 in. crs.	42·47/42·21 mm
c.	7·18 in. crs.	182·4 mm
d.	1·37 in. crs.	34·8 mm
e.	1·281 in.	32·5 mm
f.	1·62 in.	41·2 mm
g.	0·50 in.	12·7 mm

REAR AXLE, SUSPENSION AND REAR PROPSHAFT

INDEX

D.1 GENERAL DATA

Manufacturer	Salisbury Transmission
Type	4HA Semi-floating with Powr-Lok differential.
Ratio	2.88 : 1
Oil Capacity	3 pints (Imp.) 3.6 pints (U.S.) 1.705 litres.
Drive Gears	Hypoid Bevel
Drive Gear Teeth	49
Drive Pinion Teeth	17
Drive Gear and Pinion Backlash	Approx. 0.005 - 0.007 in. The correct setting is etched on drive gear for each matched assembly.
Hub Bearing	Timkin 2788A/2735X

NOTE

FF rear axle is identical to Interceptor rear axle with the exception of the spring mounting brackets.

TIGHTENING TORQUES

Position	Size	Torque
* Disc to Hub	7/16 - 20	50 lb/ft.
Hub to Axle Shaft		175 lb/ft
* Caliper to Adapter	3/8 - 20 (T)	40 lb/ft.
* Wheel Nuts	7/16 - 20	50 lb/ft.
* Wheel Stud Locknuts	7/16 - 20	35 lb/ft.
* Wheel Stud	7/16 - 20	15 lb/ft.
* Spring Pad	3/8 - 24 (T)	30 lb/ft.
Spring Eye - Front	1/2 - 20	50 lb/ft.
Spring Shackle	3/8 - 24	30 lb/ft.
Dampers - Bottom	1/2 - 20	50 lb/ft.
Dampers - Top	5/16 - 24	20 lb/ft.

* Where items are marked with an asterisk, extra care must be taken to ensure that the correct torque figures are maintained.

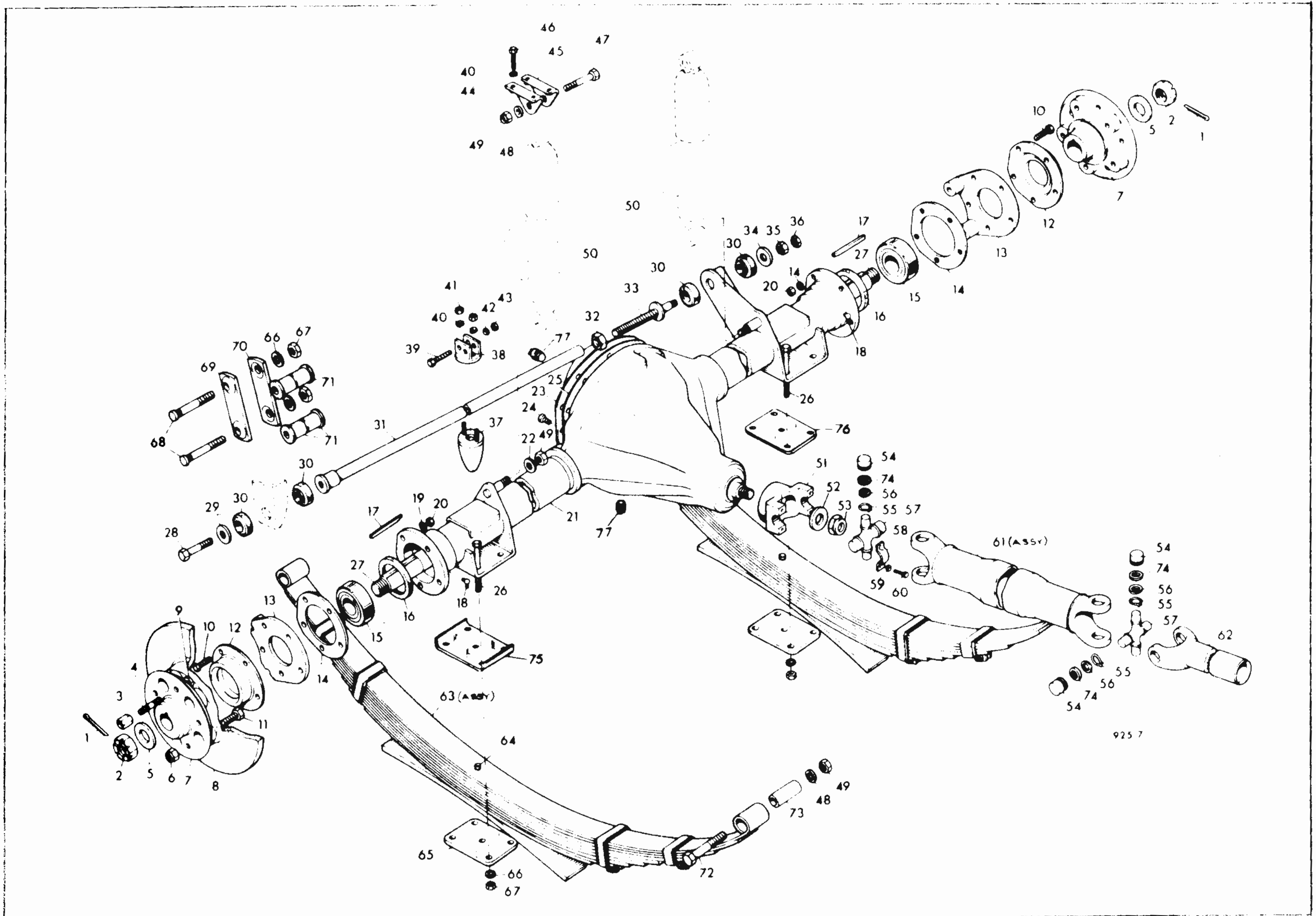


Fig. D.1 REAR AXLE

1. Split pin
2. Slotted nut
3. Wheel stud nut
4. Wheel stud
5. Washer
6. Nut
7. Hub
8. Brake disc
9. Locknut
10. Bolt
11. Bolt
12. Hub oil seal and container
13. Brake adapter
14. Shims
15. Hub bearing
16. Axle shaft oil seal
17. Key
18. Grease nipple
19. Spring washer
20. Nut
21. Rear axle assembly
22. Washer
23. Gear carrier cover
24. Screw
25. Gear carrier cover gasket
26. Bolt
27. Axle shaft
28. Bolt
29. Washer
30. Rubber bush
31. Panhard rod tube assembly
32. Locknut
33. Panhard rod screwed end
34. Washer
35. Nut
36. Locknut
37. Bump rubber
38. Bump rubber bracket
39. Bolt
40. Spring washer
41. Nut
42. Spring washer
43. Nut
44. Damper mounting bracket (outer)
45. Damper mounting bracket (inner)
46. Bolt
47. [illegible] bolt
48. Plain washer
49. Nut
50. [illegible]
51. Pinion yoke
52. Washer
53. Pinion nut
54. Needle bearing
55. Circlip
56. Retainer
57. Spider
58. Clamp
59. Washer
60. Screw
61. Propshaft assembly
62. Sleeve yoke
63. Rear spring assembly
64. Toe bolt
65. Spring plate
66. Washer
67. Nut
68. Shackle bolt
69. Shackle plate (outer)
70. Shackle plate (inner)
71. Shackle pin bush
72. Spring eye bolt
73. Spring eye bush
74. Seal
75. Upper spring plate R.H
76. Upper spring plate L.H
77. Axle plug

Fig. D.1 REAR AXLE

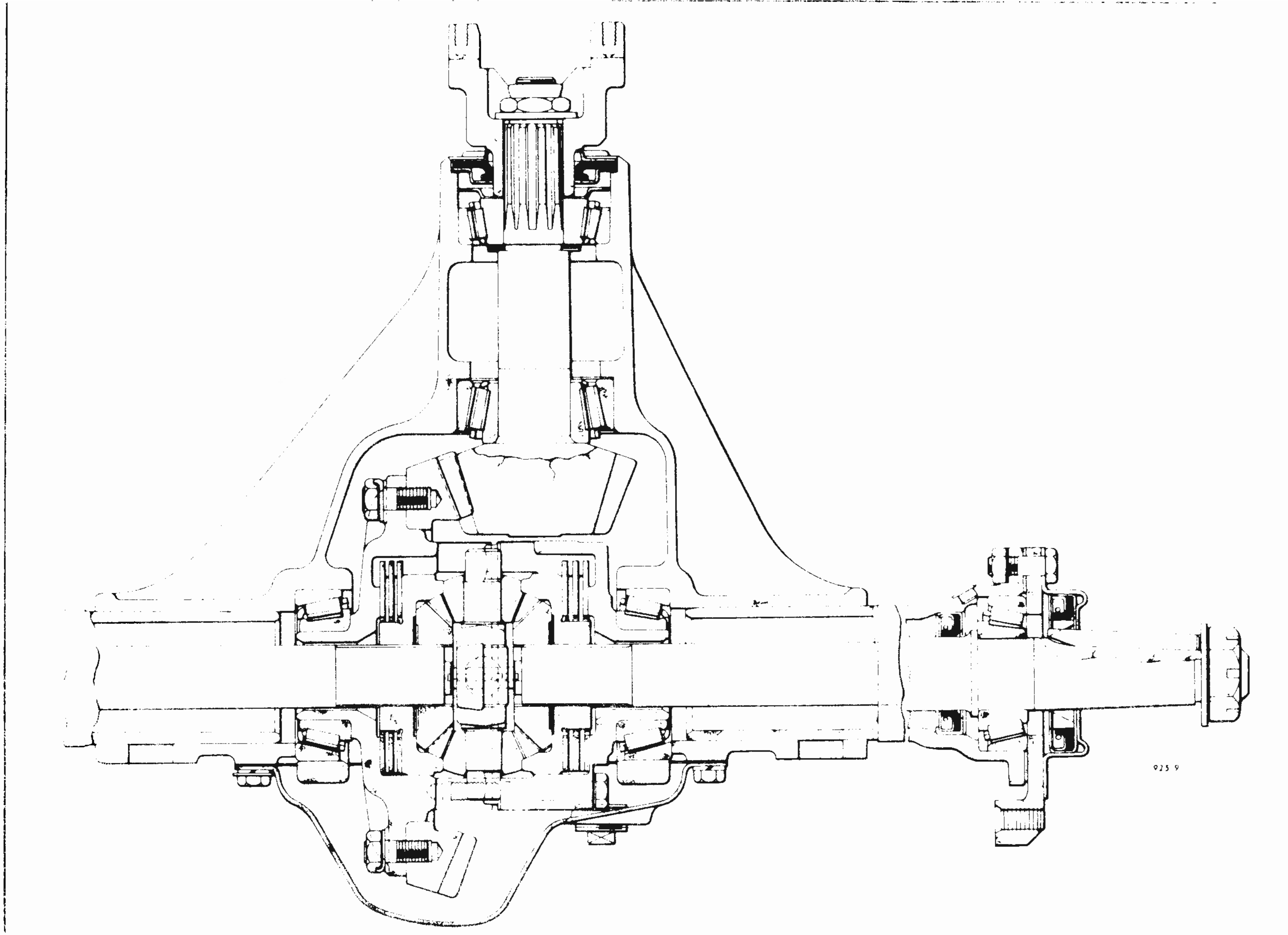


Fig. D.2 CROSS-SECTION OF REAR AXLE

D.2 BRIEF DESCRIPTION

A rigid, live axle is employed on both models. The axle is semi-floating and the drive is transmitted through hypoid bevel gears and a limited slip differential. Suspension and axle location are by means of semi-elliptic springs, supplemented by a Panhard Rod for transverse location.

D.3 LUBRICATION OF HUB BEARINGS

The wheel hub bearings are each lubricated by a grease nipple located in the axle tube housing, behind the brake back plate and visible from underneath the car. There is no other source of lubrication, since the hub bearing housing is separated from the remainder of the axle casing by an oil seal which prevents the hypoid oil reaching the hub bearing.

The greasing operation should be continued until grease is forced out of the vent hole, indicating that the chamber is full and also providing a seal against the ingress of dirt.

D.4 REMOVE AXLE COMPLETE FROM CAR

1. Disconnect the brake cable from the brake balance lever, and also the damper links to the axle.
2. Remove the propeller shaft bolts at the pinion flange.
3. Disconnect brake flex hose and seal ends of pipes against dirt.
4. Disconnect Panhard Rod.
5. Drop rear of both exhaust pipes.
6. Jack up the frame at both sides and remove the Simmons nuts from the spring clips.
7. Axle is then free and can be withdrawn for further dismantling.

Next, thoroughly clean the exterior of the unit, thereby rendering subsequent work easier and more pleasant, in addition to ensuring that the inside of the axle shall be kept clean. Carry out all stripping and assembly under clean conditions, since inclusion of foreign matter in the axle may easily lead to failure of gears and bearings. It is not essential to remove the unit from the vehicle if the work is limited to removal and replacement of an axle shaft or shafts.

D.5 AXLE SHAFTS - REMOVE AND REFIT

To Remove Axle Shafts and Hubs

To remove an axle shaft the following procedure should be carried out:

1. Remove the road wheel, brake gear and hub (See Section G). The hub should be withdrawn with a special extractor, Jensen part number JD1C/1 after removing the axle shaft nut, washer and split pin.

2. Check the end-float of the axle shaft with the dial indicator assembly, Tool No. SE. 101 in the Service Tool List. The correct tolerance for axle shaft end-float is 0.002/0.006 in.

3. Remove the brake attachment plate retaining bolts, the outer oil seal assembly, taking care not to lose or damage any of the hub bearing adjusting shims which control axle shaft end-float.

4. Remove the axle shaft, with its taper roller bearing, using Tool No. SE. 102 in the Service Tool List.

5a. To remove a broken axle shaft, make a loop at one end of a length of stiff wire, slide the loop down the axle tube and over the broken end of the shaft for a sufficient distance so that on pulling, the loop will bind on the shaft, and withdraw it from the differential side gear.

b. Examine the axle shaft oil seal, which is pressed inside the axle tube, and if necessary withdraw same and replace with a new seal.

6. Examine the hub bearing and if replacement is necessary, the cone may be withdrawn from the shaft by means of the extractor, Tool No. SE. 103 in the Service Tool List.

7. Fit the replacement bearings (if required), making sure that the cone is pressed squarely on the bearing diameter until it firmly abuts against the shoulder provided. If the bearing is not pressed home it will creep in service, resulting in excessive axle shaft end-float, which will damage the race surfaces due to hammering.

D.6 REPLACE AXLE SHAFT

1. Wash the hub bearing so that the axle shaft end-float may be determined accurately.

2. Install the shaft with the taper roller bearing cone, taking care not to damage the oil seal.

3. Assemble the bearing cup whilst making absolutely sure that the cup enters the housing squarely.

4. Add or subtract adjusting shims (available in thicknesses of 0.003 in., 0.005 in., 0.010 in. and 0.030 in.) until the correct axle shaft end-float of 0.006 in., which is just perceptible by hand, is obtained. Adding shims increases end-float, subtracting shims decreases end-float. Remove or install approximately an equal thickness of shims at each end of the axle in order to retain the axle shaft spacer in a central position.

5. Examine the hub oil seal and replace if necessary.

6. Fit the brake attachment plate and centralise the hub oil seal. When re-installing, fit new paper gaskets on either side of the attachment brake back plate and the oil seal assembly, to prevent grease leaking into the brake disc.

7. Check the axle shaft end-float with a dial indicator assembly, after gently tapping with a rawhide mallet on each axle shaft to ensure that the bearing cups are butting against the brake attachment plates.

8. FINALLY, IT IS ESSENTIAL TO GREASE HUB BEARINGS, as already described.

D.7 THE DIFFERENTIAL UNIT

CAUTION:

When a car is equipped with a "Powr-Lok" differential, the engine must NOT be run with the car in gear and one wheel off the ground otherwise, owing to the action of the differential, the car may drive itself off the jack or stand.

If it is desired to turn the transmission by running the engine with the car in gear, both wheels must be jacked up clear of the ground.

Description of the "Powr-Lok" Differential

The limited slip differential has two pinion shafts with two mates to each shaft. The pinion shafts are mounted at right angles to each other but do not make contact at their intersection. Double ramps with flat surfaces at each end of the pinion shafts mate with similar ramps in the differential case. Clearance in the differential case permits slight peripheral movement at the ends of the pinion shafts.

When a driving force is applied to the differential case, the pinion shafts, pinion mates and differential side gears splined to the axle shafts rotate as a unit. Resistance to turning at the wheel forces the pinion shafts to slide up the differential case ramps, pushing the pinion shafts and side gears apart. As the pinion shafts move apart they apply load to the clutch plates thus restricting turning between the axle shafts and the differential case. Both axle shafts have now become clutched to the differential case to a varying degree, dependent upon the amount of torque transmitted. This in effect locks the axle shafts to the differential case when in the normal straight-ahead driving position, thereby preventing spinning of either rear wheel should it leave the road or encounter poor traction such as ice, snow, sand, loose gravel or oil patches.

Due to the lateral movement of the pinion shafts in the differential case, a little more backlash may be apparent in a limited slip rear axle. Slight chatter may also occur when one wheel is on a slippery surface, this is due to surge torque.

Principle of Operation

The conventional differential divides the load equally between both driving wheels. In this connection, it should be remembered that the conventional differential will always drive the wheel which is easiest to turn. This is a definite disadvantage under adverse conditions of driving where the traction of one wheel is limited.

The main purpose of the limited slip differential is to overcome this limit-action. Many times the torque of the slipping wheel is provided to the driving wheel, thus permitting improved operation under all conditions of driving. The torque is transmitted from the differential case to the cross pins and differential pinions to the side gears in the same manner as torque is applied in the conventional differential.

The driving forces move the cross pins up the ramp of the cam surfaces, applying a load to the clutch rings and restricting rotation of the differential through the friction clutches. This provides a torque ratio between the axle shafts which is based on the amount of friction in the differential and the amount of load that is being applied to the differential.

When turning a corner, this process is in effect partially reversed. The differential gears become a planetary set, with the gear on the inside of the curve becoming the fixed gear of the planetary. The outer gear of the planetary over-runs as the outside wheel on the curve has a further distance to travel. With the outer over-running and the inner gear fixed, the pinion mates are caused to rotate, but inasmuch as they are restricted by the fixed gear, they first must move pinion mate shafts back down the cam surface, relieving the thrust loads on the plate clutches. Thus when turning the corner, the differential, for all practical purposes, is similar to a conventional differential and the wheels are free to rotate at different speeds.

On straight driving, the clutches are engaged and thus prevent momentary spinning of the wheels when leaving the road or when encountering poor traction. In turning a corner, the load is relieved from the clutch surface so that wear is reduced to a minimum.

Torque in Forward Driving

Under normal starting and operating conditions the torque in both the limited slip and conventional type differential is transmitted equally to each axle shaft and wheel. However, when sudden patches of ice, loose gravel or oil are encountered, the limited slip differential will not permit the wheel with the lesser traction to spin, gain momentum and swerve the car when a dry surface is regained.

Torque in Turns

In turning, the limited slip differential gives normal differential action and permits the outer wheel to turn faster than the inner wheel. At the same time the differential applies the major driving force to the inside rear wheel, improving stability and cornering.

Torque with Poor Traction

When traction conditions under the rear wheels are dissimilar, the driving force with an ordinary differential is limited by the wheel with the poorer traction. Typically, in this situation, the wheel with the poorer traction spins and the vehicle remains immobile. The limited slip differential enables the wheel with the better traction to apply the major driving force to the road.

Action on Rough Roads

Bumps do not adversely affect wheel action when wheels are controlled by the limited slip differential. The free wheel does not spin and gain momentum. There is no sudden wheel stoppage to cause car swerve or tyre scuffing and wheel hop is reduced.

D.8 REMOVING THE DIFFERENTIAL ASSEMBLY FROM THE CARRIER

Remove the axle as described in Section D.5.

Drain the lubricant from the gear carrier and remove the gear carrier rear cover. Flush out the unit thoroughly so that the parts can be carefully inspected. Remove the two bolts holding each differential bearing cap and withdraw the differential unit.

Pinion Removal

Remove the pinion nut and washer. Withdraw the universal joint companion flange with a suitable puller. PRESS the pinion out of the outer bearing. It is important that the pinion should be pressed out, not driven out, to prevent damage to the outer bearing. The pinion having been pressed from its outer bearing may now be removed from the differential casing.

> NOTE:
>
> Keep all shims intact.

Remove the pinion oil seal together with the oil slinger and outer bearing cone. Examine the outer bearing for wear and if replacement is required, extract the bearing outer race. It is possible to drive out the cup, the shoulder locating the bearing being recessed to facilitate this operation. Remove the pinion inner bearing outer race if the bearing requires replacement or adjustment of the pinion setting is to be undertaken. Take care of the shims fitted between the bearing cup and the housing abutment face. If the inner bearing is to be replaced, it may be driven out but the correct service tool should be used when the bearing is removed in order to carry out pinion setting adjustment.

D.9 DISMANTLING THE DIFFERENTIAL UNIT

Knock back the locking tabs from the drive gear securing setscrews. Remove the securing setscrews and tap the drive gear from the differential case with a rawhide mallet.

In the absence of any mating or aligning marks as shown in Fig. D.5, scribe a line across the two half casings to facilitate assembly.

Remove the eight bolts (Fig. D.3 No. 14) securing the two halves of the differential casing.

Split the casing and remove the clutch discs (8) and plates (7 and 9) from one side.

Remove the differential side gear ring (10).

Remove the pinion side gear (11) and the pinion mate cross shafts (16) complete with the pinion mate gears.

Separate the cross shafts (16).

Remove the remaining side gear and the side gear ring.

Extract the remaining clutch discs and plates.

D.10 ASSEMBLING THE DIFFERENTIAL UNIT

Refit the clutch plates and discs alternately into the flange of the casting.

Fit the two "Belleville" clutch plates (i.e. curved plates) so that the convex side is against the differential casing (Fig. D.3 No. 7).

Fit the side gear ring so that the serrations on the gear mesh with the serrations in the two clutch discs.

Place one of the side gears into the recess of the side gear ring so that the splines in both align.

Fit the cross shafts together.

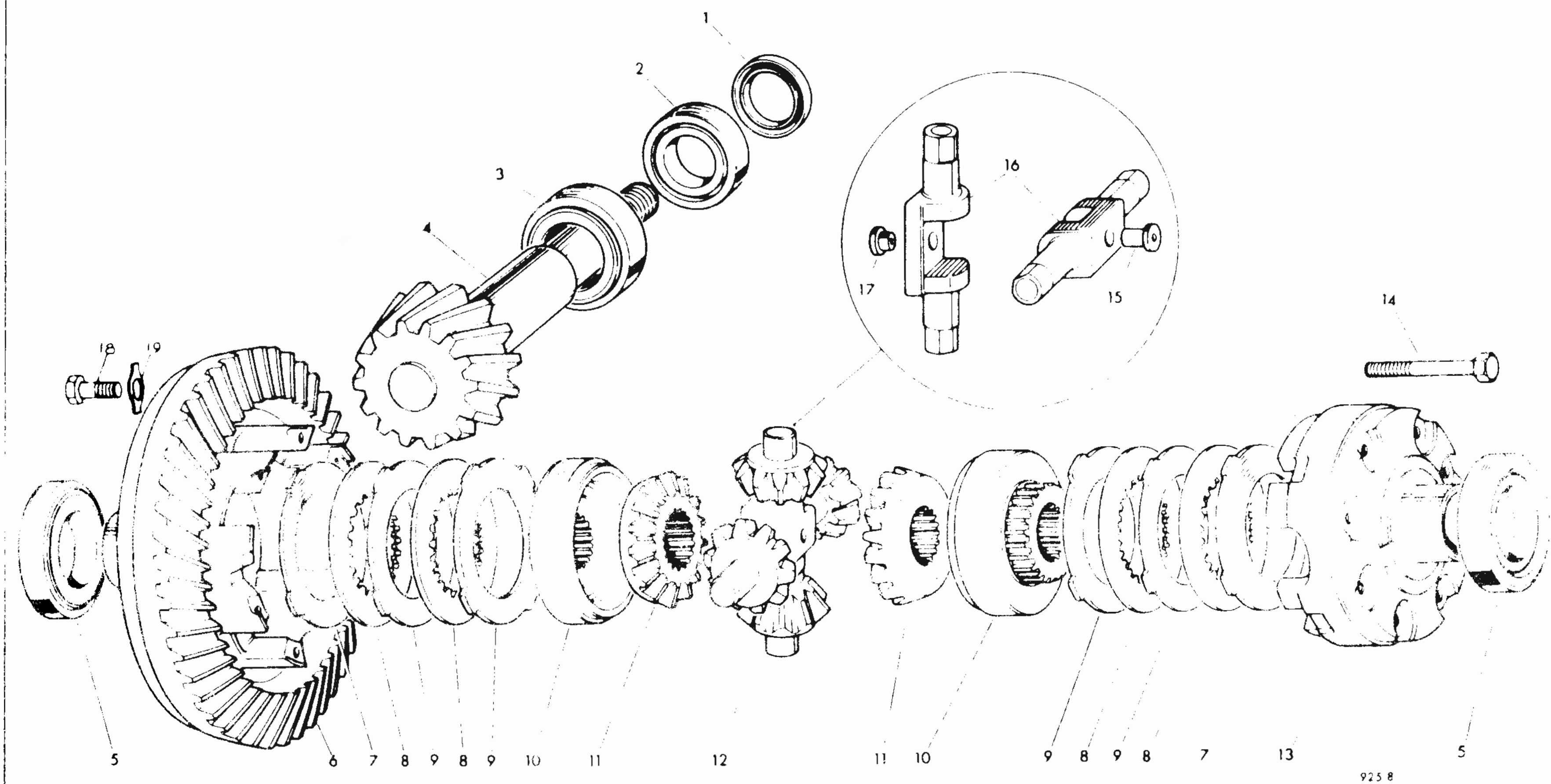


Fig. D.3 'POWR-LOK' DIFFERENTIAL & DRIVE GEARS

1. Drive pinion oil seal
2. Drive pinion bearing (outer)
3. Drive pinion bearing (inner)
4. Hypoid drive pinion
5. Differential bearing
6. Hypoid drive gear
7. Dished clutch friction plate
8. Clutch friction disc
9. Clutch friction plate
10. Side gear ring
11. Bevel side gear
12. Bevel pinion mate gear
13. Differential case - button half
14. Differential case bolt
15. Axle shaft spacer - long
16. Pinion mate cross shaft
17. Axle shaft spacer - short
18. Gear carrier cover
19. Gear carrier cover lock washer

Fig. D.3 POWR-LOK' DIFFERENTIAL AND DRIVE GEARS

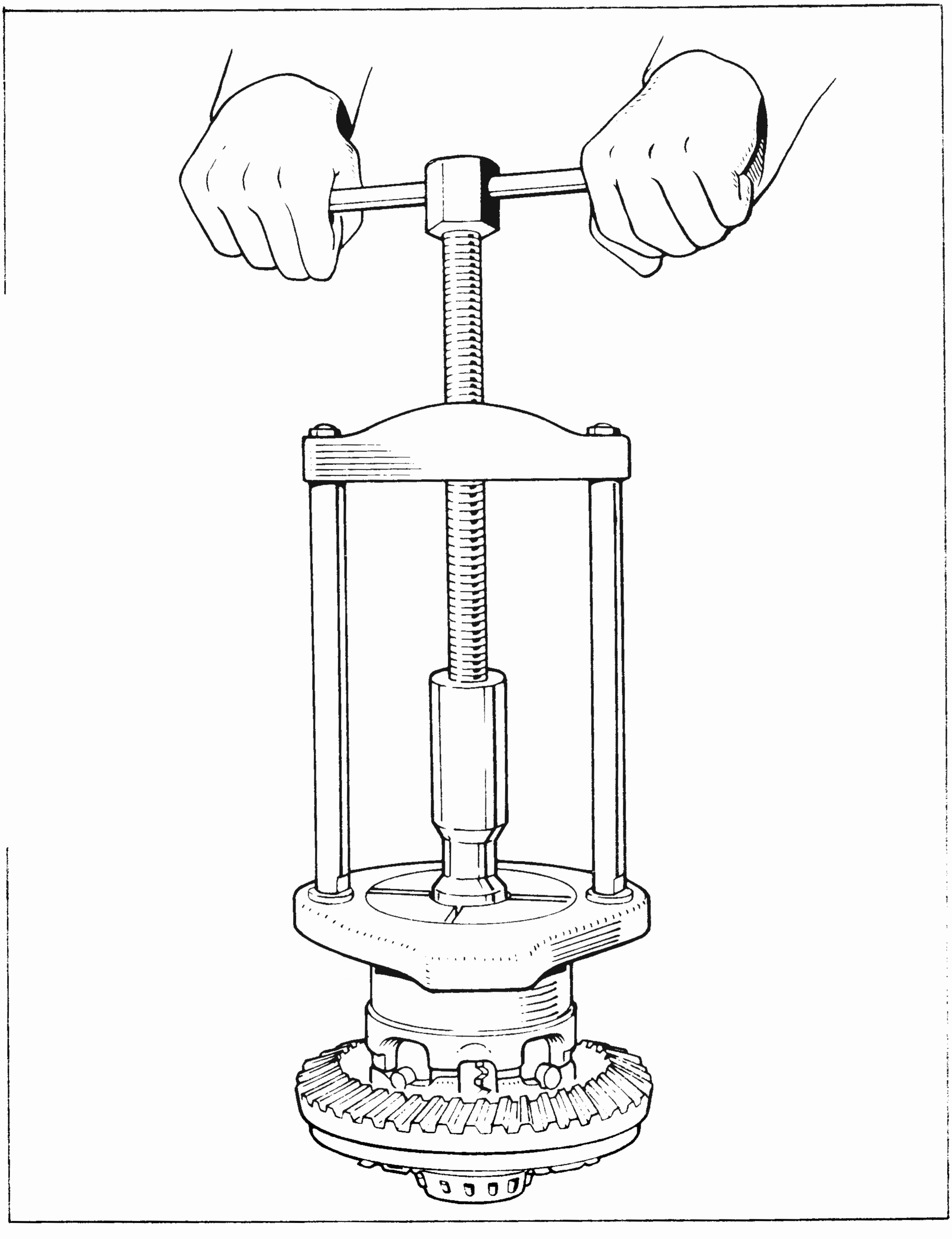


Fig. D.4 WITHDRAWING A DIFFERENTIAL BEARING USING TOOL NO. SE.103

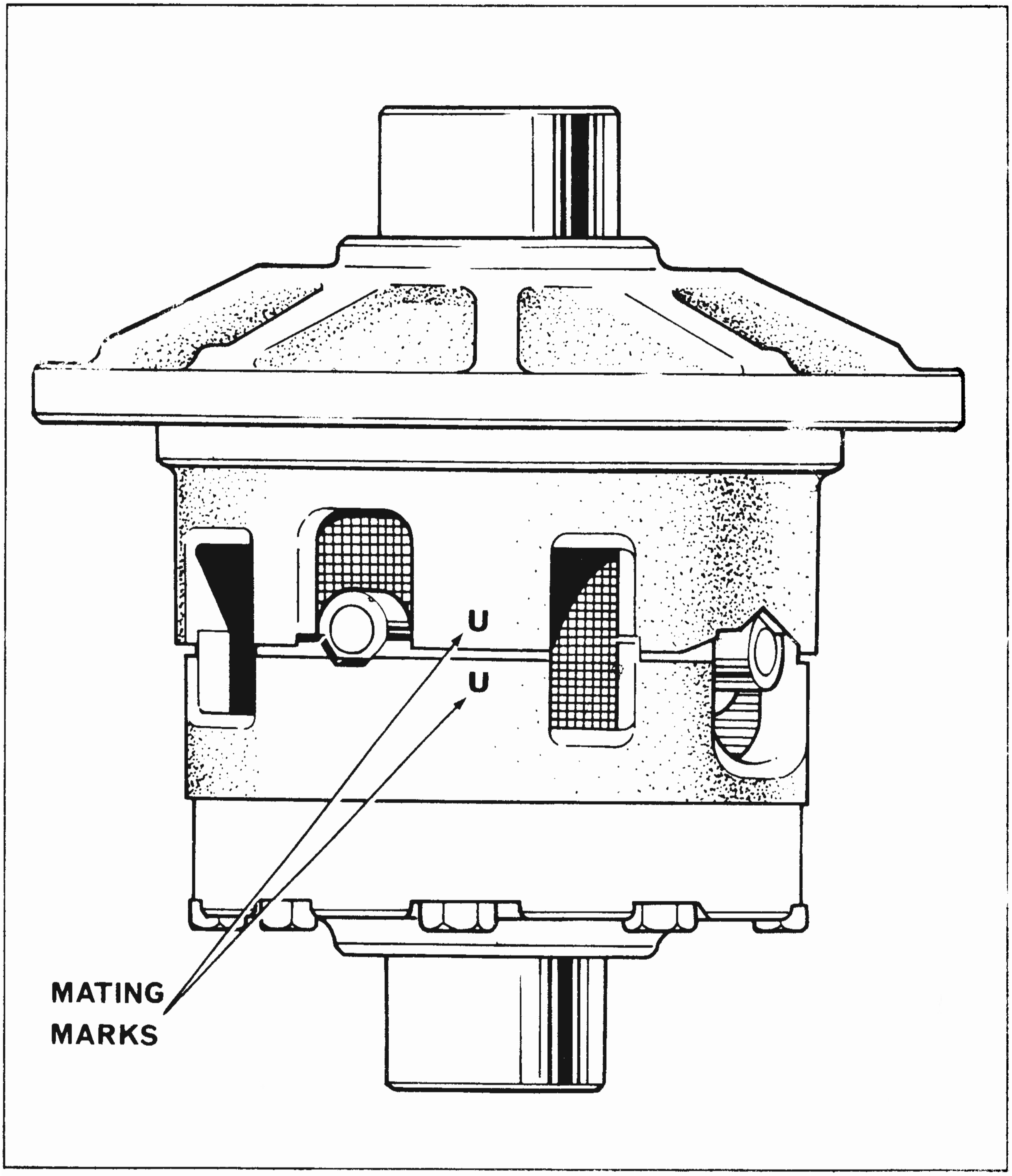


Fig. D.5 ALIGNMENT MARKS ON DIFFERENTIAL CASING

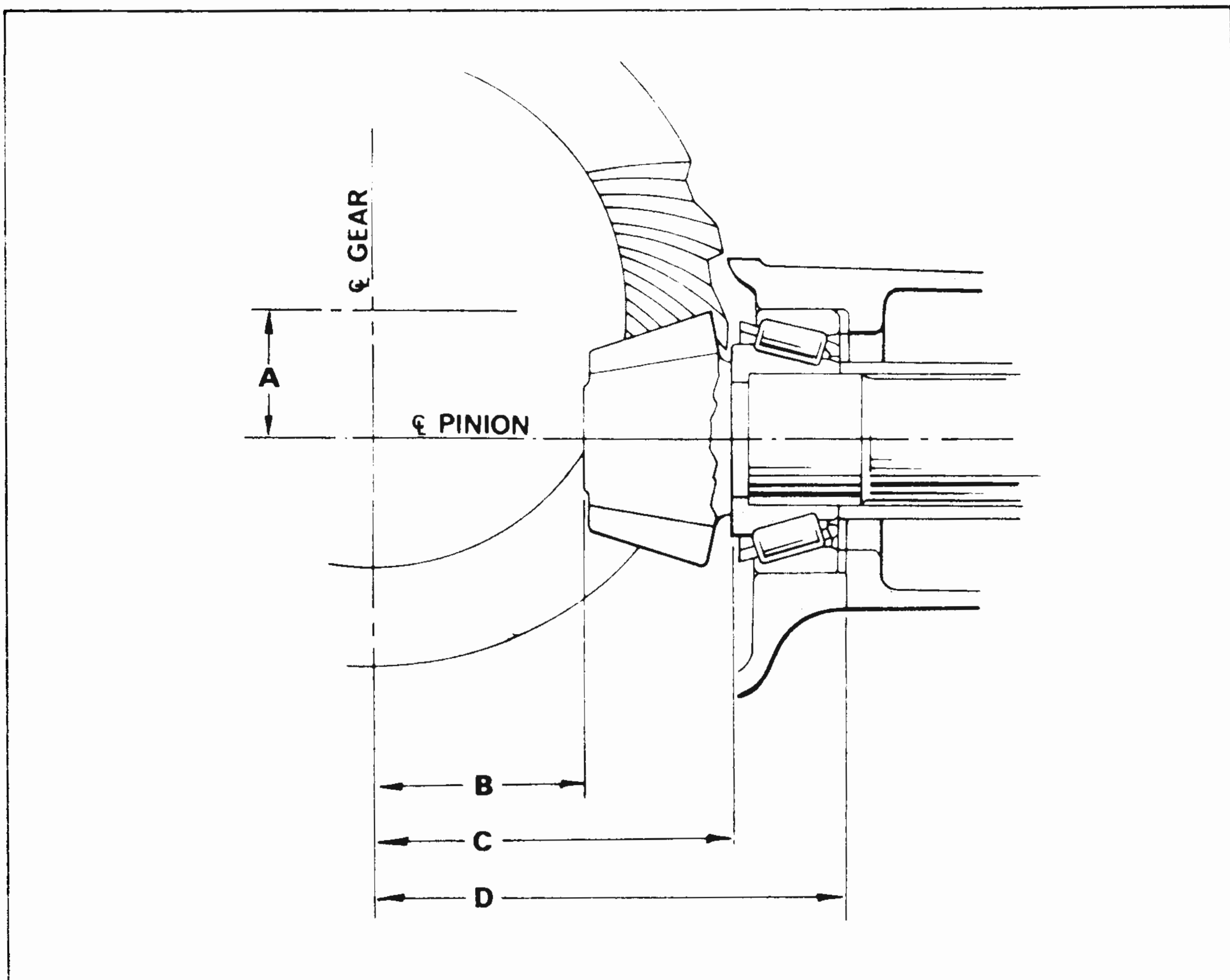


Fig. D.6 PINION SETTING DISTANCES

A.	Pinion Drop	1.5 in. (38.1 mm.)
B.	Zero Cone Setting	2.625 in. (66.67 mm.)
C.	Mounting Distance	4.312 in. (108.52 mm.)
D.	Centre Line to Bearing Housing	5.495 in. (139.57 mm.) to 5.505 in. (139.83 mm.)

Refit the pinion mate cross shafts complete with pinion mate gears ensuring that the ramps on the shafts coincide with the mating ramps in the differential case.

Assemble the remaining clutch plates and discs to the side gear ring.

Offer up the bottom half of the differential case to the flange half in accordance with the identification marks (see Fig. D.5) and position the tongues of the clutch friction plates so they align with the grooves in the differential case. Assemble the bottom half to the flange half of the differential case with eight bolts but do not tighten at this juncture.

Check the alignment of the splines in the side gear rings and side gears by inserting two output shafts, then tighten the eight bolts to a torque of 40 - 45 lb./ft. (5.5 - 6.2 kg/m.) while the output shafts are in position. Failure to observe this instruction, particularly with the differential unit having the dished clutch friction plates, will render it difficult or impossible to enter the output shafts after the eight bolts have been tightened.

Refit the drive gear to the differential case, having first ensured that the locating faces are not damaged, by aligning the bolt holes on the gear and case and tapping the gear into position with a rawhide mallet. Fit the securing setscrews using NEW locking straps and tighten to a torque of 70 - 80 lb./ft. (9.7 - 11.1 kg/m.) and knock up the tabs around the heads of the setscrews.

Checking for Wear

With one output shaft and the drive pinion locked, the outer output shaft must not turn radially more than 3/4 in. (19 mm.) measured on a 6 in. (152 mm.) radius.

Pinion Adjustment

Refit the pinion outer bearing outer race. Refit the pinion inner bearing outer race with the original shims in position between the outer race and its abutment shoulder.

Press the inner bearing inner race into the pinion using a hand press and a length of tube. Ensure that the tube contacts only the inner portion of the race and not the roller retainer. Place the pinion into position, turn the gear carrier over and support the pinion with a suitable block of wood. Fit the original outer bearing shims to the pinion shank so that they seat on the shoulder of the shank.

Fit the outer bearing inner race, companion flange, washer and nut only, omitting the oil slinger and oil seal assembly and tighten the nut.

It will now be necessary to check the pinion cone setting as follows :

Pinion Cone Setting

The correct pinion cone setting is marked on the ground end of the pinion. The serial number of the matched drive gear and pinion assembly is marked above the cone setting, it is most important that similarly marked drive gears and pinions are kept in their matched sets as each pair is lapped together at the factory. The letters on the left and right of the pinion should be disregarded.

Hold the gear carrier so that the ground end of the pinion is uppermost. Take the pinion cone setting gauge (Tool No. SE. 107) and remove the magnetic keeper from the gauge post. Using the setting block on a surface plate, set the dial test gauge to zero on the 4 HA setting. Place the dial gauge post on the end of the pinion as shown in Fig. D.7 so that the plunger of the dial gauge registers in the differential bearing bore.

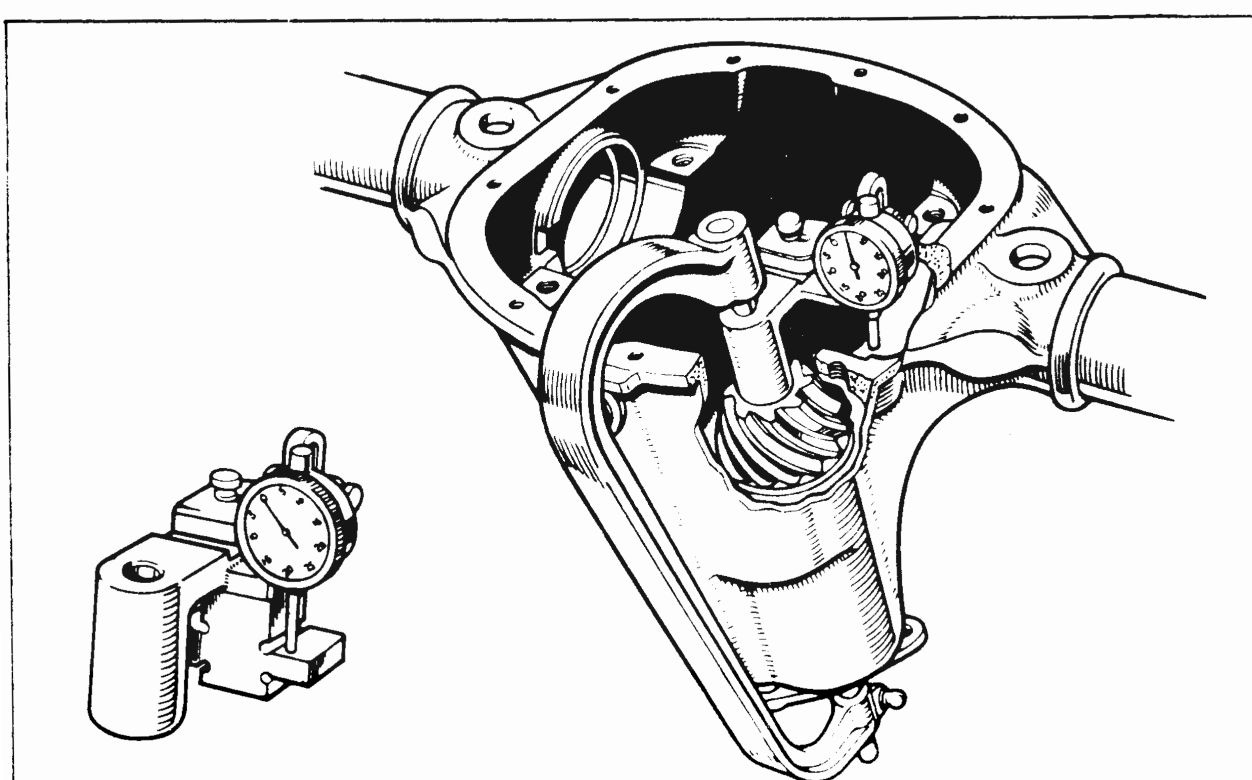


Fig. D.7 CHECKING PINION SETTING DISTANCE

Check the pinion cone setting by moving the gauge plunger in the differential bore - the actual reading being the minimum obtained. If the cone setting is correct, the reading on the dial gauge will be the same as the figure marked on the pinion end. For example, if the setting marked on the pinion is -2, then the reading on the dial gauge must also be -2.

If the pinion setting is incorrect, it will be necessary to remove the pinion assembly, as described in section D.8 and remove the pinion inner bearing outer race. Withdraw the shim pack and add or remove shims as necessary. Adding shims to the pack will decrease the gauge reading, that is increase the number on the gauge if negative (-) and decrease the number if positive (+); removing shims will increase the reading; shims are available in 0.003 in., 0.005 in. and 0.010 in. (0.076, 0.127 and 0.254 mm.) thicknesses

For example assume the required pinion cone setting distance (marked on the pinion end) to be -2, if on checking with the dial the reading is -7 it will be necessary to remove at 0.005 in. (0.127 mm.) thick shim in order to reduce the gauge reading to -2.

Replace the inner bearing outer race, fit the pinion and check the cone setting as described before.

The pinion pre-load adjustment is by means of a collapsible spacer.

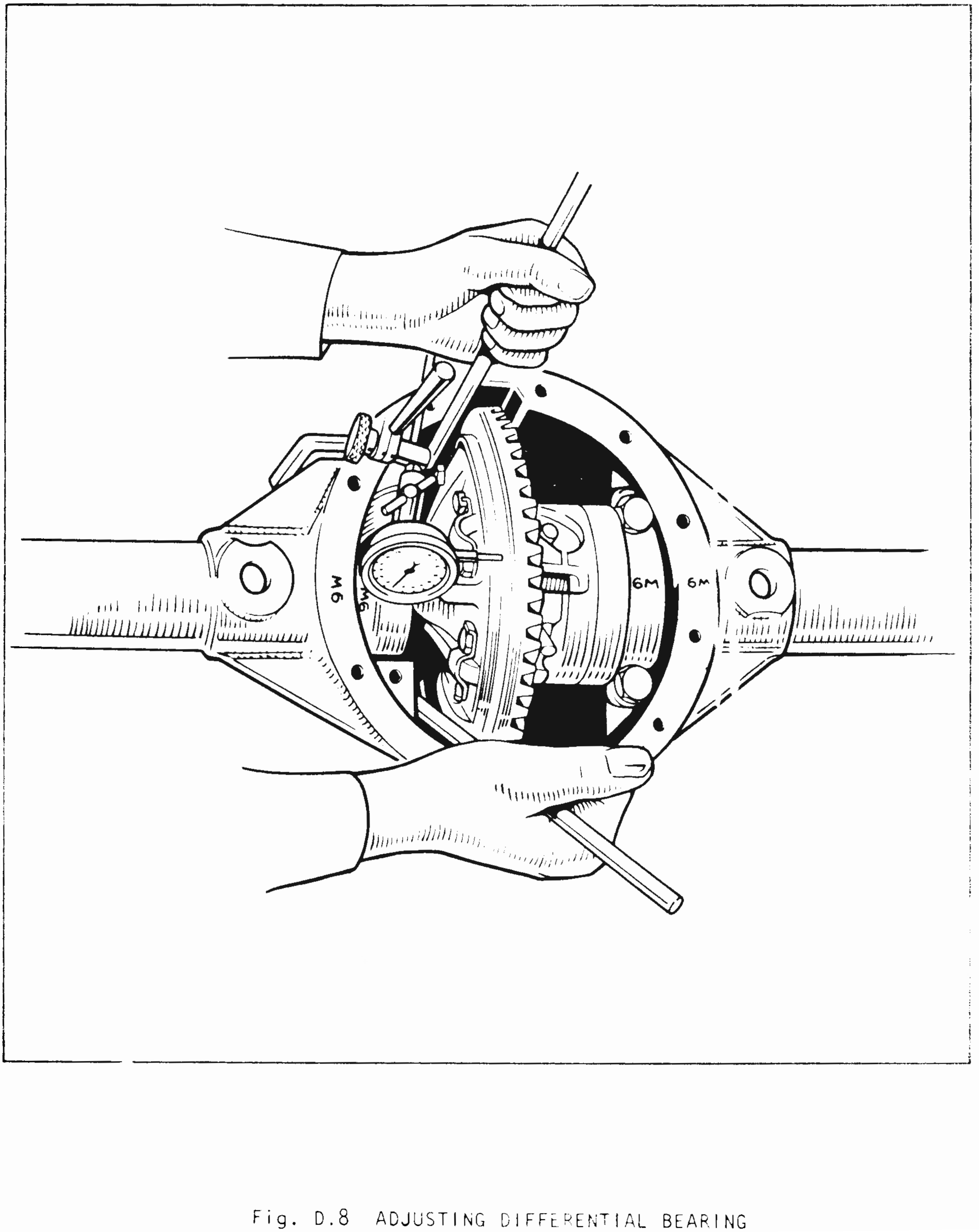


Fig. D.8 ADJUSTING DIFFERENTIAL BEARING

In this case it is necessary to tighten the pinion nut in order to collapse the spacer to a degree sufficient to pre-load the bearings to the recommended torque figure. The nut should be tightened with a torque wrench ideally of the clock variety, using a two peg bar fitted into two adjacent holes of the companion flange as the reaction member. The tightening process should be performed as a scissor action. This method of tightening will ensure that the rollers in the pinion bearings are seated against their respective thrust ribs, thus overcoming the possibility of incorrect pre-load figures. During this tightening procedure frequent checks should be made with a torque meter to ensure that the pinion pre-load of 20 - 40 lb/in. is not exceeded. Should the torque figure be exceeded inadvertently, then the assembly must be stripped and a new spacer fitted.

NOTE

On no account should the pinion assembly be slackened and re-tightened in an attempt to obtain the correct pre-load.

Differential Bearing Pre-load and Drive Gear Adjustment

With the pinion (less the oil seal and oil slinger) installed in the differential carrier, fit the differential assembly. Fit the differential bearing caps noting that the numerals marked on the bearing caps and the end cover face correspond (see Fig. D.8). Fit the cap bolts and tighten to a torque of 60 - 65 lbs./ft. (8.3 - 9.0 kg/m).

Drive Gear Runout

Mount a dial indicator on the gear carrier with the plunger of the gauge against the back face of the drive gear as shown in Fig. D.8. Turn the drive gear by hand and check the run-out on the back face, which should not exceed 0.005 in. (0.13 mm.). If the run-out exceeds this figure, the differential assembly should be removed, the drive gear withdrawn from the assembly and the locating surfaces on the drive gear and differential casing cleaned and burrs removed.

Drive Gear Mesh Adjustment and Differential Bearing Pre-load Setting

Install the drive shafts without any shims between the drive shaft bearing housing and the differential carrier. Note the condition of the "O" ring on the bearing housing and renew if necessary. Fit three bolts evenly spaced around each bearing housing. Set up a dial indicator on the differential carrier with the plunger of the gauge against one of the drive gear teeth as nearly in line with the direction of tooth travel as possible. Move the drive gear by hand to check the backlash; the correct backlash will be etched on the sloping face of the drive gear. If the backlash reading is incorrect, move the drive gear towards or away from the pinion as necessary until the correct backlash reading is obtained.

To move the drive gear in the required direction, it will be necessary to tighten the bolts in the drive shaft housing on one side of the differential carrier and slacken the bolts on the other side.

When the correct backlash has been obtained, measure the gap between the drive shaft bearing housing and the differential carrier on each side using a set of feeler gauges. Note the gap, having first checked around the circumference of the housing to ensure that the gap is even. Make up a shim pack to give the correct pre-load on the differential bearings. The shims are available in thicknesses of 0.003 in., 0.005 in., 0.010 in. and 0.030 in. (0.076, 0.127, 0.254 and 0.762 mm.).

For example: assume that the backlash etched on the drive gear is 0.007 in. (0.178 mm.) when this figure has been obtained as described previously, the gap on one side is 0.054 in. (1.37 mm.) and 0.046 in. (1.17 mm.) on the other, then the amount of shims to be fitted will be 0.054 in. - 0.003 in., that is 0.051 in. (1.30 mm.) and 0.046 in. - 0.003 in., that is 0.043 in. (1.09 mm.) to the other side.

Finally fit the output shafts with the shims in position to the differential carrier, fit the five bolts to each housing and tighten up. The drive gear mesh adjustment should now be checked as described in "Tooth Contact" (see Section D.12).

D.11 FINAL ASSEMBLY

Remove the pinion flange nut, washer and the companion flange and fit the oil slinger. Place the oil seal gasket into position in the oil seal recess, then fit the oil seal so that the lip of the seal faces inwards and the dust excluder flange is uppermost. Tighten down the pinion nut and washer to drive the assembly home. Fit the companion flange, washer and pinion nut and tighten to a torque of 120 - 130 lb./ft. (16.6 - 18.0 kg/m.).

Fit the differential carrier rear cover gasket, renewing if necessary, fit the rear cover and secure with setscrews and spring washers. Do not omit to refit the "Powr-Lok" (P.L.) and axle ratio tags which are also secured by the cover setscrews for identification purposes. Check that the drain plug is tightened and fill the axle with one of the recommended lubricants specified in Section Q. Replace the filler plug, check the tightness of the cover setscrews and check the complete unit for oil leaks.

Refit the brake discs and calipers, centralising the calipers by means of the adjusting shims (as described in Section G, "Brakes"). Fit new tab washers to the mounting bolts, tighten the bolts to a torque of 55 lb./ft. (7.6 kg/m.) and secure the bolt heads with the tab washers.

D.12 TOOTH CONTACT

After setting the backlash to the required figure, use a small brush to paint eight or ten of the drive gear teeth with a stiff mixture of marking raddle, used sparingly, or engineers blue may be used if preferred. Move the painted gear teeth in mesh with the pinion until a good impression of the tooth contact is obtained. The resulting impression should be similar to Fig. D.9.A.

The illustrations referred to in this section are those shown in Fig. D.9, which indicates the tooth bearing impression as seen on the drive gear.

The HEEL is the large or outer end of the tooth

The TOE is the small or inner end of the tooth

The FACE top or addendum is the upper portion of the tooth profile

The FLANK or dedendum is the lower portion of the tooth profile

The DRIVE side of the drive gear tooth is CONVEX

The COAST side of the drive gear tooth is CONCAVE

a. Ideal Contact

Fig. D.9.A shows the ideal tooth bearing impression on the drive and coast sides of the gear teeth. The area of contact is evenly distributed over the working depth of the tooth profile and is located nearer to the toe (small end) than the heel (large end). This type of contact permits the tooth bearing to spread towards the heel under operating conditions when allowance must be made for deflection.

b. High Tooth Contact

In Fig. D.9.B it will be observed that the tooth contact is heavy on the drive gear face or addendum that is, high tooth contact. To rectify this condition, move the pinion deeper into mesh, that is, reduce the pinion inner race setting distance, by adding shims between the pinion inner bearing outer race and the housing and adding the same thickness of pre-load shims between the pinion bearing spacer, or the shoulder of the pinion shank and outer bearing inner race. This correction has a tendency to move the tooth bearing towards the toe on drive and heel on coast, and it may therefore be necessary after making this change to adjust the drive gear as described in paragraphs (d) and (e).

c. Low Tooth Contact

In Fig. D.9.C it will be observed that the tooth contact is heavy on the drive gear flank or dedendum, that is low tooth contact. This is the opposite condition from that shown in (b) and is therefore corrected by moving the pinion out of mesh, that is increase the pinion inner race setting distance by removing shims from between the pinion inner bearing outer race and housing and removing the same thickness of pre-load shims from between the pinion bearing spacer or the shoulder on the pinion shank and the outer bearing inner race. The correction has a tendency to move the tooth bearing towards the heel on drive and toe in coast and it may therefore be necessary after making this change to adjust the drive gear as described in (d) and (e).

REAR AXLE

Drive Gear and Pinion Movement

Moving the drive gear out of the mesh moves the tooth contact towards the heel and raises it slightly towards the top of the tooth. Moving the pinion out of the mesh raises the tooth contact on the face of the tooth and slightly towards the heel on drive, and towards the toe on coast.

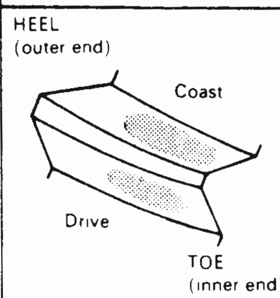
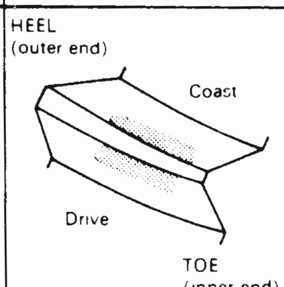
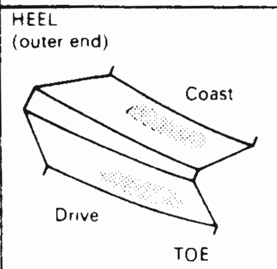
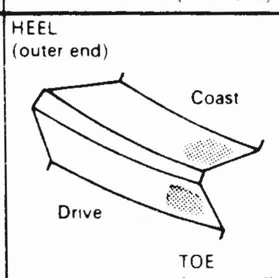
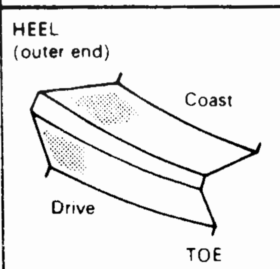
	TOOTH CONTACT (Drive Gear)	CONDITION	REMEDY
A		IDEAL TOOTH CONTACT Evenly spread over profile, nearer toe than heel	
B		HIGH TOOTH CONTACT Heavy on the top of the drive gear tooth profile.	Move the DRIVE PINION DEEPER INTO MESH i.e. REDUCE the pinion cone setting.
C		LOW TOOTH CONTACT Heavy in the root of the drive gear tooth profile	Move the DRIVE PINION OUT OF MESH i.e. INCREASE the pinion cone setting
D		TOE CONTACT Hard on the small end of the drive gear tooth.	Move the DRIVE GEAR OUT OF MESH i.e. INCREASE backlash
E		HEEL CONTACT Hard on the large end of the drive gear tooth.	Move the DRIVE GEAR INTO MESH i.e. DECREASE BACKLASH but maintain minimum backlash as given in 'Data'

Fig. D.9 TOOTH CONTACT INDICATION (CONTACT MARKING ON THE DRIVE GEAR).

d. Toe Contact

Fig. D.9.D shows an example of toe contact which occurs when the bearing is concentrated the small end of the tooth. To rectify this condition move the drive gear out of mesh, that is increase backlash, by transferring shims to the drive gear side of the differential from the opposite end.

e. Heel Contact

Fig. D.9.E shows an example of heel contact, which is indicated by the concentration of the bearing at the large end of the tooth. To rectify this condition, move the drive gear closer into mesh, that is reduce backlash, by removing shims from the drive gear side of the differential and adding an equal thickness of shims to the opposite side.

> NOTE:
>
> It is most important to remember when making this adjustment to correct a heel bearing that sufficient backlash for satisfactory operation must be maintained. If there is insufficient backlash, the gears will at least be noisy and have a greatly reduced life, whilst scoring of the tooth profile and breakage may result. Therefore, always maintain a minimum backlash requirement of 0.004 in. (0.10 mm.).

Backlash

When adjusting backlash always move the drive gear, as adjustment of this member has more direct influence on backlash, it being necessary to move the pinion considerably to alter the backlash a small amount;-0.005 in. (0.13 mm.) movement on pinion will generally alter backlash 0.001 in. (0.025 mm.).

D.13 POWR-LOK

To Eliminate Chatter from the Powr-Lok Unit (follow instructions below).

1. Drain the axle housing thoroughly of the old lubricant when the axle is warm.

> NOTE:
>
> It is necessary to rotate the wheels of the vehicle (by hand only), to allow the lubricant in the Powr-Lok unit itself to drain.

CAUTION

We do not recommend flushing the unit with solvents due to the undesirable effect the solvents may have on the new lubricant. If an attempt is made to eliminate chatter by flushing, prior to a complete teardown, we recommend using a light engine oil as the flushing agent.

2. After the axle housing has been thoroughly drained of the old lubricant - replace the drain plug and refill the axle housing with the correct amount of the proper lubricant.

CAUTION

Use only the lubricants detailed in Section Q. These lubricants are not always available at petrol service stations.

NOTE:

If the above procedure is not effective after 200 miles of operation it is recommended that the Powr-Lok unit be dis-assembled and thoroughly cleaned as outlined below.

D.14 NOISY FRICTION DISCS

1. As described in the first part of these instructions; remove the axle assembly or the differential carrier assembly from under the car, carefully measure and record the average ring gear/pinion back-lash reading and remove the Powr-Lok unit.

NOTE:

Do not remove the ring gear or the bearing cones from the differential case assembly. Be careful not to damage the bearing and mark the bearing cups so they may later be re-assembled with the same bearing cones.

NOTE:

The Powr-Lok differential case halves should be marked or scribed for correct alignment at re-assembly. Each pinion mate cross shaft should also be marked or scribed so that each pin cam surface will match with the same "V" ramp in the case when re-assembling.

2. Separate the case halves and remove the pinion mate cross shafts, bevel pinion mate gears, bevel side gears, side gear rings, clutch friction plates, and clutch friction discs.

NOTE:

Care should be taken to see how the friction plates and friction discs are assembled. The exact location and orientation of the Belleville spring plate used on each side should be noted here.

NOTE:

Inspect all parts and replace any items which appear to be worn or damaged. Inspect in particular the plate surfaces of the case halves, the side gear rings and the clutch plates and discs for excessive wear and scoring.

NOTE:

In the event that one or more of the clutch friction plates, discs or spring plates needs replacing, it is suggested that the entire stack of plates, discs and spring plates on each side be replaced. These are supplied in a kit and can be obtained through your Powr-Lok parts supplier or car dealer.

NOTE:

It is essential that all parts be clean and free of any foreign material before re-assembling - wash in kerosene oil prior to re-assembly, dry thoroughly.

CAUTION:

As each part is re-assembled in its proper position, it is necessary that it be lightly coated with the correct lubricant.

3. Assemble the proper number of clutch friction plates and clutch friction discs on the splined hub of each bevel side gear. Make sure the plates and discs are arranged correctly.

4. Hold each differential case half on its side, install the side gear rings with the friction plates and friction discs assembled. The side gear ring will rotate with a slight drag when properly located in the case.

5. With the ring gear flange half of the differential case in an upright position, assemble the bevel side gears pinion mate cross shafts (align the previously made marks on the cross shafts and the case halves), and bevel pinion mate gear.

6. Hold the remaining case half through the bearing trunnion and install it on the ring gear flange half.

7. Make sure the markings on each differential case half coincide. Install the differential case bolts and turn them in a few threads.

8. Before tightening the differential case bolts, use the axle shaft from the vehicle and align the splines of the side gear and the side gear ring.

9. With these axle shafts in position, tighten the differential case bolts evenly, and alternately torque to 35-45 lb./ft. Remove the axle shafts.

NOTE:

A check can be made here to determine whether or not the Powr-Lok components have been assembled properly. Each pinion mate cross shaft can be tight on its ramp or in the event there is clearance between the cross shaft and the ramp it should be only a few thousandths and it should be equal at all four cross shaft ends.

10. Re-install the assembled Powr-Lok unit in the axle as outlined in D.12 in the first part of these instructions.

CAUTION:

If the ring gear or the bearings have not been replaced, it is only necessary to re-check the back-lash to the amount recorded in paragraph 1. This re-check will insure that all of the components are properly located. If the ring gear or the bearings have been replaced, follow previous instructions for re-setting back-lash and bearing pre-load.

D.15 SIMPLE PROCEDURE FOR TESTING POWR-LOK

Operation under Immobile Conditions

When one wheel is slipping, the Powr-Lok will automatically increase the power to the gripping wheel. This increased power, always of the same ratio, is several times that required to drive the slipping wheel. However, there may be times when the spinning wheel is on an excessively slippery surface and does not provide enough resistance to transfer sufficient power to the gripping wheel. Under these conditions, the Powr-Lok offers an additional advantage for cars equipped with the parking brake at the rear wheels. By lightly applying the brake (usually three or four notches), enough additional resistance can be applied to the slipping wheel to greatly increase the power to the wheel with the better traction.

Only a light throttle application on starting is recommended to provide maximum traction by preventing "break-away" of the non-slipping wheel.

Testing for Correct Operation

The Powr-Lok can be effectively tested for correct operation by placing one rear wheel on good dry pavement and the other on ice, snow, mud, gravel, grease, etc.

It can easily be determined whether or not the non-slipping wheel is providing pulling power. The procedure should then be repeated with the opposite wheels on the different surfaces.

> CAUTION:
>
> Do not attempt to test the Powr-Lok while one wheel is on a jack. Under certain conditions, the unit could possibly cause the vehicle to jump off the jack.

The above testing procedure is a rough test that can be made by the owner of the vehicle. However, if it is suspected that the unit is not operating properly, it can be checked at the vehicle dealer service department by the following procedure.

Be sure the transmission is in neutral. Raise one wheel off the floor and place chocks at the front and rear of the opposite wheel. Remove the hub cap and apply a torque wrench to the axle shaft nut. Disregard break-away torque and observe only the torque required to turn the wheel continuously and smoothly.

If the torque reading is less than 40 lb./ft. the unit should be dis-assembled and the necessary repairs made.

D.16 REAR SUSPENSION SPRING DATA

Type	Semi-Elliptic
Free Length	46¼ in.
Free Camber (main spring)	8 in. Positive
Free Camber (aux. spring)	0.25 in. Negative
Laden Camber	0.2 in. Positive
Number of leaves	1 main, 8 aux., 1 helper
Number of thrust buttons and interleaves	8
Width of leaves	2 in.
Thickness of leaves	7/32 main, 3/16 aux. 11/32 helper

D.17 REAR SUSPENSION - BRIEF DESCRIPTION

The springs should be given regular lubrication, as the riding comfort of the car is largely dependent upon their condition.

There are eight thrust buttons fitted to each spring and the front eyelets of each spring have silent block bushes. The shackle bearings are fitted with non-metallic rubber bushes.

Periodic examination should be carried out to ensure that the spring leaves are in sound condition and the clamp bolts checked for tightness. The bushes should also be checked for wear and the shackles examined for possible side play.

Removing a Shackle

Chock all wheels except the one near the spring to be serviced. Jack up the car (use a screw or garage jack but not the car jacking system) until the rear wheel is clear of the ground and place suitable support blocks under the frame side member, forward of the spring to axle securing clips. Gently lower the car on to the blocks and remove the rear wheel. If an under axle type of jack is available it is better to place this under the rear axle instead of the locks, as this permits the axle to be raised or lowered as required to relieve the spring load.

To remove the rear shackle complete, detach the lock nut and plain washer on the inside of the lower shackle pin, also remove the locking nut and washer from the inside of the upper shackle pin. The inner shackle connecting link can now be removed and the top and bottom shackle pins which are fixed to the outer link can now be tapped out of the bush bearings.

For the spring eye pin at the anchor or forward end of the spring remove the lock nut and washer on the outside of the pin and then drive the pin clear.

Removing a Spring

Remove the front spring eye pin and rear shackle pins as already described.

Using a box spanner, release the four self-locking Simmonds type nuts from the spring bolts securing the spring to the rear axle pad.

The spring and clamp plate may now be lowered clear of the axle and frame.

Dismantling a Spring

First, remove the spring as previously detailed. Grip the spring in a vice, with the vice jaws against the top and bottom leaves, adjacent to the centre bolt. Free the two outside leaf clips by opening them out with a suitable punch and hammer. In the case of the two inside leaf clips, the riveted pin should be unscrewed, or if this is not possible the threaded end should be centre-punched and counter-sunk away with a drill. The pin can then be driven out. After removing the nut the centre bolt (toe bolt) may now be withdrawn.

Carefully open the vice when the spring leaves will separate. These should now be thoroughly examined for signs of failures or cracks. Replace any defective leaves, thoroughly clean and regrease. Also see that the rivets are tight which hold the leaf clips to the bottom spring leaf.

Replace the spring in a vice. Utilising a rod of similar diameter to the clamping bolt and having a taper end, position the leaves so that the clamping bolt can be readily replaced, without the risk of damage to the thread.

Replace the clamping bolt and nut followed by the leaf clips which should be carefully refitted.

Renewal and Replacement of Shackle Bushes and Spring Eye Bushes

The front spring eye bushes are of the silent bloc type and must therefore be pushed clear of the spring eyes by applying pressure to the outer bush of the assembly. When replacing the silent bloc bush it must be so positioned that its outer bush is perfectly central in the spring eye. Again pressure must only be applied to the outside bush. When the pin is inserted the nut must be pulled up tight otherwise the silent bloc bush will not operate properly.

The shackle bushes are non-metallic and the pins are fixed in the outer shackle plates.

To remove the shackle assemblies tap out pins from inner side and remove bushes.

Replacing a Spring

When the spring is fully assembled it should be fitted at the anchor end first and then at the shackle end. Remember that the shackle nuts must be pulled up tight, as previously described for the silent bloc bushes. Finally, fit the spring securing bolts and secure the clamp plate and spring to the axle.

D.18 REAR DAMPERS

The dampers are Armstrong double-acting hydraulic, resistance being offered to the compression and to the recoil of the road springs.

Damper maintenance in position on the vehicle is confined to the periodical examination of the anchorage to the chassis.

No adjustment is required or provided for, and any attempt to dismantle the piston assembly will serously affect the performance of the damper.

Testing

When there is any doubt that the rear suspension of the car is not adequately damped, the conditions of the road springs and tyre pressures should be borne in mind.

If the dampers do not appear to function satisfactorily an indication of their resistance can be obtained by carrying out the following check:-

Remove the dampers from the chassis (See Section D.20). Place individually in a vice, taking care to grip by the fixing rings, to avoid distortion of the cylinder body.

Move the piston up and down through its complete stroke. A moderate resistance throughout the full stroke should be felt.

If resistance is erratic, and free movement of the piston is noted, a new or re-conditioned unit must be fitted.

Too must resistance, when it is not possible to move the piston slowly by hand, may indicate a broken internal part or a seized piston in which case the unit will have to be replaced.

Refitting the Dampers

When handling dampers that have been removed from the chassis for any purpose, it is important to keep the assemblies upright as far as possible, otherwise air may enter the working chamber and cause erratic resistance.

D.19 SELECTARIDE SWITCH

This section is not applicable.

D.20 REMOVING REAR DAMPERS

1. Remove rear deck (section P.19).
2. Remove four screws securing damper top brackets and one anchor bolt at axle bracket.
3. Damper can now be withdrawn downwards complete with top bracket.
4. Remove top brackets.

Replacing Rear Damper

To replace, reverse the above sequence of operations.

> NOTE
>
> When fixing brackets to top of damper, the rubber bushes should be tightened when the top faces of the brackets form an angle of 82°, in side elevation, with the centre line of the damper.

D.21 PROPELLER SHAFT

General Description

The front universal joint incorporates an internally splined yoke which slides fore and aft on the transmission output shaft to compensate for the movement of the rear axle. A bellows type rubber seal provided with a nylon ring which fits over the sliding yoke is used in the opening of the extension housing to exclude road splash and other foreign material.

The universal joints and sliding spline are permanently lubricated. The joints should be inspected every time the car is serviced, for external seal leakage. The joints need not be dis-assembled or re-lubricated unlesss seal leakage is observed. If the cross and roller universal joints are dis-assembled and inspected for any reason, they should be repacked with Universal Joint Grease NLGI grade "0" before re-assembly.

D.22 PROPSHAFT JOINTS

Removal - Rear Joint

1. Remove both rear universal joint roller and bushing assembly clamps from drive pinion flange. DO NOT DISTURB THE RETAINING STRAP USED TO HOLD THE BUSHING ASSEMBLIES ON THE UNIVERSAL JOINT CROSS.

2. Alternative flange. Remove 4 nuts and bolts from the flange and slide propeller shaft forward to part flanges.

> CAUTION:
>
> Do not allow propeller shaft to drop or hang loose from either joint during removal. Wire up or otherwise support the loose end of shaft to prevent damage to joint.

Front Joint

1. Slide propeller shaft with the front yoke from the transmission output shaft. Be careful not to damage splines on output shaft or yoke. Examine sliding yoke seal for evidence of leakage. If no leakage is evident, do not disturb the seal. (If necessary to replace the seal, refer to Transmission Group in relevant Chrysler manual.)

> CAUTION:
>
> It is important to protect the machined surface of the sliding yoke from damage after propeller shaft has been removed.

Installation

Front Joint

1. Before installing propeller shaft clean old lubricant from splines of slip spline yoke. Lubricate with approximately one-third ounce of an Automotive Multi-Purpose Grease, NLGI Grade 2. Multi-Mileage Lubricant Part Number 2525035 is suitable for this application. Spread evenly over all the splined area of yoke.

2. Engage the yoke splines on end of output shaft, being careful not to burr the splines.

Rear Joint

1. Install rear universal joint cross roller bushings in the seats of pinion yoke. Install bushing clamps and attaching screws. Tighten screws to 170 lb./in.

2. Alternative flange. Place two flanges together with the holes opposite, replace nuts and bolts and tighten to 30 lb./ft. torque making sure the two flanges are pulled together squarely.

CROSS AND ROLLER UNIVERSAL JOINT

Dis-Assembly

1. Before dis-assembling universal joint, mark yoke, cross and bushings to facilitate re-assembly if inspection discloses parts are serviceable.

2. Remove the four bushings retainers from yoke. Press the roller and bushing out of yoke by pressing opposite bushing.

3. Press out remaining roller and bushing assembly by pressing on end of cross.

4. Remove cross assembly from yoke. Do not remove seal retainer from cross. The cross and retainers are serviced as an assembly.

Cleaning and Inspection

1. Clean all parts in a suitable solvent and dry with compressed air. Examine bearing surfaces of cross. They should be smooth and free from ripples and pits. If bearings surfaces or seal retainers are damaged, replace cross assembly.

2. Examine rollers in bushings. Rollers that have operated on a worn cross should be replaced. Rollers should have a uniformly good appearance and roll freely inside bushings.

Assembly

1. Lubricate roller and bushing assemblies with Universal Joint Grease, NLGI Grade 0. Also fill reservoirs in the ends of the cross.

2. Place cross in propeller shaft yoke, observing identification marks made at dis-assembly. Install roller and bushing assemblies in yoke, matching identifying marks.

3. Press both bushing assemblies into yoke while guiding cross into bushings. Press until bushing retainers can be installed in grooves in bushings.
4. Position remaining two bushing assemblies on cross. Install retainer strap to hold bushings on cross during installation of shaft on pinion flange. Lightly tap outer ends of bushings while rotating cross to be sure cross and bushings operate freely.

> NOTE:
>
> After severe operating condition check for annular marking on propshaft caused by fouling and take necessary steps to restore the required clearance.

D.21A PROPELLER SHAFT

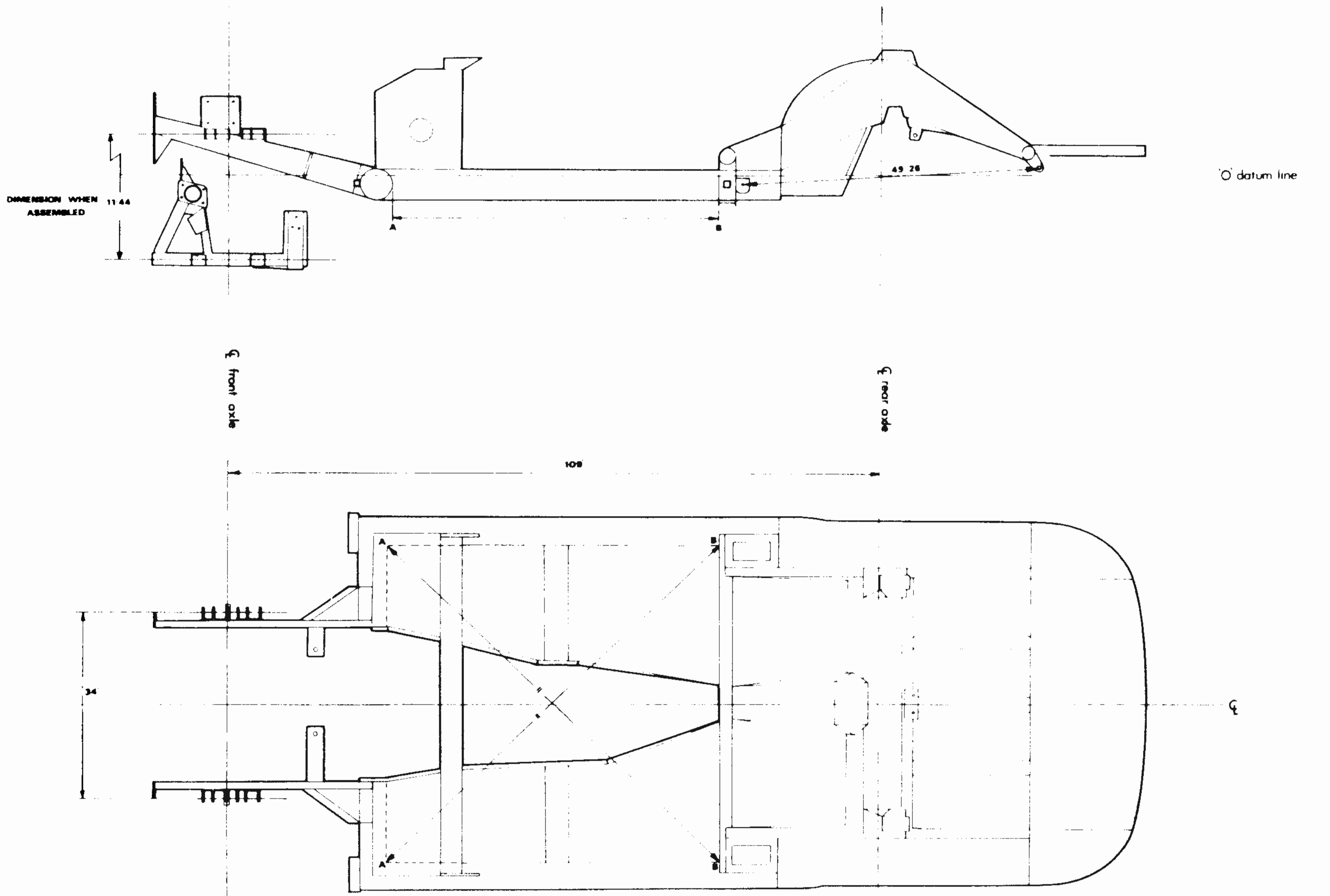
The front universal joint incorporates an internally splined yoke, which slides fore and aft on the transmission output shaft, to compensate for the movement of the rear axle. A bellows-type rubber seal, provided with a nylon ring which fits over the sliding yoke, is used on the opening of the extension housing to exclude road splash and other foreign material.

The universal joints are packed with grease, and each has a grease nipple fitted for replenishing the grease.

If the cross and roller universal joints are dismantled and inspected for any reason, they should be packed with Universal Joint Grease NLGl grade '0' before re-assembly.

CHASSIS FRAME

INDEX



THE DIMENSIONS GIVEN ARE FOR CHECKING PURPOSES

WHEN CHECKING A FRAME SUSPECTED OF BEING DISTORTED DIAGONAL MEASUREMENTS SHOULD BE MADE IF FRAME IS TRUE DIAGONALS A B SHOULD EQUAL ONE ANOTHER

F. I. INTERCEPTOR CHASSIS FRAME

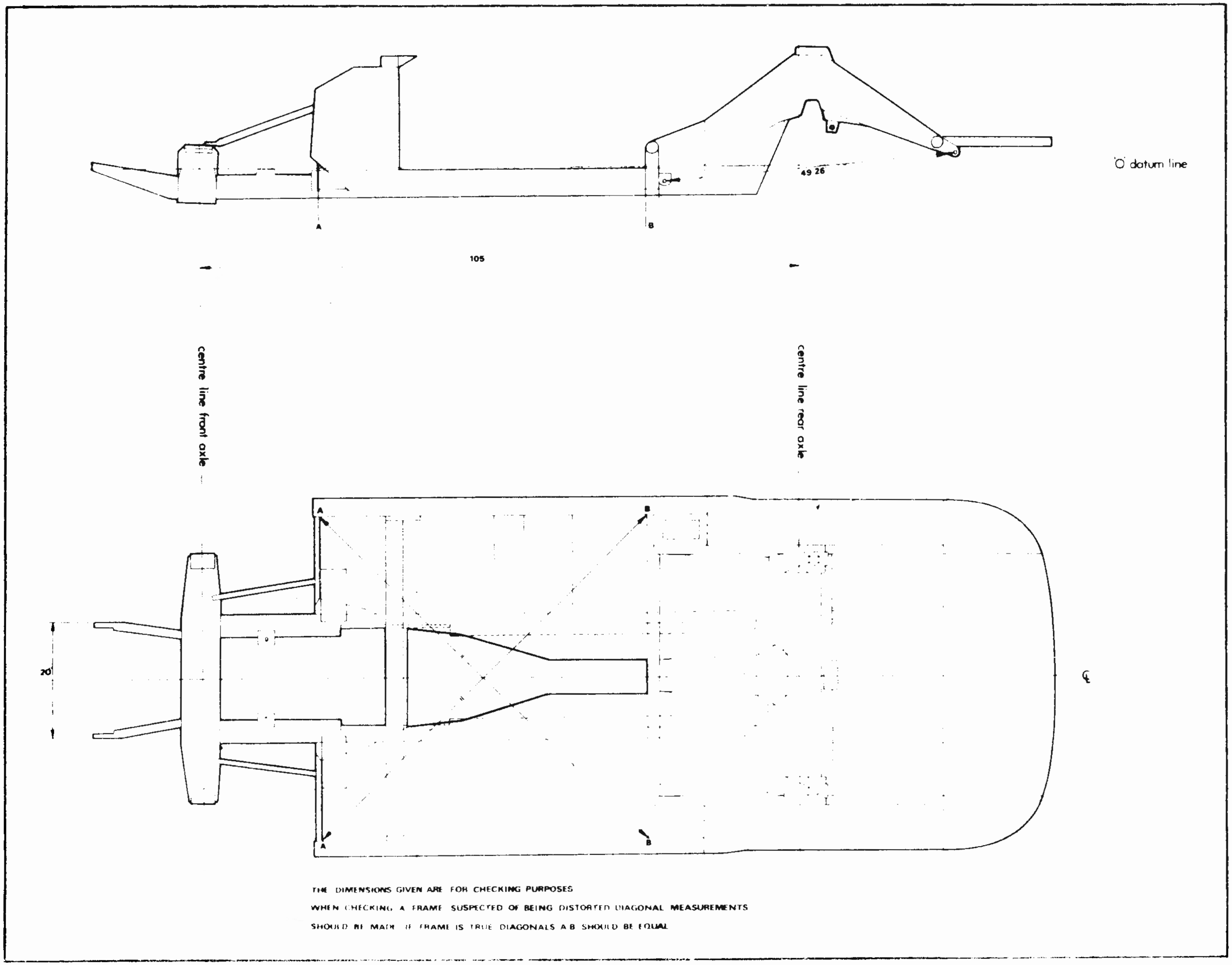


Fig. E.2 F.F. CHASSIS FRAME.

STEERING

INDEX

White

Green

F.26 SERVO STEERING GENERAL DATA

Type	Rack and Pinion with Servo and energy absorbing column
Front Wheel Alignment	1/16 in. (1.5 mm) [illegible]
Ratio	17.1 : 1
Steering turns lock to lock	3.4
Turning circle	38 ft. (1159 cm.)
Hydraulic capacity	3 pints (IMP), 3.6 pints (US) 1.7 litres

F.27 BRIEF DESCRIPTION

A power steering rack manufactured by Adwest is fitted to both the Interceptor and the FF and it is only possible to carry out a limited amount of servicing on this rack.

The power to operate the servo mechanism is supplied by an engine driven constant displacement hydraulic pump.

A control valve (8), (see Fig. F.13), is mounted in the pinion cas[illegible] directs oil pressure to either side of a double-acting piston attached [illegible] rack.

The forces required to actuate the rotary control valve are derived directly from the amount of twist of a lightweight torsion bar splined [illegible] the steering shaft. It will be appreciated therefore that when the stee[illegible] is only lightly loaded no servo action takes place. Conversely, [illegible] load inputs at the handwheel, such as when manoeuvring at low speed, [illegible] action occurs and increases progressively with the load.

The servo action also operates in reverse thereby providing [illegible] hydraulic steering damper.

F.28 SERVICING

1. System

The only regular maintenance required for the power steering system is that the oil is kept to the correct level. The level should be checked every 4,000 miles (6,400 kilometres) by unscrewing the cap. The level should be at the bottom of the filler neck when cold and half-way up when hot. It is important that any hydraulic fluid added is absolutely clean and also one of the recommended fluids listed below.

1. Ball joint.
2. Locknut.
3. Clip.
4. Gaiter.
5. Clip.
6. Steering unit assembly.
7. Hose assembly from pump.
8. Elbow.
9. Clip.
10. Hose - return to pump.
11. Balance pipe
12. Pipe valve - to L.H. cylinder.
13. Adapter.
14. Pipe valve - to R.H. cylinder.
15. Strap.
16. Clip.
17. Rubber bush.
18. Elbow.
19. Clip.
20. Rubber bush.
21. P.K. screw.

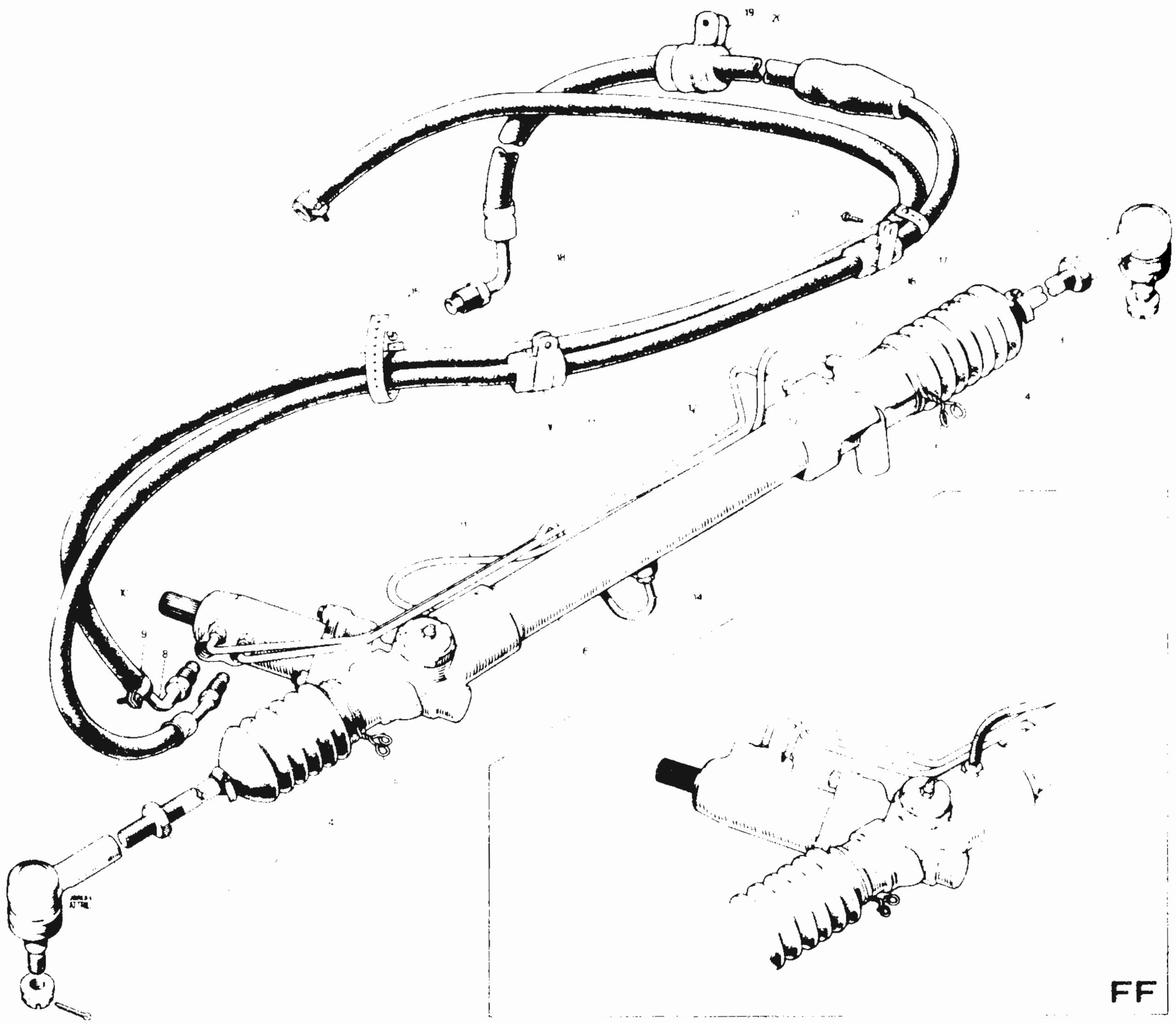


Fig. F12 Power Steering Interceptor & FF.

IMPORTANT

The fluid level MUST NOT be allowed to fall below the bottom of the filler neck otherwise air will be dragged into the hydraulic system causing lumpiness and erratic behaviour.

Recommended Hydraulic Fluids

Chrysler Fluid Part Number 2084329 or Veedol ATF Special 3433.

2. Steering Gear

The Rack and Pinion requires greasing every 6,000 miles (this does not include track rod ends), and the rubber bellows should be checked for fracture.

NOTE

The greasing of the gear should be done very sparingly and with the recommended grease. If the unit is over-greased the air transfer pipe may become blocked

Recommended Lubricant

Shell Retinax 'A' or Equivalent.

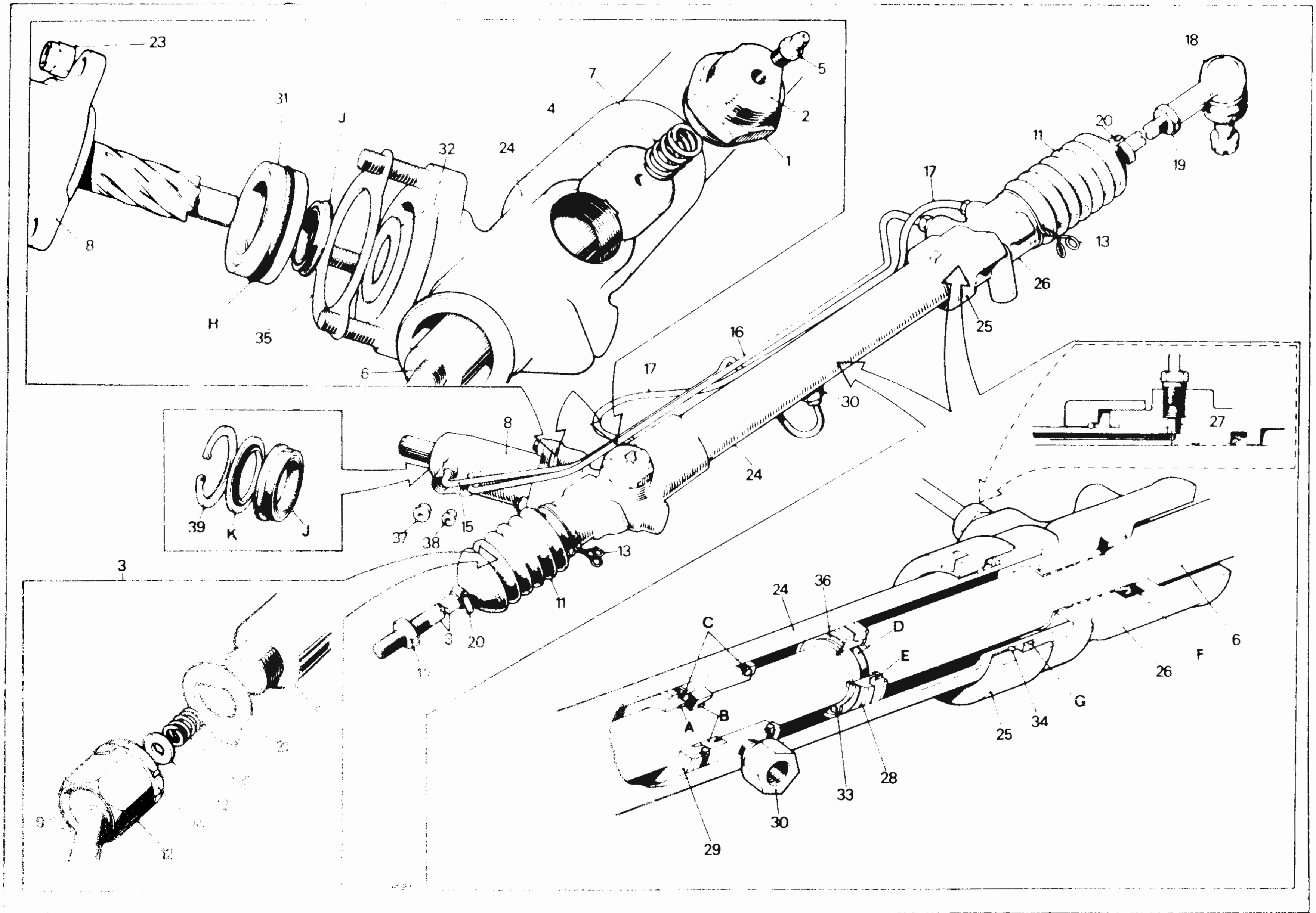
F.29 ADJUSTMENTS ON CAR

(refer to figure F.13)

1. Rack Rattle

This usually occurs when the car travels over rough road surfaces. The steering gear can be adjusted as follows:-
Slacken off locknut (1) retaining screwed plug (2). Screw in screwed plug (2)until a light contact is made, and back off 1/6th of a turn maximum. Firmly grip the inner ball joint assembly (3) protruding from the pinion end of the steering gear, and by moving it towards the screwed plug (2) a spring resistance should be felt.

The total amount of play at the rack plunger (4) should not exceed 0.010 in. and this can be checked by removing the greaser (5) and placing a dial indicator or measuring device through the screwed plug (2) and plunger (4) until the measuring instrument contacts the back of the rack. When rack (6)



[illegible]er Steering Details - Interceptor and FF

1. Locknut.
2. Screwed plug.
3. Inner ball joint assy. and rack end.
4. Rack plunger.
5. Grease nipple.
6. Steering rack.
7. Rack plunger spring.
8. Valve and pinion assy.
9. Inner ball joint assy.
10. Anti-rattle spring.
11. Rubber bellows.
12. Ball pin nut.
13. Wire clip.
14. Tab washer.
15. Pipe-valve to R.H. cylinder.
16. Pipe-valve to L.H. cylinder.
17. Air balance tube.
18. Tie-rod end assy.
19. Locknut.
20. Clip.
21. Tab washer-ball joint to rack.
22. Packing washer.
23. Nyloc nut.
24. Casing assembly.
25. Special nut.
26. End mounting.
27. End mounting - locating bush.
28. Piston assembly.
29. Centre seal housing.
30. Adaptor-cylinder line.
31. Seal housing.
32. Seal backing washer.
33. Piston circlip.
34. Circlip-special nut.
35. Gasket.
36. Piston shim.
37. Seat - return pipe.
38. Seat - supply pipe.
39. Circlip.

A. Seal (Nylon) ring-centre seal.
B. Seal (black) lipped-centre seal.
C. Seal (black) '0' ring-centre seal.
D. Seal (black) '0' ring-piston.
E. Piston ring.
F. Seal (black) lipped-end mounting.
G. Seal (black) '0' ring-end mounting.
H. Seal (black) '0' ring-seal housing.
J. Seal (black) lipped-seal housing and valve housing.
K. Seal (black) valve housing.

Fig. F.18 Power Steering Details

is pulled against the spring the total amount of play can be measured. If the spring resistance is negligible then it is suggested that the screwed plug be removed, and the spring (7) checked to see if it is broken. The clearance should be the minimum that will allow smooth operation of the steering unit with no bind at any point throughout its full travel.

2. Car tends to veer to the left or right when being driven in the straight ahead position.

Before the steering gear is checked or removed a simple test can be carried out to see if the valve (8) is out of trim. This is done by jacking the front of the car off the ground in such a way that the road wheels are free to turn from lock to lock. Set the steering wheel and road wheels in the straight ahead position, start engine and increase engine r.p.m., if the steering gear is out of trim; with no hands on the steering wheel, the steering gear will self steer towards either left or right depending upon which direction it is out of trim. If this does not occur a further check is to attempt to turn the steering from the straight ahead position over a small angular movement towards the left and right. If this requires an equal effort then the gear is not out of trim. The veering to left and right is therefore caused by some external source, for example, unequally worn tyres, tyre pressures including rear wheels, or steering geometry fault. If it is found that the valve is out of trim then it is not advisable to attempt re-trimming on the car because if the valve has gone out of trim once it could easily do so again. The valve should be replaced as an assembly.

3. Ball Pin Knock (See Fig. F.13)

To determine if any wear has taken place on the ball pin assembly (9) or if anti-rattle spring (10) is broken or weak:-

Compress the rubber bellows (11) by hand until the ball pin assembly (9) is felt through the rubber. Hold the ball pin assembly nut (12) firmly with one hand and attempt to push and pull the pin itself with the other hand or turn steering wheel side to side. If lost motion or play can be felt this can be adjusted out as follows;

2. Dismantling steering gear

Thoroughly clean outside of unit before attempting to dismantle. Remove the sub-assemblies or components as follows:-

a) Remove all external pipes (15), (16) and (17).

b) Remove the tie rod ends assembly (18), and locknuts (19).

c) Remove clips (13) and (20) and bellows (11) from steering unit.

d) Untab washers (21) holding inner ball joint assembly (9) to rack. Detach inner ball joint assembly by holding rack (6) at rack teeth end in vice with soft jaws to protect damage to rack teeth and rack.

NOTE:

Position of spring (10) and packing washer (22).

e) Undo locknut (1) retaining rack adjustment screwed plug (2), remove screwed plug, rack plunger (4) and spring (7).

f) Undo 3 nyloc nuts (23) retaining valve body, valve and pinion assembly (8) to pinion housing, mark the flanges for reassembly, and remove valve and pinion assembly complete from gear.

g) Remove seal housing (31) and back-up washer (32) from pinion housing.

h) The unit is now split into its two major components i.e. valve body, valve and pinion assembly (8), and casing assembly (24). Depending on the fault, the rack assembly only can be dismantled and faulty component replaced. (See F.32 for Serviced Parts).

3. Valve assembly (8)

This unit is not to be dismantled. Oil leakage from the valve housing seals can be rectified by fitting new seals (J) and (K) after removal of the circlip (39). If the unit is proved faulty it is to be replaced as an assembly.

4. Dismantling casing assembly (24)

This to be dismantled as follows:-

a) Undo special nut (25) retaining end mounting (26) to casing and slide end mounting off casing (24).

NOTE:

Radial location of end mounting locking bush (27). Pull rack (6) complete with piston (28) through centre seal housing (29).

b) Undo adaptor cylinder line (30) retaining centre seal housing (29) and push centre seal housing out of rack tube.

c) Remove piston (28) from rack by removing retaining circlip (33) taking care not to scratch rack.

d) The end mounting retaining nut (25) and wire circlip (34) should not be removed.

5. Inspection of components

Examine all components for signs of excessive wear, scoring or damage. It is important that when the steering rack is dismantled, all 'O' rings and seals should be automatically changed.

See Section F.32 for details of repair kit.

6. Assembly of Steering Gear

NOTE:

All parts to be clean and coated with approved hydraulic fluid.

a) Assembly of valve assembly (8) to seal housing.

Fit 'O' ring (H) to outside of seal housing. Place seal housing (31) over pinion and against ball race with seal recess (the full machined face with small step on internal bore) facing pinion.

IMPORTANT:

Suitably protect the pinion teeth with tape to avoid damaging the seal (J) and fit seal (J) into recess until lip is flush with face of seal housing. Examine the return and supply pipe seats (37) and (38) in the valve body and replace if necessary.

This completes the assembly of the valve and pinion etc.

b) Assembly Seal Housing Cylinder (29)

Fit nylon ring (A) with chamfered edge away from seal (B) recess.

Remove bellows retaining wire clip (13) from rack housing and fold bellows back until ball pin assembly (3) is exposed. It will be noted that there are two nuts and it is important that the tab washer (14) between the two nuts is untabbed and the two nuts split apart by the inner nut closest to the rack being firmly held and the outer nut retaining the ball released. Turn the nut (12) away from the ball pin and it will be noted that there is shimming between the two nuts, remove the appropriate shim and retighten the outer nut to inner and recheck ball for play. Continue this exercise until all play has been removed but ball joint is still free to turn. Check spring during this adjustment.

The ball joint is serviced as an assembly only.

Any other faults in the steering gear will necessitate the removal of the gear from the vehicle and servicing out of the car. (See F.32).

F.30 FAULT FINDING CHART

This chart gives an indication of the defects that could cause malfunctioning of the power assisted steering system and/or mechanical failure.

1. Sudden loss of power assistance

Both Directions

a) Broken vee belt to pump.

b) Fractured pressure or return hose.

c) Flow control valve stuck open.

d) Relief valve spring broken.

One Direction

a) Broken circlip (33) retaining piston (28).

2. Slow deterioration of power assistance

a) Loss of pump efficiency.

b) High internal leakage in steering unit.

3. Loss of steering effort (light steering)

a) Torsion Bar retaining pins loose or broken.

4. Vehicle self steers or veers to left or right

   a) Loose trim pin.
   b) Loose torsion bar retaining pins.
   c) Rotor tight in sleeve.

5. Internal mechanical play or knock

   a) Track rod ends (18) worn.
   b) Inner ball joint (9) worn or broken spring (10).
   c) Rack adjustment incorrect or spring (7) broken.
   d) Play between piston (28) and circlips (33).
   e) Worn rack back-up pad (4).

6. Loss of head in reservoir (topping up required)

   a) Oil entering bellows (11) past rack or pinion seals. Check by removing air transfer pipe and squeezing bellows.
   b) Leak past pump.

7. Aeration of oil in reservoir.

   a) Faulty pump shaft seal.
   b) Oil level too low in reservoir.

F.31 CHECKING HYDRAULIC SYSTEM IN CAR

Method

Remove return pipe from pump to reservoir at reservoir end and blank off pipe connection in reservoir. Refill reservoir with oil and place return pipe into reservoir filler hole.

Start engine and note flow into reservoir from return pipe. By watching the return flow under differing conditions the operating efficiency of the system can be determined.

1. Internal leakage in unit

Test 1

Set engine r.p.m. at just above idling and turn steering hard towards right hand lock against stops. Check flow of oil returning into reservoir. If the internal bleed is correct it should only be a trickle.

Repeat for opposite lock.

Test 2

If flow exceeds 3 pints per minute isolate valve from cylinder by blanking off cylinder ports and repeat test.

If flow returning to reservoir is the same the valve is faulty, if reduced, the piston seals in the cylinder are faulty.

2. Pump efficiency

If Test 2 is satisfactory but the steering is still heavy the pump can be checked as follows.

For this test a pressure gauge (1500 lb./min.) is required.

Remove pressure pipe from pump to steering gear at steering gear end and blank off pipe with pressure gauge.

Test 1

Start engine, leave idling, and note pressure gauge readings.

Results

Low pressure say under 300 lb./sq.in. would denote either a stuck flow control valve, a broken relief valve spring or a badly worn pump.

Test 2

Increase engine r.p.m. watching the pressure gauge readings.

Results

If the pressure increases from say 300 lb/sq.in. to 1000 lb./sq.in. at high r.p.m. but only say 500 lb./sq.in. at medium r.p.m. then the pump is badly worn.

A more effective method of checking the pump is to have a pressure gauge fitted into a 'tee' piece between the pump and steering gear. The tests then are as follows:-

Test 1

With engine r.p.m. at tickover, check that the flow returning to reservoir does not significantly drop off until the pressure reaches 500 lb./sq.in. when the steering is turned towards lock.

Test 2

Increase r.p.m. above tickover and repeat tests. The flow should not drop off until the relief valve starts to open, also the pressure should increase to relief valve setting without any drop in flow.

F.32 SERVICING OUT OF CAR

1. Serviced parts

Servicing/repair operations are limited to those listed. The following Service Parts only will be supplied by Jensen Motors Limited:-

Item	Qty.	Ill. No.	Part Number		
			Interceptor R.H.D.	Interceptor L.H.D.	F.F.
Steering unit assembly.	1		CT 3398	CT 3399	26832
Valve assembly complete.	1	(8)	CT 5227	CT 5227	CT 5226
Ball Joint assembly.	2	(9)(12)(14)	CT 5229	CT 5230	CT 5228
Kit repair comprising:-	1		CT 5224	CT 5224	CT 5224
Washer tab ball joint.	2	(14)			
Bellows ball joint	2	(11)			
Clip bellows (wire)	2	(13)			
Clip bellows (jubilee).	2	(20)			
Gasket - valve assembly	1	(35)			
Seals oil.	11 A. B. C. D. E. F. G. H. J. K.				
Washer fibre (for air-balance pipe connections)	1				
Seat return pipe.	1	(37)			
Seat supply pipe.	1	(38)			
Bush - locating	1	(27)			

Fit seal (B) into seal recess taking care not to damage lip. Lip should be away from nylon ring.

Fit two 'O' rings (C) to outside of housing.

c) <u>Assembly of Rack, Piston, Circlip, Seal Housing etc.</u>

Fit 'O' ring (D) into groove in rack.

Slide seal housing (29) over end of rack opposite to teeth. Recessed end of seal housing to face away from rack. Carefully slide assembly over circlip grooves and 'O' ring (D) in rack.

Fit circlip (33) into the groove nearest the rack teeth.

Fit piston ring (E) into groove in piston (28) ensuring that it is free to turn.

Fit piston and ring assembly onto rack and push against circlip (33).

Fit piston adjustment shim if required against circlip.

Fit second circlip (33) into remaining groove.

Check that the piston assembly is free to turn when circlip is home. tight to turn, remove adjustment shim. If play exceeds 0.010 in. fit adjustment shim.

d) <u>Assembly of rack (6) etc. to rack and pinion housing (24)</u>

Lubricate the rack teeth with Shell Retinax 'A' or equivalent. Slide rack into cylinder tube, teeth first.

Align threaded hole in seal housing (29) on rack with chamfered hole in tube.

Slide complete rack assembly into tube (taking care to compress piston ring) (E) until hole in seal housing (29) mates with hole in tube.

Screw adaptor (30) into seal housing and tighten to 27 - 30 lb.ft. It is adviseable to coat the first three threads of the adaptor with Loctite Hydraseal.

e) <u>Assembly cylinder end mounting (26)</u>

Fit seal (F) to mounting with lip facing threaded end.

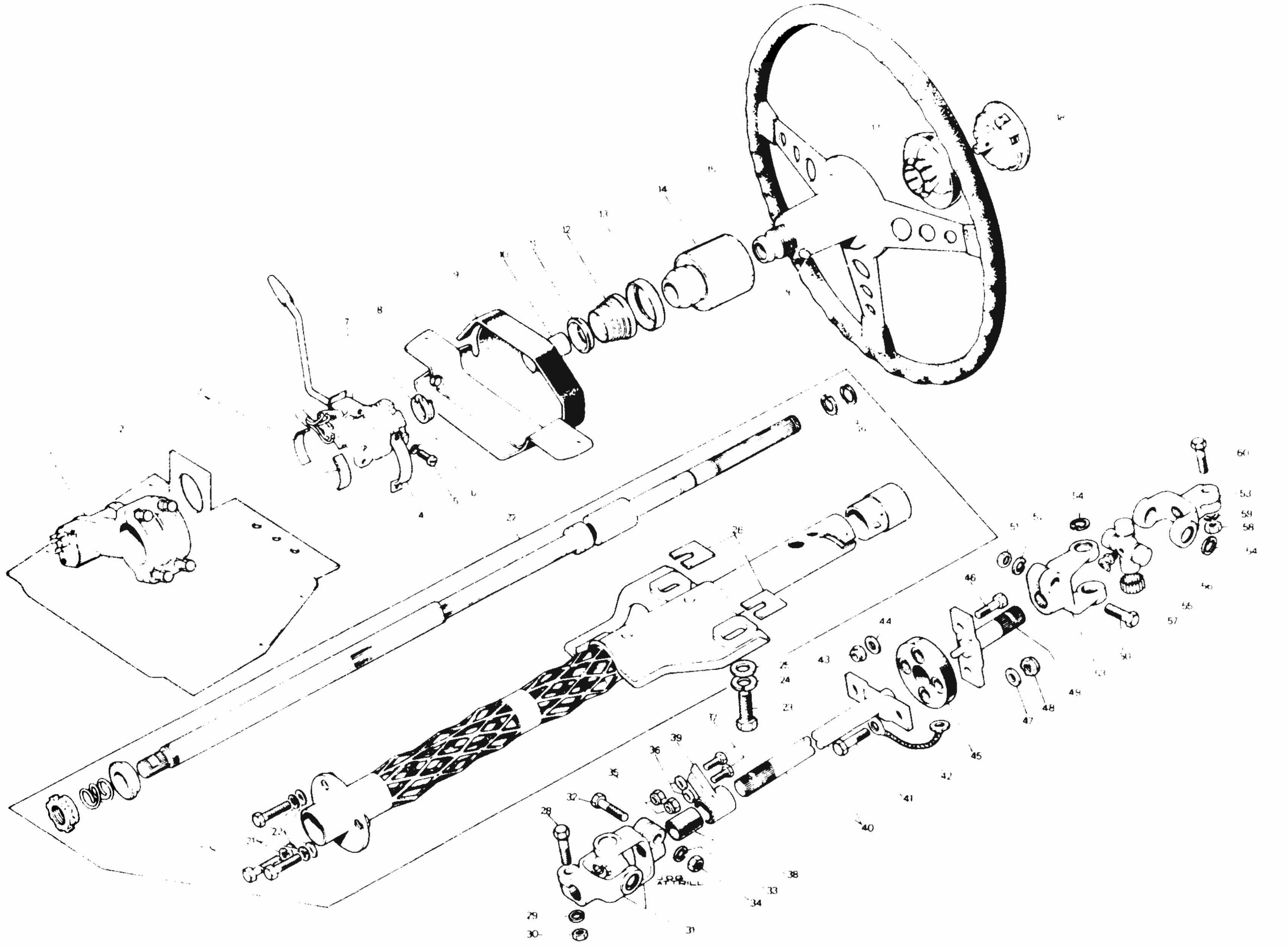


Fig. ... Steering Column and Shafts

1. Ignition and steering lock assembly.
2. Cover ignition and steering lock.
3. Spacers.
4. Clamp.
5. Screw.
6. Washer.
7. Trafficator switch assembly.
8. Striker.
9. Cowl.
10. Spacer.
11. Splined abutment.
12. Gaiter.
13. Bezel.
14. Locknut assembly.
15. Steering wheel assembly.
16. Plug.
17. Horn button surround.
18. Horn button.
19. Circlip.
20. Bolt.
21. Spring washer.
22. Washer.
23. Bolt.
24. Spring washer.
25. Washer.
26. Distance piece.
27. Steering column assembly.
28. Bolt.
29. Spring washer.
30. Nut.
31. Universal joint assembly.
32. Bolt.
33. Spring washer.
34. Nut.
35. Nut.
36. Washer.
37. Bolt.
38. Felt bush.
39. Steady bracket.
40. Lower steering shaft - long.
41. Bolt.
42. Bonding cable.
43. Nut.
44. Washer.
45. Flexible coupling.
46. Bolt.
47. Washer.
48. Nut.
49. Lower steering shaft - short.
50. Bolt.
51. Nut.
52. Spring washer.
53. Yoke.
54. Circlip.
55. Needle roller.
56. Trunnion.
57. Grease nipple.
58. Nut.
59. Spring washer.
60. Bolt.

Fig. F.14 Steering Column and Shafts.

Fit 'O' ring (G) into recess, it is adviseable to stretch this 'O' ring before fitting.

f) Assembly of cylinder end mounting to rack and pinion housing assembly.

Place assembly dolly or suitable protection over threaded end of rack and slide through bearing and seal (F) in cylinder end mounting assembly (26).

Lightly screw special nut (25) onto cylinder end mounting, but do not tighten.

Place a new locating bush (27) into its hole and rotate cylinder end mounting until bush enters half moon recess in end of cylinder tube and then tap home.

Tighten special nut (25) to 130 - 140 lb.ft.

This completes assembly of pinion housing, cylinder tube and rack, etc.

g) Final assembly

Place gasket (35) over three studs in pinion housing. Place backing washer (32) in recess. Slide assembly of valve (8) into pinion housing noting relationship of inlet holes to pinion housing (previously marked on dismantling). Push home and retain with three nyloc nuts 5/16 in. (23). Tighten nuts to 16 - 18 lb.ft.

Fit rack pad (4) ensuring that it is a slide fit in the pinion housing.

Place spring (7) into adjusting screw (2), screw adjusting screw into pinion housing lightly until a firm resistance is felt. Back off a maximum of 1/6 turn or until mesh between rack and pinion is smooth when pinion is turned.

Fit locknut (1) and tighten to 50 - 60 lb.ft.

Fit tab washer (21) to thread on end of rack, place washer (22) and spring (10) into thread of inner ball joint. Lightly tighten ball joint up to tab washer.

Repeat on opposite end.

To finally tighten, hold ball joint on one end with spanner or in vice and tighten ball joint at other end using hexagon nearest to rack. Tighten to 45 - 55 lb.ft.

Knock down tab, turn rack lock to lock and check that tab washer does not foul housing.

Fit all hydraulic and air pipes and fittings, checking that there is no blockage in any pipe. Note that the longer metal pipe (16) to the left hand cylinder fits into the screwed hole in the valve (8) nearest to the valve mounting flange.

Place 2 oz. of grease in each bellows and 1 oz. in pinion.

Fit bellows to steering unit retaining with wire clip (13).

Slide jubilee clip (20) over inner ball joint rod but do not tighten until assembled to car.

Screw nut (19) onto inner ball joint.

Screw ball end onto inner ball joint and set centres of ball ends to approximate wheel arm centre but do not tighten until assembled to car.

Assembly Lubricants

Hydraulic fluid to recommendations.
Grease to recommendation.
P.T.F.E. grease to recommended specification.

F.33 REMOVING AND REPLACING STEERING WHEEL, COLUMN ETC.

1. Remove switch cowl (4 screws).

2. Slacken off the lock-nut (black sleeve immediately below the wheel) by turning it in a clockwise direction. To release the lock-nut it may be necessary to insert a 3/16 in. tommy bar into one of the four holes provided.

3. Remove the horn push bezel, which is clipped to the wheel hub, by inserting suitable tool between bezel and wheel and levering away.

4. Disconnect horn switch lead and withdraw horn push assembly.

5. Remove three bolts from column upper bracket.

6. Remove three bolts from column lower bracket.
7. Remove bolt from upper universal joint.
8. Withdraw column assembly complete.

To replace reverse the above precedure.

> NOTE
>
> Should any fault exist in the column assembly it should be returned complete to Jensen Motors Limited and a replacement unit fitted.

F.34 REMOVING AND REFITTING STEERING UNIT

1. Remove lower clamp bolt from pinion coupling.
2. Remove ball-joints from steering arms.
3. Remove 4 - 7/16 in. rack mounting bolts. After disengaging pinion splined end the unit can be removed from the car.
4. To refit reverse the above sequence of operation.

F.35 TRACK ADJUSTMENT

Track adjustment can be effected by either tie-rod, both of which have right-hand threads.

Slacken the locknut at the outer end of the tie-rod and using the flat provided, turn the tie-rod in the appropriate direction to adjust the track as required. The correct "toe-in" figure is 1/16 in. (1.6 mm.).

When the above setting has been obtained retighten the locknuts and move the car forwards for a short distance, before re-checking. It will be necessary to repeat this check three times to ensure accuracy of readings.

F.36 SERVO STEERING GENERAL DATA

Type	Rack and pinion with Servo and energy absorbing column
Front wheel alignment	1/8 in. (3.2 mm.) toe-out
Ratio	17.1 : 1
Steering turns lock to lock	3.1
Turning circle	39 ft. (1188) cm.
Hydraulic capacity	3 pints (IMP), 3.6 pints (US) 1.7 litres

F.37 BRIEF DESCRIPTION

The power to operate the servo mechanism is supplied by an engine-driven constant displacement hydraulic pump.

A control valve is mounted in the pinion casting which directs oil pressure to either side of a double-acting piston attached to the rack.

The forces required to actuate the rotary control valve are derived directly from the amount of twist of a lightweight torsion bar splined into the steering shaft. It will be appreciated therefore, that when the steering is only lightly loaded no servo action takes place. Conversely, with higher load inputs at the handwheel such as when manoeuvring at low speed, servo action occurs and increases progressively with the load.

The servo action also operates in reverse thereby providing an effective hydraulic steering damper.

F.38 REMOVAL AND REFITTING OF STEERING UNIT

1. Remove lower clamp bolt from pinion coupling.
2. Remove ball-joints from steering arms.
3. Remove 4 - 7/16 in. rack mounting bolts. After disengaging pinion splined end the unit can be removed from the car.
4. To refit reverse the above sequence of operations.

F.39 FRONT WHEEL ALIGNMENT

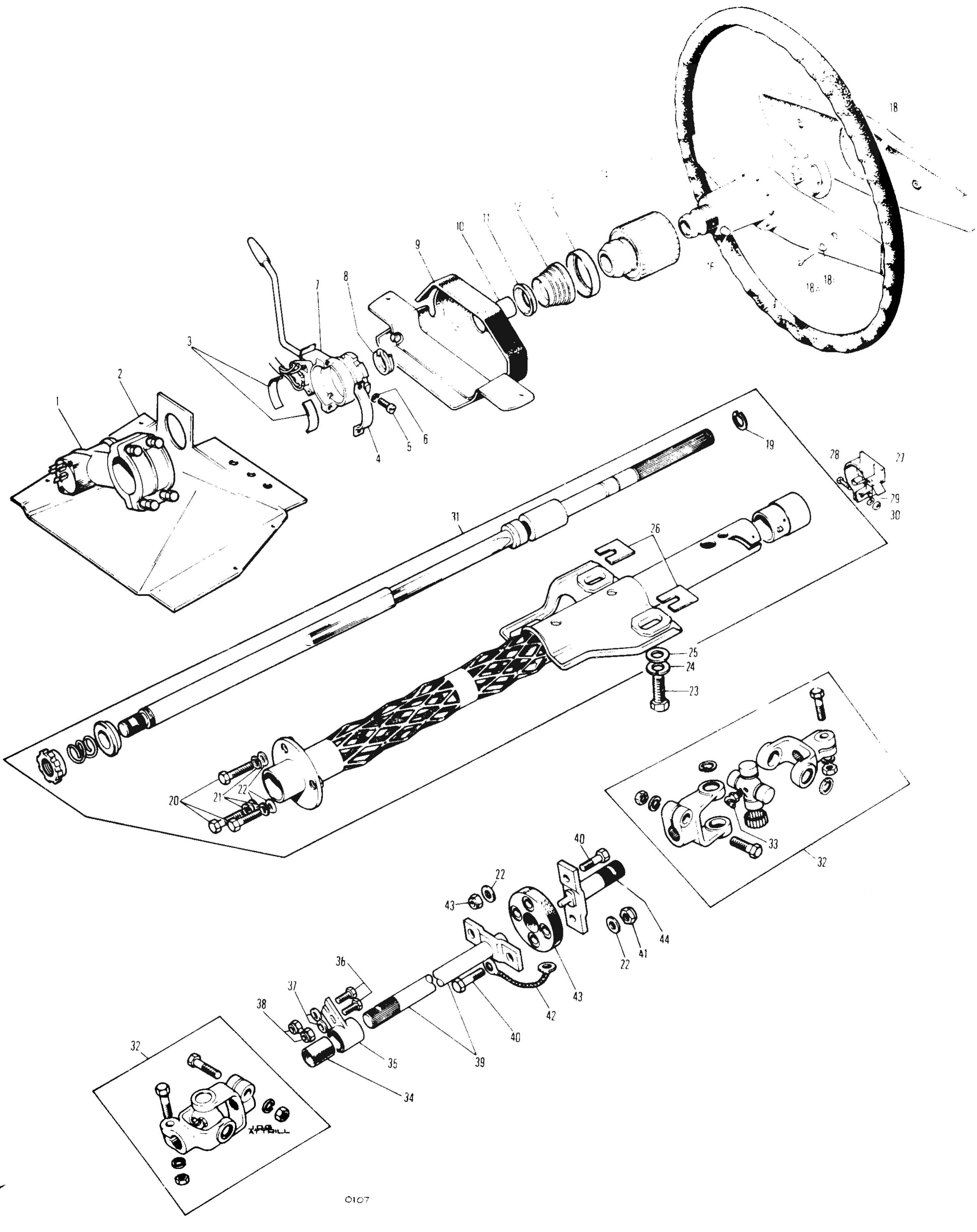
Front wheel alignment is best checked by means of the Dunlop optical alignment gauge, particulars of which can be obtained form the Dunlop Company, Fort Dunlop, Erdington, Birmingham.

F.40 TRACK ADJUSTMENT

Track adjustment can be effected by either tie-rod, both of which have right-hand threads.

Slacken the locknut at the outer end of the tie-rod and using the flat provided, turn the tie-rod in the appropriate direction to adjust the track as required. The correct "toe-out" figure is 1/8 in. (3.2 mm).

When the above setting has been obtained retighten the locknuts and move the car forwards for a short distance, before re-checking. It will be necessary to repeat this check three times to ensure accuracy of readings.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1. Steering column lock.
2. Steering column lock cowl.
3. Flasher switch spacer.
4. Flasher switch strap.
5. Flasher switch screw.
6. Spring washer.
7. Flasher switch.
8. Flasher clip.
9. Cowl.
10. Spacer.
11. Splined abutment.
12. Gaiter cup.
13. Gaiter bezel.
14. Locking nut.
15. Steering wheel assembly.
16. Plug.
17. Horn button.
18. Cover plate.
18A. Screw.
18B. Cup washer.
19. Circlip.
20. Screw.
21. Spring washer.
22. Plain washer.
23. Screw.
24. Spring washer.
25. Plain washer.
26. Distance piece.
27. Horn contact plate.
28. Screw.
29. Plain washer.
30. Nut.
31. Steering column assembly.
32. Universal joint assembly.
33. Grease nipple.
34. Felt bush.
35. Bush housing.
36. Screw.
37. Plain washer.
38. Nyloc nut.
39. Lower steering shaft - long.
40. Bolt.
41. Nyloc nut.
42. Earth lead.
43. Flexible coupling.
44. Lower steering shaft - short.

Fig. F.14A Steering column and shafts.

F.33A STEERING WHEEL, COLUMN - REMOVAL AND INSTALLATION

1. Remove the padded steering wheel centre by withdrawing the retaining screws, and cup washers.
2. Withdraw the spring retained horn button switch, and disconnect the lead.
3. Remove the circlip at the top end of the steering shaft, and turn the locknut (black sleeve immediately below the steering wheel) in a clockwise direction to withdraw the locknut. Lift off the steering wheel from the shaft splines.

   Note: To release the locknut, a 3/16 in. (4.76 mm) diameter tommy bar, placed in one of the four holes provided, may be necessary.
4. Remove the three bolts from the column upper bracket.
5. Remove the three bolts from the column lower bracket.
6. Remove the bolt from the upper universal joint.
7. Withdraw the complete column assembly.
8. To fit the column assembly, and the steering wheel, reverse the removal procedure.
9. Note: (a) Should the column assembly be defective, fit a replacement unit, and return the unserviceable column assembly, complete, to Jensen Motors Limited.

   (b) When fitting the steering wheel, ensure that the spokes are horizontal, with the road wheels in the straight ahead position.

ALFORD & ALDER STEERING RACK

On later cars, a different power steering rack and control valve assembly is fitted. This equipment is manufactured by Alford and Alder Ltd. and cars fitted with it can be readily identified by the prefix 'AA' immediately before the chassis number on the chassis identification plate.

Power steering rack

The rack shaft is fitted with a single piston which operates in an enclosed sealed chamber. By means of the control valve/pinion assembly, pressurized oil from the engine-driven hydraulic pump is directed to one or other side of the rack piston, thus providing power assistance to deflect the front road wheels as required.

Dismantling power steering rack

1. Remove rack complete from vehicle.
2. Slacken clips securing bellows seals and slide bellows seals along tie-rods to expose inner ends of tie-rods.
3. Wipe inner ends clear of grease and straighten tab ends of innermost lock washers.
4. Unscrew tie-rods from rack. Care must be taken not to disturb adjustment of the inner ball joint.
5. Disconnect unions connecting rack pipes to control valve and rack chamber, and remove pipes.
6. Slacken locknut on rack plunger adjusting screw, and withdraw adjusting screw, spring and plunger.
7. Remove the three nuts and washers securing control valve flange to rack and withdraw control valve and gasket.
8. Withdraw spacer from rack.
9. Disconnect unions securing rack balance pipe and remove balance pipe.

10. Using a suitable 'C' spanner, release screw securing end-housing to rack cylinder and withdraw end-housing.
11. Remove union from centre of rack cyclinder.
12. Withdraw rack shaft complete with piston in direction of end-housing.

    Note: This operation invariably results in the rack teeth being drawn through the lip-type seal in the cylinder sleeve. It is essential that this seal is renewed when the rack shaft is removed. It is recommended that all seals are renewed once they have been disturbed.
13. Withdraw cylinder sleeve from bore of cylinder, if necessary wing a soft drift.
14. Remove circlips and extract piston from rack shaft. Take care that circlips do not score rack.

Assembling power steering rack

1. Thoroughly clean all components.
2. Fit new seal and nylon backing ring to cylinder sleeve. Note that seal lip must be fitted adjacent to tapped locating hole and that square edge of nylon ring must abut against seal.
3. Fit new '0' rings to cylinder sleeve and lubricate cylinder bore with hydraulic oil.
4. Lubricate lip seal and enter cylinder sleeve (seal leading) over rack shaft at opposite end to rack teeth.
5. Fit piston inner '0' ring to rack shaft.
6. Carefully slide cylinder sleeve (seal end first) along plain end of rack shaft beyond location of piston. Do not slide cylinder sleeve over rack teeth.
7. Fit piston inner circlip to rack shaft, taking care not to mark or score rack shaft.
8. Fit piston ring to piston, slide piston into position on rack shaft and secure with circlip, taking care not to score or mark shaft, shimming if required.

9. Align tapped hole in cylinder sleeve with countersunk hole in cylinder and carefully slide sleeve and rack shaft into cylinder.
10. Through countersunk hole in cylinder, locate tapped hole in cylinder sleeve.
11. Ensure end-cover securing ring is towards open end of cylinder, smear conical seat of union with hydraulic sealing compound and fit and tighten union securing cylinder sleeve.
12. Fit new lip-type seal (lip of seal towards cylinder bore) and 'O' ring to end cover.
13. Lubricate seal lip, and 'O' ring, and slide end cover into position.
14. Line up mounting feet and secure end cover by tightening screwed retaining ring.
15. Fit spacer.
16. Fit new gasket to control valve flange.
17. Locate rack shaft in cylinder so that rack teeth are visible through control valve flange and are aligned to permit engagement of pinion.
18. Carefully enter pinion to engage rack teeth, locating control valve over studs. Fit and tighten the three nuts.
19. Rotate pinion until rack is centralised, i.e. the dimple on the rack shaft lies in the middle of the thrust plunger aperture.
21. Remove the small hexagonal plug from the screwed plug and, using a dial gauge, tighten the screwed plug until plunger end-float (i.e. side movement of the rack shaft) does not exeed 0.007 in. (0.178mm). This measurement must not be confused with backlash or axial movement. Tighten locknut.
22. Fit grease nipple to screwed plug and grease rack.
23. Remove grease nipple and replace hexagonal plug.
24. Fit new end washers complete with 'D' plates to rack ends (recessed side of washer towards rack).
25. Fit and tighten tie-rod inner ends to correct torque figure. Both tie-rod inner ends should be tightened simultaneously to prevent stress to pinion. Secure by bending over lock tabs on 'D' plates, care being taken not to disturb ball housing tabs. Ball joints to be checked for free articulation following assembly to rack.

26. Grease rack ends and inner ball ends, slide bellows seats into position, and secure with clips.
27. Fit bundy tubing to control valve and rack housing.

If necessary, during assembly of rack, the pinion lower needle bearing and rack shaft bush in the end housing can be renewed.

The control valve.

Brief description

The steering rack control valve is a combined pinion shaft and rotary-type valve assembly through which oil flow from the hydraulic pump is directed to either side of the rack piston as required.

The ports in the control valve body are connected, in order of descent, as follows:-
Top - return to reservoir
1st intermediate - delivery to, or return from, one side of rack piston
2nd intermediate - pressure supply from pump.
Bottom - Delivery to, or return from, other side of rack piston.

Attention to the control valve is not recommended as its construction and setting does not favour dismantling. Where, however, the top oil seal requires renewal, this operation may be carried out provided care and scrupulous cleanliness are observed.

Removing and replacing control valve top seal

1. Thoroughly clean exterior of control valve end unions.
2. Disconnect flexible hoses and steel pipes at control valve and seal all apertures to prevent ingress of grit.
3. Release plunger load from rack shaft.

4. Remove the three nyloc nuts from the control valve flange and withdraw control valve.
5. Carefully press pinion shaft and extract pinion and shaft from underside of control valve. Note that pressure must not be applied to the pinion shaft torsion bar.
6. The withdrawal of the pinion shaft will expose the valve which is fitted with special sealing rings. These rings must not be disturbed in any way. Disregard of this instruction may result in a requirement for a new control valve.
7. Remove circlip, backing washer and seal from the control valve body; renew seal and replace in reverse order.
8. Using special sleeve, insert the pinion shaft and rotary valve into body.
9. Remove special sleeve from pinion shaft.
10. Refit control valve to rack.
11. Adjust and lock rack plunger.

Removing and replacing control valve seat inserts

Seat inserts are fitted to the inlet and return parts of the control valve housing. These seats can be damaged due to overtightening of the flexible hose unions.

Seat removal can be accomplished by using an 'Easy-out' extractor. Carefully fit a new insert observing scrupulous cleanliness, as the admission of swarf or grit may render the control valve inoperative.

Important: The insert in the control valve pressure inlet port is also a restrictor. This insert, or restrictor must be chosen to suit the hydraulic pump fitted.

Bleeding the steering system

The hydraulic steering system is self-bleeding but care must be taken to ensure that at no time is the pump reservoir allowed to empty or become dangerously low. This is especially important where both the pump and the rack have been newly installed.

When the hydraulic system has been disturbed, proceed as follows:-

1. Ensure all hydraulic connections are properly made and tight.
2. Fill hydraulic reservoir to high level mark on dipstick.
3. Place road wheels in straight-ahead position, and with drive belt slackened or removed, rotate the pump pulley by hand to prime the system.
4. Fit and adjust drive belt.
5. Check, and top up hydraulic reservoir as necessary.
6. Start engine and allow to idle.
7. Turn steering wheel to full lock and return wheel to straight-ahead position.
8. Check and top up reservoir.
9. Turn steering wheel to opposite lock and return to straight-ahead position.
10. Recheck reservoir level.
11. Turn wheels from lock to lock several times to permit air to be fully exhausted from the system.
12. Return wheel to straight-ahead position and give final check to reservoir level.

    Note: While repeated turning of the steering wheel when the car is stationary will do the steering mechanism and hydraulic units no harm, the effect on tyre treads is not so favourable. When testing or bleeding the power steering, the road wheels should be rotating slowly to minimise tyre scrub.

Renewing components in situ.

Renewing tie-rod outer end

1. Remove road wheel
2. Scribe a line on one flat of the tie-rod outer end locknut and a corresponding line on the tie-rod. Slacken the locknut.
3. Replace tie-rod from steering arm and unscrew tie-rod outer end.
4. Screw on new outer end, ensuring it will be located in the same position on the tie-rod as the old one. That is, that the length between ball centres is not altered.
5. Connect and tighten tie-rod end to steering arm.
6. Repeat above procedure on opposite side.
7. Fit road wheels and check track, adjusting as necessary.

Wear in tie-rod outer ends cannot be removed by adjustment; renewal of the complete end is necessary. Tie-rod outer ends should be renewed in pairs.

Renewing bellows seal.

1. Remove front wheel.
2. Remove tie-rod outer end and locknut.
3. Clean area around bellows.
4. Release clips securing bellows seal to rack housing and tie-rod and slide off bellows seal.
5. Ensure tie-rod inner end is adequately greased, pack new bellows seal with approximately 2 oz. of grease and slide into position.
6. Secure inner end of seal to rack with a clip or twist of wire, taking care not to cut or bite into the seal.
7. Position outer end of bellows seal 5.75 in. (146 mm) from outer end of tie-rod and secure with clip.
8. Replace locknut and tie-rod outer end, and secure to steering arm
9. Fit front wheel, lower vehicle to ground, and check and adjust wheel track as necessary.

Renewing tie-rod

1. Remove front wheel, disconnect tie-rod outer end from steering arm and withdraw outer end and bellows seal.
2. Turn steering wheel as necessary to expose tie-rod inner end.
3. Straighten lock tabs securing ball end to rack on inner lock washer.
4. Unscrew tie-rod.
5. Replace in reverse order, ensuring inner lock tabs are renewed and properly secured. Both tie-rod inner ends must be tightened simultaneously to prevent stress being applied to pinion teeth.
6. Check tie-rod inner ball joints for free articulation.
7. Check and adjust wheel track as necessary.

   N.B. Should removal of the rack control valve be required, it is advised that the rack be removed from the vehicle. This recommendation is made principally to minimise the entry of grit to either rack or control valve, and also to eliminate damage to the control valve, and also to eliminate damage to the control valve lower seal if the pinion is inserted in situ.

Removing rack.

1. Raise car on ramp or jack.
2. Remove pinch bolt and nut from pinion shaft universal joint.
3. Clean control valve in vicinity of pipe unions.
4. Disconnect, at control valve housing, the main oil supply and return unions (flexible pipes).
5. Plug, or seal off, disconnected unions and control valve ports to prevent entry of grit.
6. Disconnect tie-rod ends from steering arms.
7. Remove the four bolts, plain and spring washers, and angle plates securing rack mounting feet to mounting brackets.
8. Withdraw rack forward to release pinion shaft from universal joint and remove from car.

Replacing rack.

1. Centralise rack and position it on car.
2. With front road wheels and steering wheel set in straight-ahead position, engage pinion shaft in steering shaft universal joint, ensuring that the flat machined in the pinion shaft corresponds with the bolt location in the universal joint.
3. Align tapped holes in rack feet with those in the mounting brackets and engage single plates, bolts, plain and spring washers. Ensure single plates are in contact with mounting platform before tightening bolts.
4. Connect tie-rod ends to steering arms.
5. Fit pinch bolt to universal joint and pinion shaft.
6. Connect flexible pipe unions to control valve.
7. Top up hydraulic reservoir, bleed steering system and check for leaks.
8. Check also that the rack bundy pipes do not make contact either with each other or any part of the car.

BRAKING SYSTEM

INDEX

G.13 GENERAL DATA

Brake type	Disc
Brake disc diameter	F.11 3/8 in. R. 10 3/4 in.
Wheel cylinder bore dia.	
Front inner (1 off)	2.25 in.
outer (2 off)	1.59 in.
Rear inner (1 off)	1.68 in.
outer (2 off)	1.18 in.
Master cylinder bore diameter	7/8 in.
Swept area - Front	231 sq. in.
Swept area - Rear	197 sq. in.
Servo unit type	direct acting
Main friction pad material	Ferodo 2430 F
H/Brake friction pad material	Don 117
Brake Fluid	Girling amber

SPECIAL TOOLS

Piston retraction tool	Pt. No.64932392

TIGHTENING TORQUES

Position	Size	Torque
H/Brake bracket	5/16 - 24	15-lb. ft.
Abutment H/B Cable - front	3/8 - 24	30-lb. ft.
Abutment H/B Cable - rear	3/8 - 24	30-lb. ft.
Compensator bracket	1/4 - 28	8-lb. ft.
	5/16 - 24	15-lb. ft.
* Brake pedal box to Bulkhead	1/4 - 28	8-lb. ft.
* Brake Pivot Bolt	3/8 - 24	30-lb. ft.
* Servo to Box	5/16 - 18	25-lb. ft.
Brake Pedal Pad	3/8 - 24	30-lb. ft.

* Where items are marked with an asterisk extra care must be taken to ensure that the correct torque figures are maintained.

G.14 BRIEF DESCRIPTION

The Interceptor is fitted with disc brakes on all four wheels.

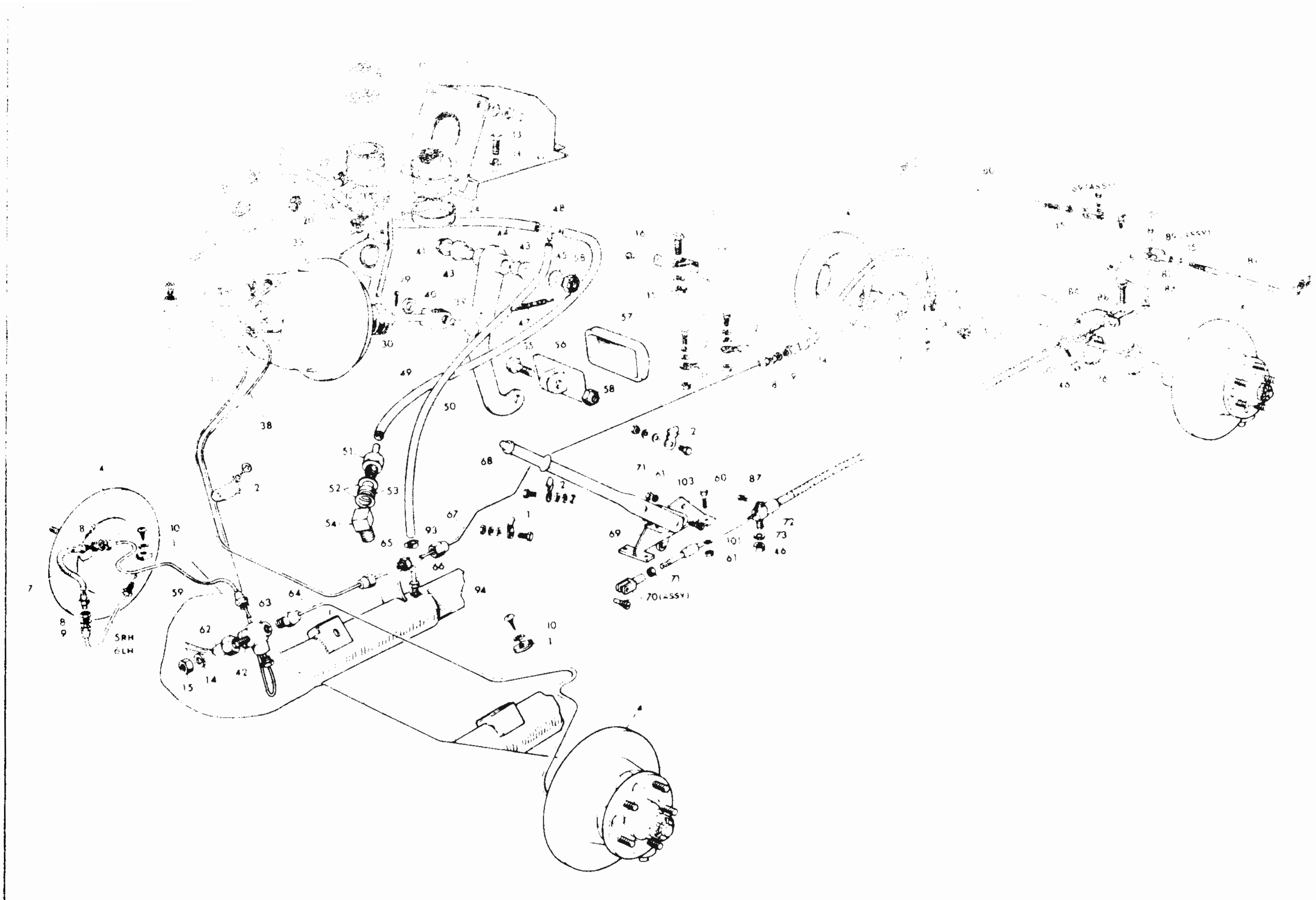


Fig. G.8 BRAKING SYSTEM INTERCEPTOR

1. Pipe clip
2. Pipe clip
3.
4. Brake disc
5.
6.
7. Brake hose - front
8. Nut
9. Washer
10. Washer
11. Nut
12. Screw
13. Bolt
14. Washer
15. Nut
16. Rubber buffer
17. Return spring bracket
18. Cap - fluid reservoir
19. Gasket
20. Hose
21.
22. Fluid reservoir
23.
24. Clip for reservoir
25. Pedal bearing
26. Gasket
27.
28. Hose clip
29. Reservoir support bracket
30. Brake servo unit
31. Master cylinder assembly
32. Pipe - hose to master cylinder
33. Pipe - hose to master cylinder
34. Manifold assembly
35. Hose - manifold to T. piece
36. Grommet
37. Brake pipe - m/cyl. to 2-way
38. Brake pipe - m/cyl. to 4-way
39. Clevis pin
40. Washer
41. Special bolt
42. Bolt
43. Bush
44. Brake pedal lever
45. Washer
46. Nut
47. Return spring
48. Non-return valve
49. Hose - T.piece to manifold
50. Hose - T.piece to vacuum tank
51. Union
52. Gasket
53. Spacer
54. Elbow
55. Bolt
56. Pedal pad
57. Pedal rubber
58. Nut
59. Brake pipe - 4-way to RH hose
60. Bolt
61. Washer
62. Stop switch
63. 4-way connector
64. Brake pipe - 4-way to LH hose
65. Union
66. Hose connector
67. Brake pipe - 2-way to rear hose
68. Hand brake assembly
69. Hand brake bracket
70 Clevis assembly
71. Nut
72. Hand brake cable assembly
73. Cable abutment
74. Rear brake hose
75. Brake pipe - 3-way to RH brake
76. Pipe clip
77. Washer
78. 3-way union
79. Brake pipe - 3-way to LH brake
80. Brake rod RH
81. Brake rod LH
82. Clevis pin
83. Compensator lever
84.
85.
86. Compensator bracket
87.
88. Compensator trunnion
89. Clevis assembly
90.
91. Grease nipple
92.
93. Hose clip
94. Gasket

Fig. G.3 - [illegible] INTERCEPTOR

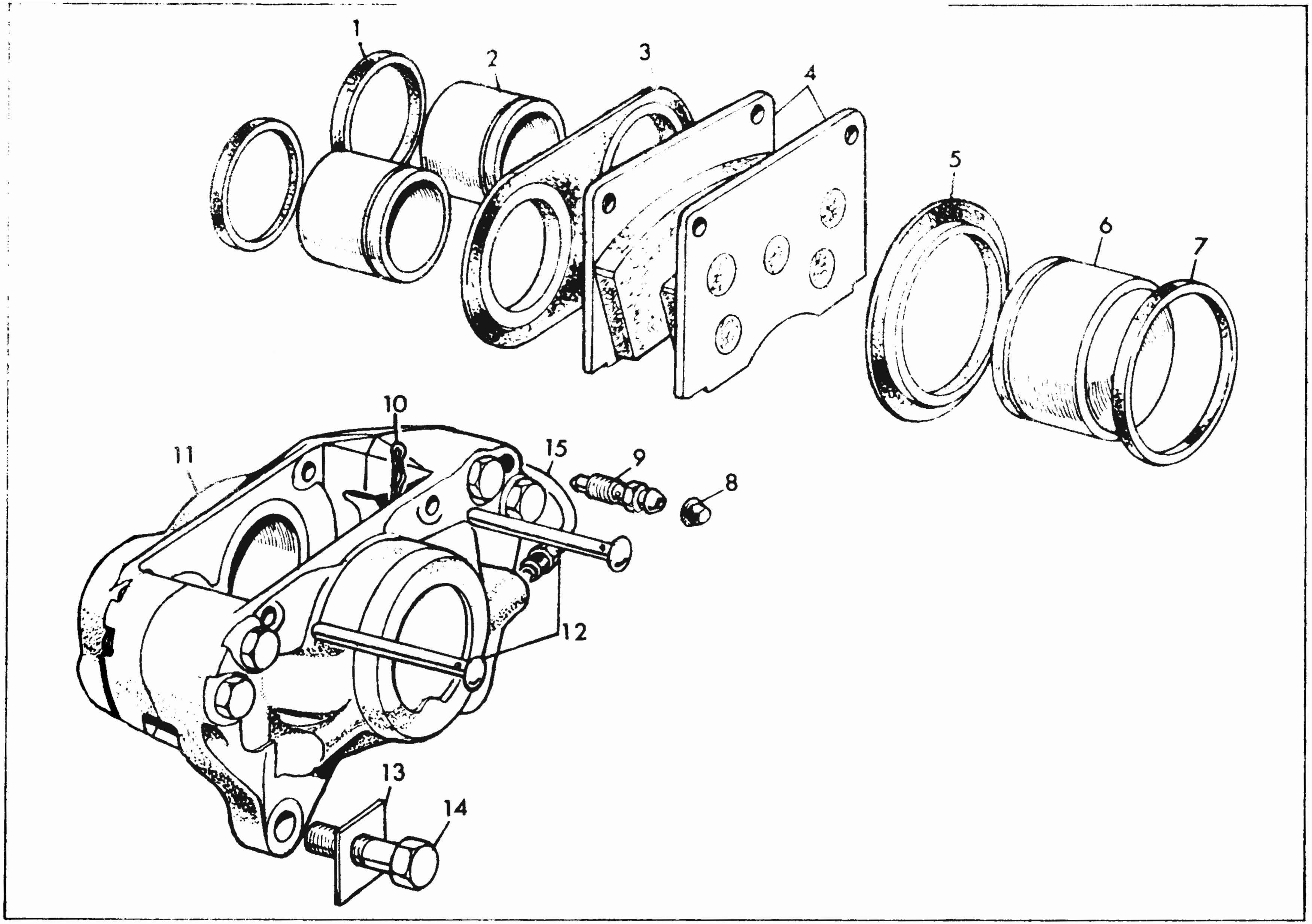


Fig. G.9 FRONT BRAKE UNITS

1. Sealing ring.
2. Piston.
3. Dust cover.
4. Pad assy.
5. Dust cover.
6. Piston.
7. Sealing ring.
8. Dust cap.
9. Bleedscrew.
10. Retaining clip.
11. Caliper body RH.
    Caliper body LH.
12. Pad retaining pin
13. Lock plate.
14. Bolt.
15. Bridge pipe RH.
    Bridge pipe LH.

Fig. G.9 ... NTERCEPTOR

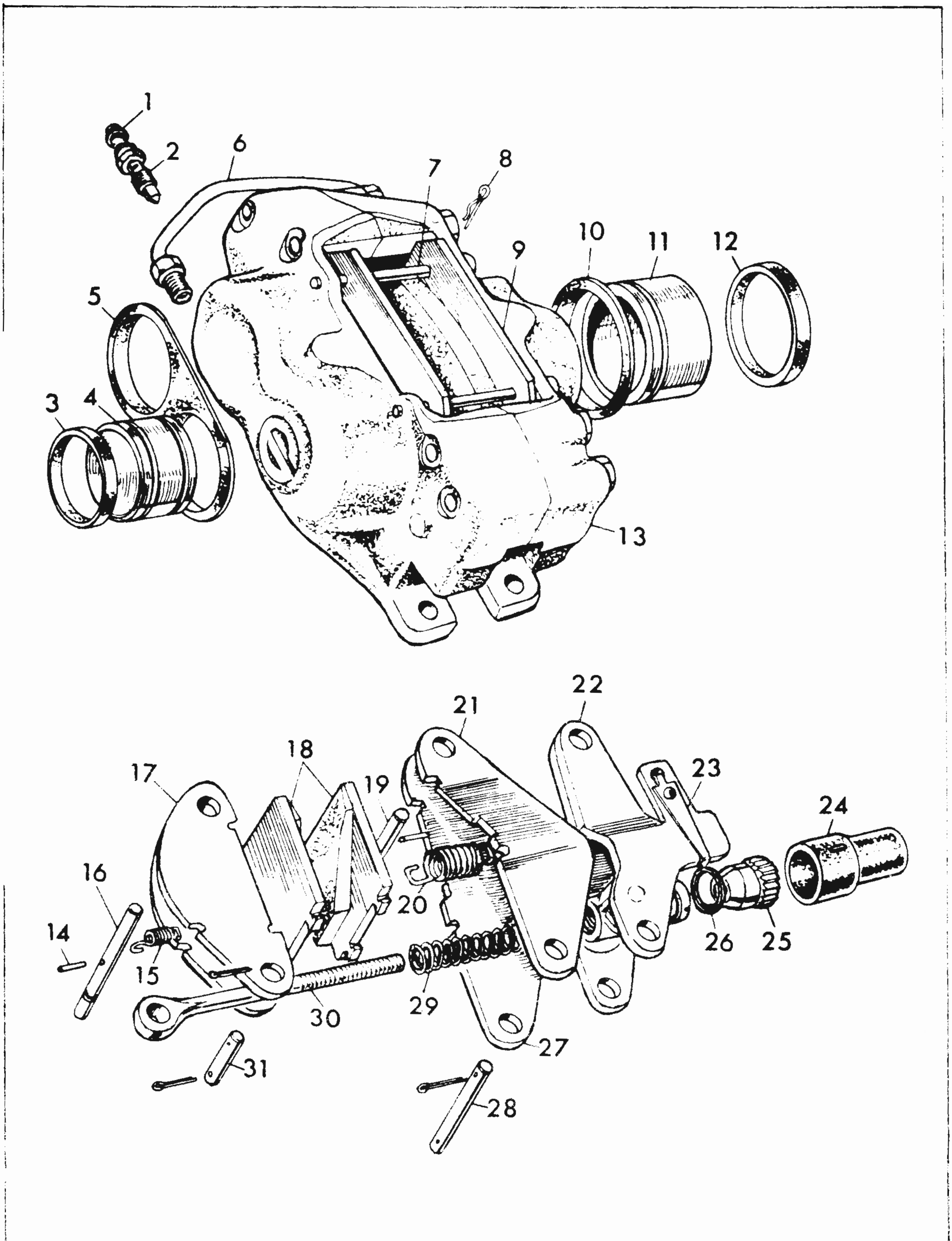


Fig. G.10 REAR BRAKE UNITS

1. Dust cap.
2. Bleedscrew.
3. Sealing ring.
4. Piston.
5. Dust cover.
6. Bridge pipe RH.
   Bridge pipe LH.
7. Pad retaining pin.
8. Retaining clip.
9. Pad assy.
10. Dust cover.
11. Piston.
12. Sealing ring.
13. Caliper body RH.
    Caliper body LH.
14. Spring pin.
15. Pad retaining spring.
16. Lever pivot pin.
17. Outer clamping lever.
18. Handbrake pad assys.
19. Lever pivot pin.
20. Return spring.
21. Inner clamping lever.
22. Operating lever assy.
23. Spring lever.
24. Rubber boot.
25. Adjuster nut.
26. Clutch ring.
27. Inner clamping lever.
28. Pivot pin.
29. Return spring.
30. Tie rod.
31. Tie rod pivot pin

Fig. G.10 - REAR BRAKE UNITS - INTERCEPTOR

The footbrake is hydraulically-operated by a tandem master cylinder and a direct-acting servo unit is incorporated. Pad adjustment is automatic.

The handbrake operates through independent mechanical calipers to the rear discs and the pads are automatically adjusted.

G.15 RENEWING FRICTION PADS

When the lining has worn to approximately $\frac{1}{8}$ in. (3 mm) new pads should be fitted.

Jack up the car and remove the road wheels. Withdraw the worn pads by removing the retaining pins and clips.

Open the bleedscrew one turn and with an even pressure push the pistons to the bottom of the bores. The Girling piston retraction tool (Part. No. 64932392) is recommended for all Girling disc calipers with conventional hollow pistons. Some brake fluid will escape as the pistons are moved. Tighten the bleedscrew and clean the pad abutment faces of the caliper until all road dirt is removed.

Ensure the piston dust covers and pad retaining pins are in good condition and fit the new pads. The direction arrow on the shim faces the forward rotation of the disc. Secure the pads with retaining pins and clips.

Bleeding is unnecessary but to reposition the pads against the disc the foot pedal should be pumped until a solid resistance is felt. Top up the supply tank with the recommended brake fluid, fit wheels, jack down and road test.

G.16. CYLINDER MAINTENANCE

No attempt should be made to unscrew the bolts and separate the two halves of the caliper body.

To replace the piston sealing rings it is necessary to remove the disc brake from the vehicle. Have ready the relevant Girling Service Kit which will contain the sealing rings, dust covers and retaining rings to service both front and rear calipers, as applicable. Always service disc brakes in axle sets.

Drain the fluid from the system by attaching a rubber bleed tube to a bleedscrew; hold the other end of the tube in a container and unscrew the bleedscrew one turn. Pump the brake pedal to discharge the fluid.

Unscrew the bundy pipe nut which is connected directly to the caliper. Unscrew the bolts retaining the disc brake to the stub axle and remove complete with hose. Take note of any shims between the mounting faces so they can be replaced in the same position when re-fitting the disc brake to the vehicle.

Remove the pads as described previously - refer to 'Renewing New Pads' (Section G.15).

Pack a clean piece of rag between the pistons then eject them from the cylinders by applying compressed air to the inlet connection.

The sealing rings may now be removed from the cylinders, but take care not to damage the bore or locating groove.

Unscrew the bleedscrew and remove the dust cap.

Clean all parts thoroughly with Girling Cleaning Fluid or Brake Fluid of the approved grade. Use only the recommended fluids.

Examine the cylinder bores and the pistons carefully for signs of damage, abrasion, scuffing or corrosion. The pistons may be serviced, but if the cylinder is damaged a new disc brake must be used.

Lubricate the cylinders with clean, unused approved brake fluid and fit the new sealing rings into the grooves.

To ease assembly keep the dust cover dry and do not lubricate.

Locate the dust cover lip in the groove in the body and insert the piston through the dust cover into the cylinder bore, then locate the cover in the groove in the piston.

The two small pistons have a single dust cover which should be fitted in a similar manner to that described above.

Ensure the dust covers are correctly fitted and replace pads.

Refit the disc brake to the vehicle ensuring that any shims, originally fitted between the mounting faces, are correctly positioned.

Re-connect the hose and bleed the system in the recommended manner as detailed in section G.20, using new unused approved brake fluid. Never re-use fluid drained from a vehicle. Before road testing the car, ensure the fluid in the reservoir is at the correct level and in order to re-position the pads against the disc, pump the pedal until a solid resistance is felt.

G.17 DISCS

The condition of the disc is a vital factor in the efficient functioning of the brake.

The disc should run true between the pads. The maximum run-out permissible on the disc is 0.004 in. (0.1 mm) and if this tolerance is exceeded it will cause knock back of the pistons which will be recognised by pedal flutter. If there is any doubt concerning this condition the disc should be replaced.

The surface of the disc should be smooth. The scratches and the light scoring which appear after normal use are not detrimental but a heavily scored disc will impair efficiency and increase pad wear. Again if there is doubt a new disc should be fitted.

If replacement of the disc is impossible it is permissible to regrind but great care has to be exercised, and it should be done only by competent engineers with suitable grinding equipment. The disc must be rotary ground with the vertically mounted grinding wheel traversing the horizontal disc. The ground surface should be quite flat and parallel to the mounting face, with a fine finish. Special care should be taken to avoid sharp corners at the inner circumference of the ground surface. Both sides must be ground equally but the thickness of the disc should not, under any circumstances, be reduced below 0.050 in. (1.2 mm) of the original thickness of ½ in. (12.7 mm). The importance of the accuracy of this work cannot be over-emphasised and regrinding should only be considered if a new disc cannot be obtained.

When fitted, the disc must run equidistant between the caliper cylinders and this condition should be checked by feeler gauges between the pad abutments and the disc face. The gap on opposite sides of the disc may differ by 0.010 in. (0.25 mm) but there should be no difference between the gaps at the two abutments on the same side.

This ensures that the caliper is in line and the pads and pistons are square with the discs.

Shims should be used at the caliper mounting to correct any discrepancy.

G.18 REAR BRAKES AND HANDBRAKE MECHANISM

The hydraulic operation, cylinder maintenance and replacement of pads for the rear footbrakes is exactly as described for front disc brakes.

The handbrake mechanism consists of an operating lever and two clamping levers and its length requires adjustment as the pads wear. The clamping levers pivot from lugs in the caliper body whilst the operating lever pivots on the inner clamping lever. Centralising strips retract the pads from the disc when the handbrake is released.

The operation of the handbrake mechanism is shown in Fig. G.10. The operating lever is pulled outwards by the handbrake linkage, which moves one clamping lever and pad by the tie-rod and the other by the reaction of the lever pivot. The disc is thus clamped between the pads. As the pads wear, movement of the operating lever increases and adjustment is necessary. This is automatic, the adjusting nut being turned the equivalent of one tooth by the spring lever, after the operating lever moves a pre-determined amount. Adjustment is therefore automatic throughout the life of the pads with this brake.

If the cable or linkage require adjustment with the automatic adjusted handbrake, take care not to over adjust and pull the operating lever off its stop.

Fitting new pads

When the lining material has worn to approximately 1/16 in. thick (1.5mm), new pads should be fitted.

Detach springs and remove pads. Check that the levers pivot easily. If necessary, remove pivot pins and lightly smear with Girling Rubber Grease. The pivot pins fitted to the clamping levers and caliper are retained by spring pins; withdraw these and extract the pivot pins using suitable 2BA bolt.

Remove the rubber boot, slacken off adjuster nut and fit new pads. Screw in adjuster nut until both pads are almost touching the disc. Smear the threads of the tie-rod and pack the rubber boot over the adjusting nut,

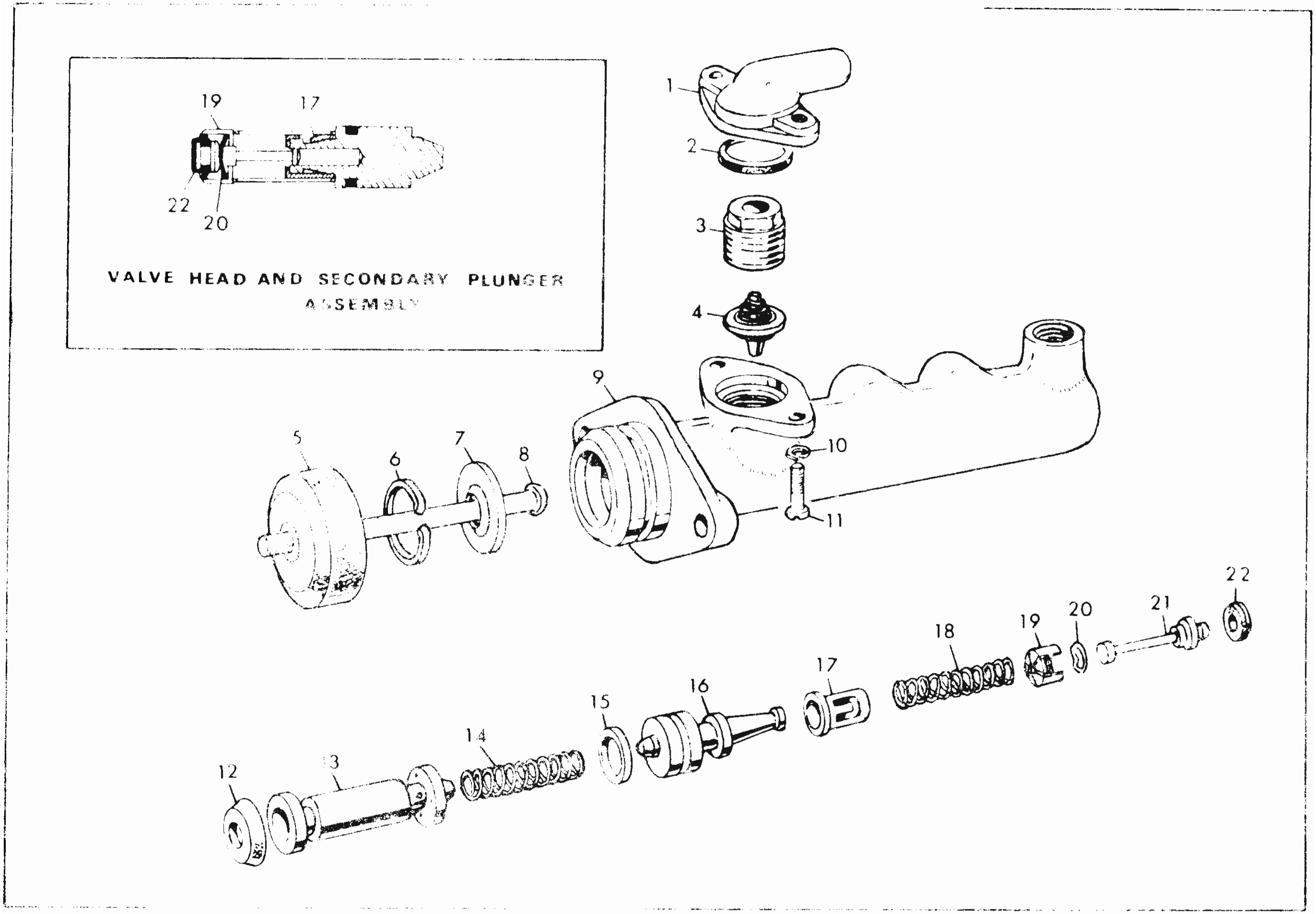


Fig. 6.11 BRAKE TANDEM MASTER CYLINDER

1. Cover.	12. Gland seal.
2. Cover seal.	13. Secondary plunger.
3. Securing nut.	14. Intermediate spring.
4. Tipping valve.	15. Ring seal.
5. Dust cover.	16. Primary plunger.
6. Circlip.	17. Retainer and thimble leaf.
7. Retaining washers.	18. Spring.
8. Push rod.	19. Valve spacer.
9. Body.	20. Spring washer.
10. Spring washer.	21. Valve stem.
11. Screw.	22. Valve seal.

Fig. G.11 - BRAKE TANDEM MASTER CYLINDER - INTERCEPTOR

G.18 (cont.)

ensuring the spring lever locates in the boot slot and the boot locates in the groove in the trunnion. Apply the handbrake. When the handbrake is released the clamping lever should return to the central position with the pads retracted off the disc.

Handbrake warning adjustment

1. Remove the four screws around the hand brake gaiter escutcheon and draw the gaiter up the handbrake.
2. The switch is now accessible and adjustment can be made for the light to operate after the handbrake has been applied two notches on the ratchet. The adjustment is made by releasing the retaining nuts on the switch and moving the switch the appropriate way.
3. Replace the gaiter and escutcheon.

G.19 TANDEM MASTER CYLINDER

The Tandem Master Cylinder (Fig. G.11) consists of two independent and complete hydraulic cylinders in series, one operating on the front brakes and the other on the rear, so that in the unlikely event of one system failing, the other system will provide an effective brake.

Upon application of brake pedal pressure, the push rod moves the primary plunger up the cylinder bore and allows a spring-loaded tipping valve to return to centre. The primary supply port is closed by the valve and furthe movement of the primary plunger results in hydraulic pressure being transmitted to the front brakes. At the same time the pressure created acts in conjunction with the increasing force of the intermediate spring to overcome the stronger secondary spring, thus actuating the secondary plunger. Initial movement of the secondary plunger closes off the centre valve supply port and hydraulic pressure is then transmitted to the rear brakes.

To remove servo/master cylinder

1. Disconnect the front and rear brake pipes from the master cylinder.
2. Disconnect the wiring from the reservoir caps.
3. Disconnect the vacuum line to the servo.
4. Remove the brake pedal. (nut and bolt).
5. Remove the front wing stone guard. R.H. on R.H. drive
   L.H. on L.H. drive
6. Remove five set pins from around the booster mounting plate (2 each side and 1 at the rear).
7. Slacken the set pin underneath the booster, approached from under the wing.
8. Withdraw the assembly.

   To refit reverse procedure.

Dismantling

Remove the push rod, by pulling back the dust cover and removing the retaining circlip.

Remove fluid pipes and tipping valve cover.

Unscrew the tipping valve securing nut and remove the seal.

Depress the primary plunger and remove the tipping valve. The internal parts can now be removed, either by shaking the cylinder body or by compressed air pressure.

Separate the plungers and the intermediate spring.

Lift the leaf of the spring retainer (see inset Fig.G.11) and remove the spring centre valve sub-assembly from the secondary plunger. Remove the spring, valve spacer and spring washer from the valve stem and the valve stem from the valve head

Remove the seals from the primary and secondary plungers.

Lever out the baffle and remove the cap washer from the filler cap.

Cleaning

Replace all seals and parts with those contained in the appropriate Girling Service Kit. Clean the remaining parts and the cylinder thoroughly with Girling Cleaning Fluid.

Examine the bore of the cylinder and the plungers for visible score marks, ridges and corrosion; check that the bore is smooth to the touch. If there is the slightest doubt regarding the condition of the bore, then a new guaranteed master cylinder should be fitted.

Assembling

Lubricate all parts immediately before assembling with unused Girling Brake Fluid of the approved grade.

Fit the seals to the primary and secondary plungers.

Refer to the inset Fig. G.11 and fit the valve seal, smallest diameter leading, onto the valve head. Position the spring washer on the valve stem so that it "flares" away from the valve stem shoulder and follow with the valve spacer, legs first. Attach the spring retainer to the valve stem, keyhole first. Slide the secondary spring over the spring retainer, then position the sub-assembly on the secondary plunger. To do this, position the sub-assembly between the jaws of a bench vice and, to prevent possible contamination, place a clean piece of paper between each end of the sub assembly and the vice jaws as shown on Fig. G.12. Close the vice to compress the spring until it is almost coil bound. Use a suitable small screwdriver to press the spring retainer right back against the secondary plunger (Fig. G.12), this is important. Using a pair of pointed nosed pliers (Fig. G.13), depress the leaf of the spring retainer behind the head of the plunger. Ensure that the retainer leaf is straight and firmly located behind the plunger head as shown on the inset Fig. G.11.

Fit the intermediate spring into position between the primary and secondary plungers. Liberally lubricate the cylinder bore and the plunger seals with unused Girling Brake Fluid of the approved grade. Insert the plunger assemblies fully into the cylinder plunger bore, valve end leading,

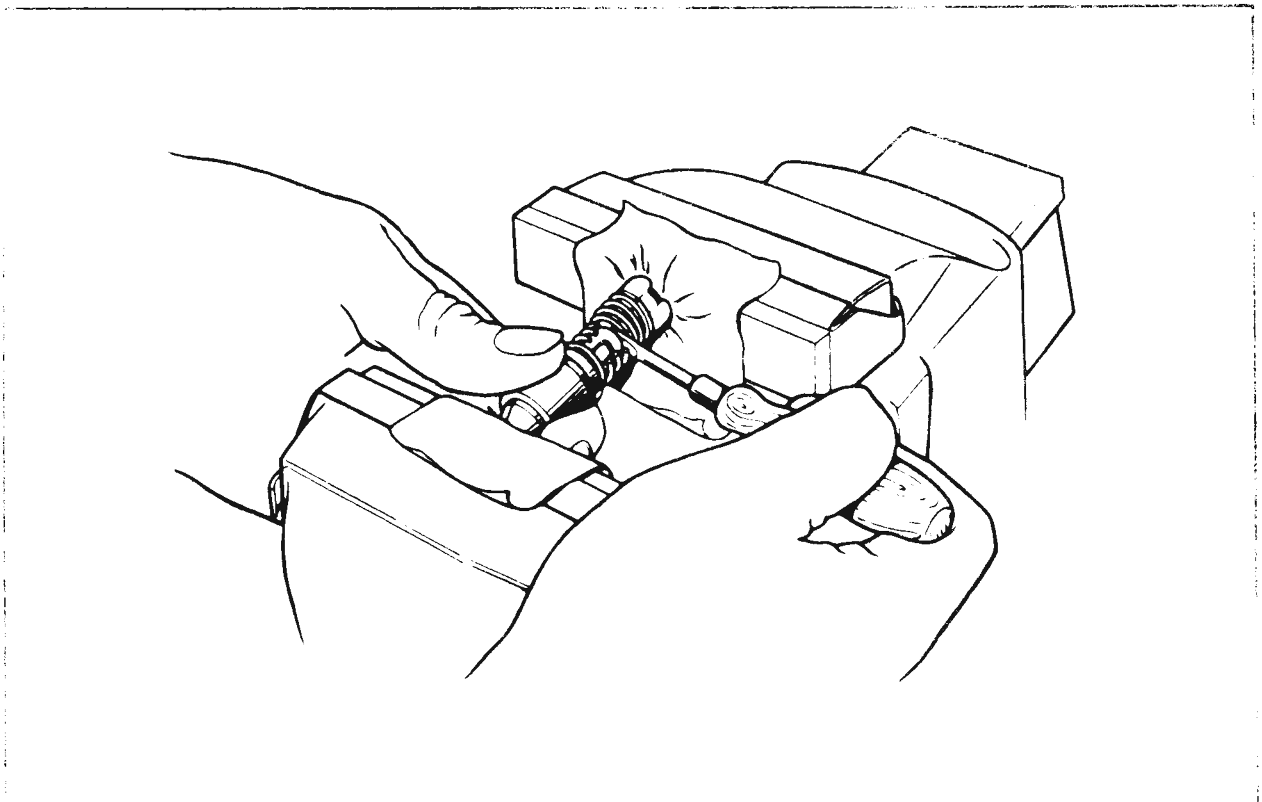


Fig. G.12

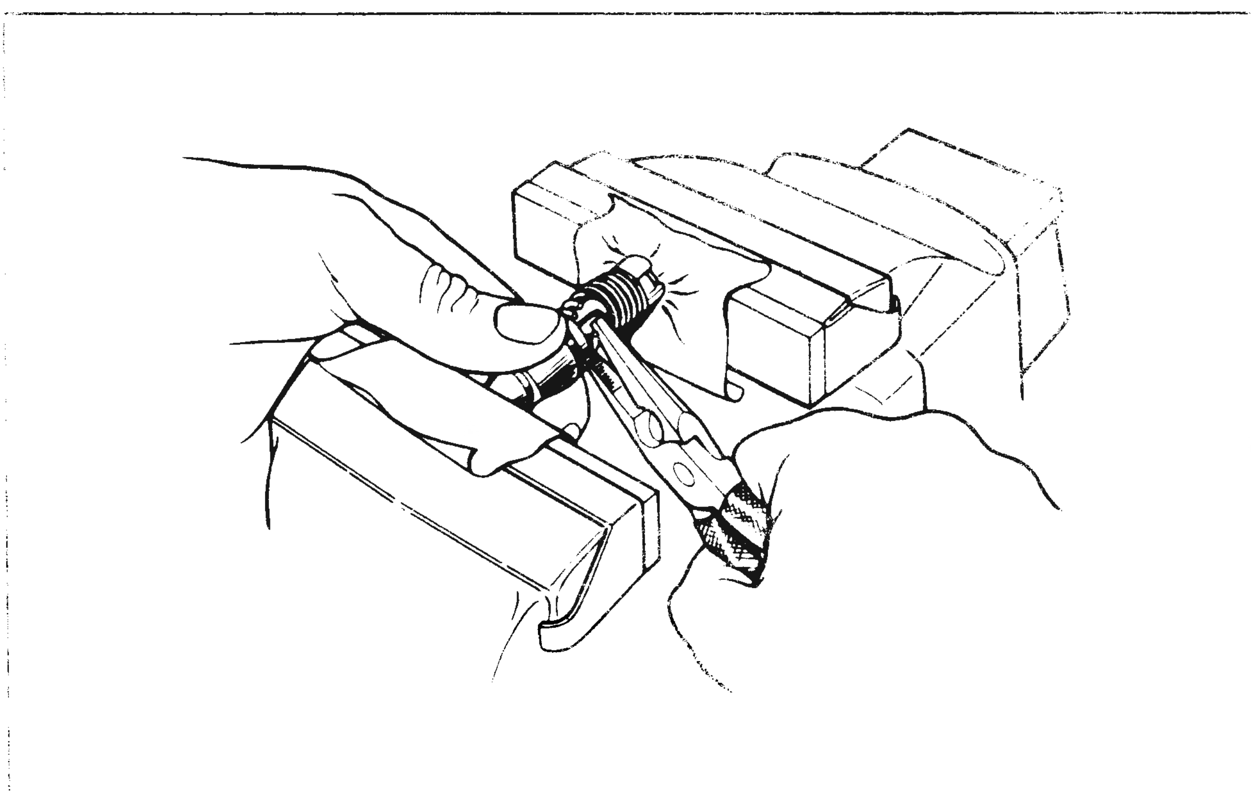


Fig. G.13

easing the entrance of the plunger seals. Press the primary plunger down the bore to fit the tipping valve assembly. Fit the seal and screw in the tipping valve securing nuts, tighten to a torque of 35 to 40 lb. ft.

Position the push rod and retaining washer and fit the circlip. Smear the sealing areas of the rubber dust cover with Girling Rubber Grease and fit to the push rod. The remainder of the tube of grease should be used to pack the dust cover. Position the dust cover on the cylinder body.

G.20 BLEEDING THE SYSTEM

It is vital that scrupulous cleanliness is maintained throughout the entire bleeding operation. Never use a rag of linty texture and ensure that dirt and grit are not allowed to enter the system - especially at the supply tanks.

Both supply tanks should be kept topped up during the bleeding procedure

The rear brakes should be bled first, commencing with the near side wheel. Then bleed the front brakes, commencing with the front near side wheel.

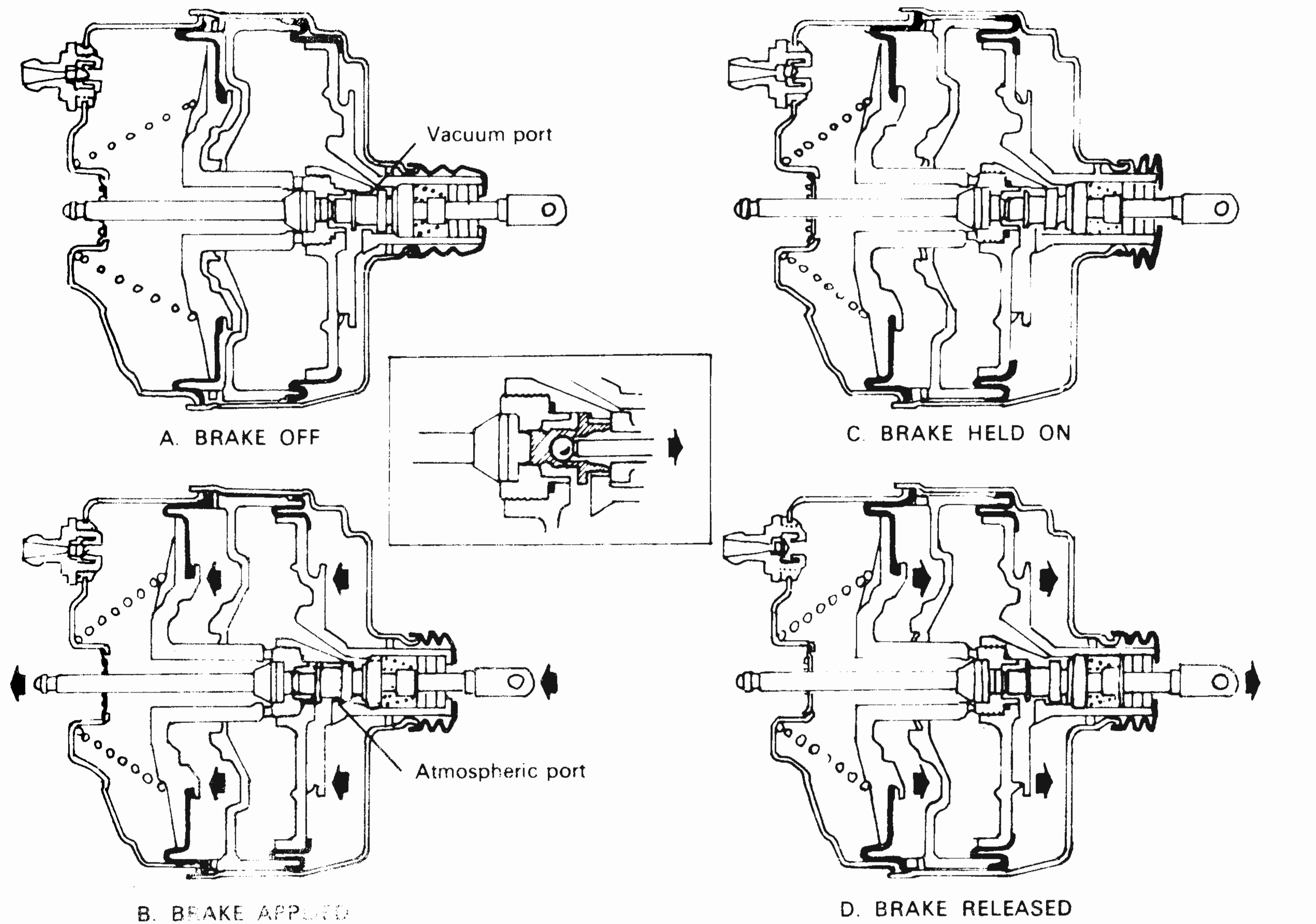
By bleeding the rear brakes first, the front brakes are being self-bled by the action of the tipping valve; this is the reason why both tanks, or cells should be kept topped up. Also, the front brakes are easier to bleed once the rear brakes have been bled.

Unscrew the bleedscrew enough to allow the fluid to be pumped out (half a turn is normally sufficient) and close the bleedscrew immediately after the last downward stroke of the pedal.

The pedal should be depressed slowly throughout the full stroke and allowed to return slowly; there should be a pause of three or four seconds and the action repeated until the air is dispelled at each bleedscrew.

Always remove the floor mat or any object which may obstruct the full stroke of the pedal.

A slight variation of the above procedure would be to bleed both front and rear brakes together and this method can be employed if difficulties are encountered.



OPERATION OF SERVO UNIT

Brake fluid

The brake fluid should be regularly checked as this will fall gradually as the brake pads wear. Any sudden drop should be investigated immediately and the cause traced and rectified.

Brake fluid should be changed every 18 months. Only Castrol-Girling Amber brake fluid should be used.

G.21 DIRECT ACTING SERVO UNIT

Brief Description

The Tandem Supervac is a mechanical servo unit designed to provide adequate power assistance to the brake system. Vacuum created in the engine manifold is used to suspend in vacuum two separate diaphragms, and by admitting atmospheric pressure to one side of the diaphragms, the force which assists the driver's effort is obtained. The power assistance is controlled exactly in proportion to the effort applied by the driver's foot to the brake pedal.

The unit is mounted between the brake pedal and the master cylinder and connected to those parts by push rods. Should a vacuum failure occur, the two push rods would act as a single rod and the brakes would therefore work in the conventional manner without power assistance.

Operation

A. Brake Off

The twin diaphragms are fully recuperated and held against the stop faces by the diaphragm return spring. The input rod assembly is also fully retracted, within the diaphragm plate, as far as the valve control piston will allow. With the input rod in this position the vacuum port is open and there is a vacuum each side of both diaphragms.

B. Brake Being Applied

When the brake pedal is depressed the input rod moves forward and the rubber valve seal closes the vacuum port, isolating the chambers behind the diaphragms from the vacuum source. The input rod continues to move forward through the now stationary valve seal. The air valve allows air to pass through the centre of the seal into the chambers behind the two diaphragms. The forward movement of the input rod is stopped just as the air valve opens by pressure on the reaction disc. The combined effort of the input rod in the centre of the reaction disc and the diaphragm plate on the circumference of the disc drive the output rod forward to operate the Master Cylinder.

C. Brake Held On

When the brake pedal is held on, the front and rear diaphragms will momentarily continue to now move forward and so compress the outer edges of the reaction disc. This compression causes the centre of the disc to extrude, pressing back the push rod (see inset) and thus closing the atmospheric port, depending on whether the brake pedal is released or depressed.

D. Brake Released

Immediately the brake pedal is released, the vacuum port is opened and the manifold via the non-return valve unit is extracted to the inlet manifold via the non-return valve. The atmospheric port remains closed whilst the valve rod assembly returns to its original position (as shown on A) assisted by the diaphragm return spring. The twin diaphragms are then suspended in the vacuum until the brake pedal is depressed.

Servicing

Should a fault develop in the Servo Unit it should be replaced with a new unit or with a factory re-conditioned unit.

NOTE:

It is recommended that, every 40,000 miles or 3 years whichever occurs first, all hydraulic cylinders, servo units and hoses are replaced by new guaranteed units.
Should conditions exist whereby it is not possible to replace hydraulic units the existing cylinders and servo units should be overhauled using the appropriate Girling Service Kit. Whether the units are serviced or replaced, care must be taken to prevent contamination and emphasis must be placed on cleanliness. The work area, bench, tools containers, overalls and hands must be scrupulously clean.

G.26 GENERAL DATA

Brake Type	Disc with Maxaret
Brake Disc Diameter	F.11.⅜ in. R.10¾ in.
Brake Cylinder Bore Diameter	Front Inner (1 off) 2.25 in.
	Front Outer (2 off) 1.59 in.
	Rear Inner (1 off) 1.68 in.
	Rear Outer (2 off) 1.18 in.
Master Cylinder Bore Diameter	⅞ in.
Servo Unit Type	Direct Acting
Main Friction Pad Material	Ferodo 2430 F
H/Brake Friction Pad Material	Don 117
Brake Fluid	Girling Amber
Swept Area - Front	231 sq. in.
Swept Area - Rear	197 sq. in.

SPECIAL TOOLS

Piston Retraction Tool .. .. Pt. No. 64932392

Tightening Torques

	Position	Size	Torque
	H/Brake Bracket	5/16 - 24	15 lb.ft.
	Abutment H/B Cable - Front	3/8 - 24	30 lb.ft.
	Abutment H/B Cable - Rear	3/8 - 24	30 lb.ft.
	Compensator Bracket	1/4 - 24	8 lb.ft.
		5/16 - 24	15 lb.ft.
*	Brake Pedal Box to Bulkhead	1/4 - 28	8 lb.ft.
*	Brake Pivot Bolt	3/8 - 24	30 lb.ft.
*	Servo to Box	5/16 - 18	25 lb.ft.
	Brake Pedal Pad	3/8 - 24	30 lb.ft.
**	Maxaret Switch Lock Nut	1 in. A.F.	18/20 lb.ft.

* Where items are marked with an asterisk, extra care must be taken to ensure that the correct torque figures are maintained.

** When tightening lock nut, hexagon on switch (1⅛ A.F.) should be held.

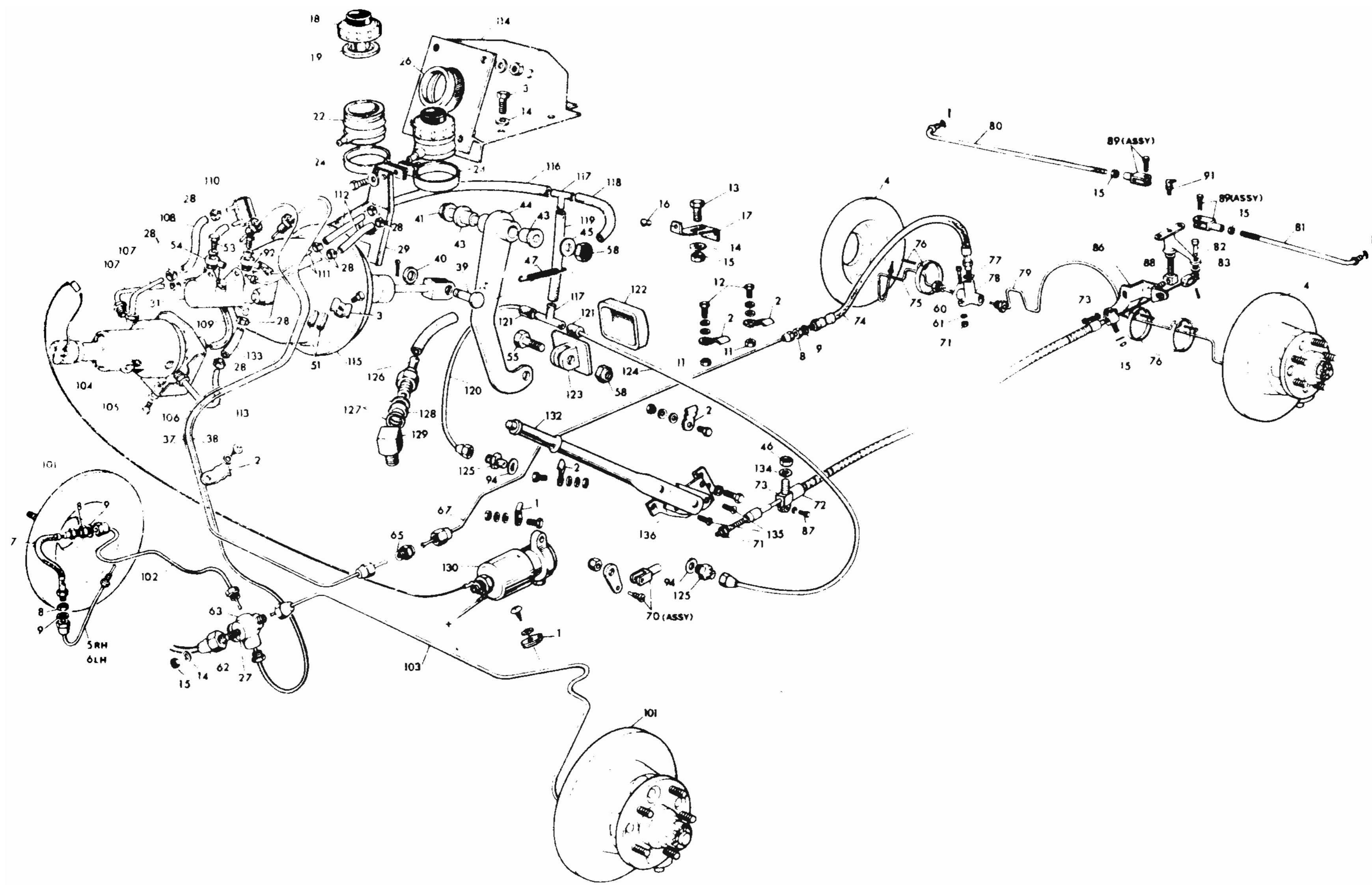


Fig. G.17 BRAKE SYSTEM FF

1. Pipe clip
2. Pipe clip
3. Pipe clip.
4. Brake disc.
5. Brake bridge pipe R.H.
6. Brake bridge pipe L.H.
7. Front brake hose.
8. Nut.
9. Washer.
10.
11. Nut.
12. Screw.
13. Bolt.
14. Washer.
15. Nut.
16. Rubber buffer.
17. Return spring bracket.
18. Cap - fluid reservoir
19. Baffle.
20. Nut.
21. Washer.
22. Fluid reservoir.
23.
24. Clip for reservoir.
25.
26. Grommet.
27. Bolt.
28. Hose clip.
29. Bracket for reservoir.
30.
31. Brake master cylinder.
32.
33.
34.
35.
36.
37. Brake pipe. m/cyl. to 2-way.
38. Brake pipe. m/cyl. to 4-way.
39. Clevis pin.
40. Washer.
41. Special bolt.
42.
43. Bearing bush.
44. Pedal lever.
45. Washer.
46. Nut.
47. Return spring.
48.
49.
50.
51. Insulator.
52.
53. Banjo bolt.
54. Banjo.
55. Bolt.
56.
57.
58. Nut.
59.
60. Nut.
61. Washer.
62. Stop light switch.
63. 4-way union.
64.
65. 2-way union.
66.
67. Brake pipe assembly - 2-way to rear hose.
68.
69.
70. Clevis assembly.
71. Nut.
72. Hand brake cable assembly.
73. Cable abutment.
74. Rear brake hose.
75. Brake pipe assembly - 3-way to rear brake R.H.
76. Pipe clip.
77. Washer.
78. 3-way union.
79. Brake pipe assembly - 3-way to rear brake L.H.
80. Brake cable assembly R.H.
81. Brake cable assembly L.H.
82. Clevis pin.
83. Compensation lever.
84. Extension plate.
85. Spacer.
86. Compensator bracket.
87. Screw.
88. Compensator trunnion.
89. Clevis assembly.
90. Screw.
91. Grease nipple.
92. Gasket.
93.
94. Gasket.
95. Hand brake caliper assembly R.H.
96. Hand brake caliper assembly L.H.
97. Brake unit R.H.F.
98. Brake unit L.H.F.
99. Brake unit R.H.R.
100. Brake unit L.H.R.
101. Brake disc - front.
102. Oil pipe - 4-way to hose R.H.
103. Oil pipe - 4-way to hose L.H.
104. Control unit solenoid.
105. Control unit.
106. Control unit bracket.
107. Vacuum pipe.
108. Hose.
109. Hose.
110. Sensitivity control valve.
111. Low pressure pipe.
112. Low pressure pipe.
113. Vacuum pipe.
114. Brake pedal box.
115. Brake servo unit.
116. Vacuum hose.
117. T-piece.
118. Vacuum hose.
119. Vacuum hose.
120. Vacuum pipe.
121. Hose connector.
122. Brake pedal rubber.
123. Brake pedal pad.
124. Vacuum pipe.
125. D/E union.
126. Hose connector.
127. Gasket.
128. Spacer.
129. Adaptor.
130. Maxaret unit.
131. Hand brake cable adaptor.
132. Hand brake lever assembly.
133. Vacuum hose.

Fig. G.17 BRAKE SYSTEM FF

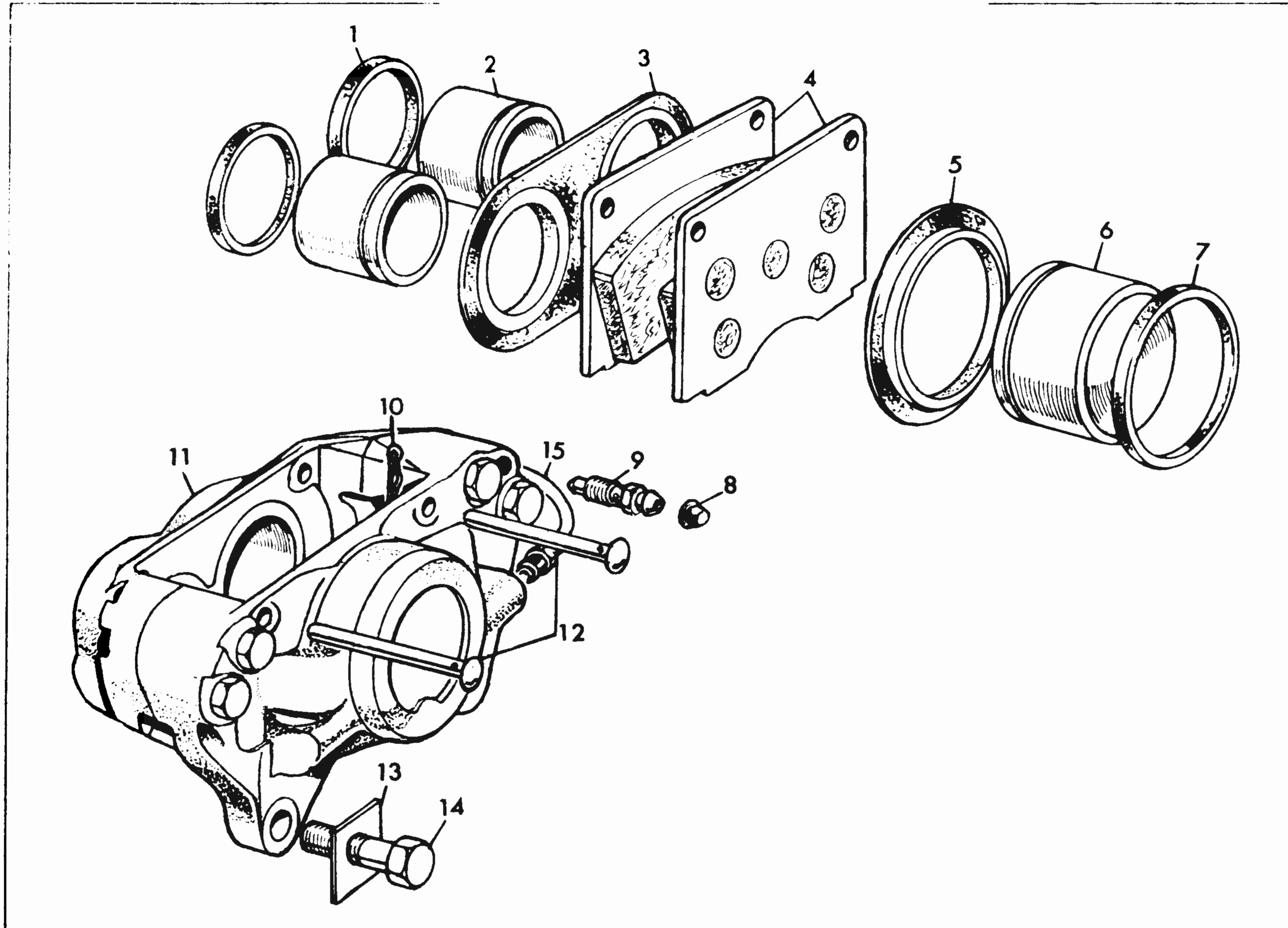


Fig. G.18 FRONT BRAKE UNITS

1. Sealing ring.
2. Piston.
3. Dust cover.
4. Pad assy.
5. Dust cover.
6. Piston.
7. Sealing ring.
8. Dust cap.
9. Bleedscrew.
10. Retaining clip.
11. Caliper body RH.
    Caliper body LH.
12. Pad retaining pin.
13. Lock plate.
14. Bolt.
15. Bridge pipe RH.
    Bridge pipe LH.

Fig. G.18 - FRONT BRAKE UNITS - FF

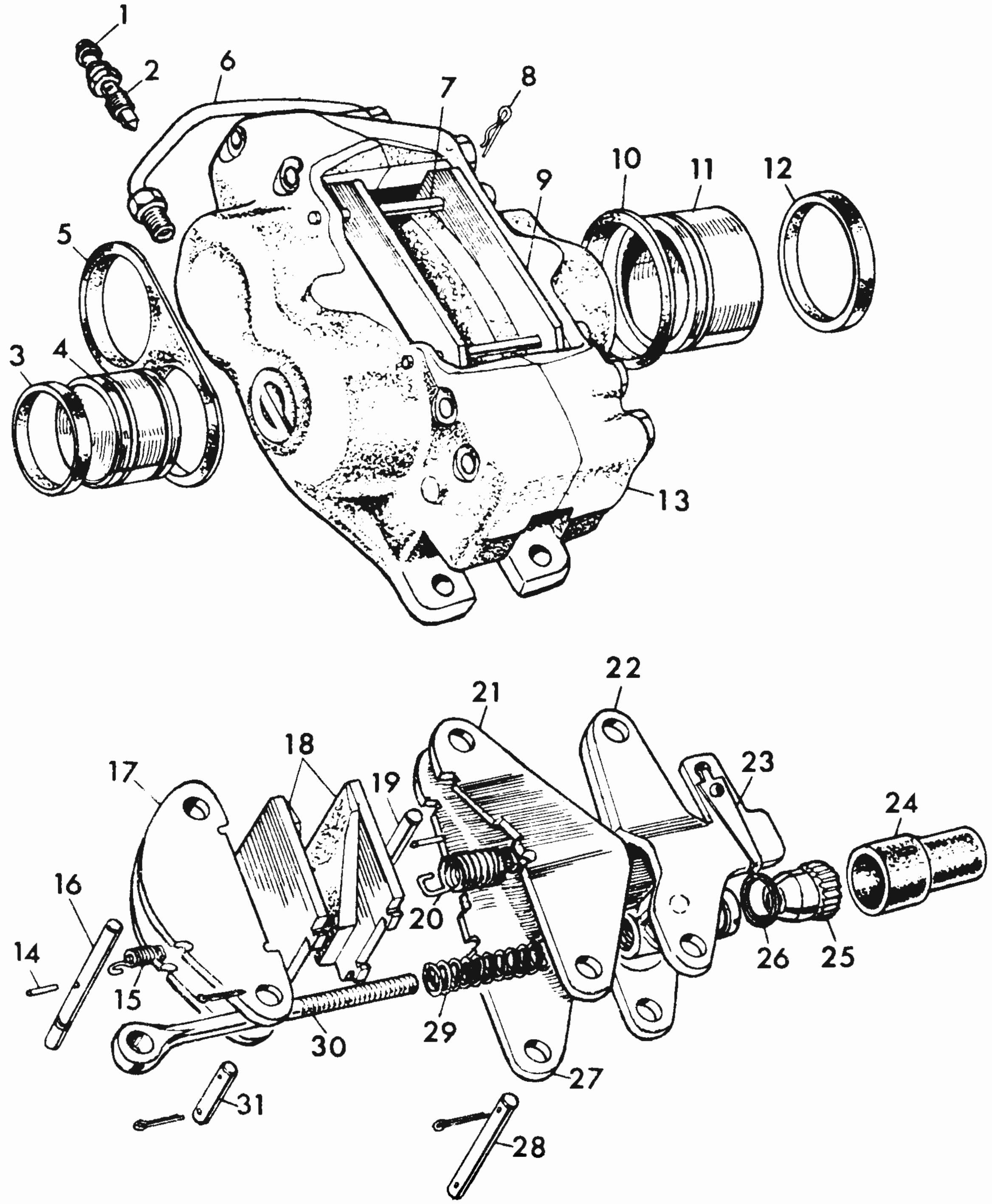


Fig. G.19 REAR BRAKE UNITS

1. Dust cap.
2. Bleedscrew.
3. Sealing ring.
4. Piston.
5. Dust cover.
6. Bridge pipe RH.
   Bridge pipe LH.
7. Pad retaining pin.
8. Retaining clip.
9. Pad assy.
10. Dust cover.
11. Piston.
12. Sealing ring.
13. Caliper body RH.
    Caliper body LH.
14. Spring pin.
15. Pad retaining spring.
16. Lever pivot pin.
17. Outer clamping lever.
18. Handbrake pad assys.
19. Lever pivot pin.
20. Return spring.
21. Inner clamping lever.
22. Operating lever assy.
23. Spring lever.
24. Rubber boot.
25. Adjuster nut.
26. Clutch ring.
27. Inner clamping lever.
28. Pivot pin.
29. Return spring.
30. Tie rod.
31. Tie rod pivot pin.

Fig. G.19 - REAR BRAKE UNITS - FF

f. On making good contact between the extended Solenoid lead and the positive battery terminal* the brake pedal should first move back, towards the driver, for a period in time of 1-second and then forward, away from the driver, by an amount considerably less than the back movement. Throughout this test the pedal effort should be maintained as steadily as possible.

Should the pedal movement forward not occur, or the timing of the movement back be judged to be significantly more or less than 1-second, carry out the appropriate Defect Analysis Procedure to Table C.

* NOTE:

If possible, the extended lead should include a reliable electrical switch (rates to 20-amps min.) and the free end of the lead should be well connected to the positive battery terminal. The switch being so positioned within the length of the lead will enable the Service Engineer to depress the brake pedal and close the electrical circuit without assistance.

3. Test

Movement Forward of Brake Pedal Delayed for Less Than One Second

Examine Fail-safe line for possible leaks, paying particular att[illegible] end connections. Remove tube and test as outlined in [illegible] are available.

Action

If leakage is detected or suspected, replace Fail-safe line with new part and carry out Periodic Check Test (2) to prove.

If no leakage is detectable, or if it is still unsatisfactory after the foregoing action, contact the Service Department of Jensen Motors Limited

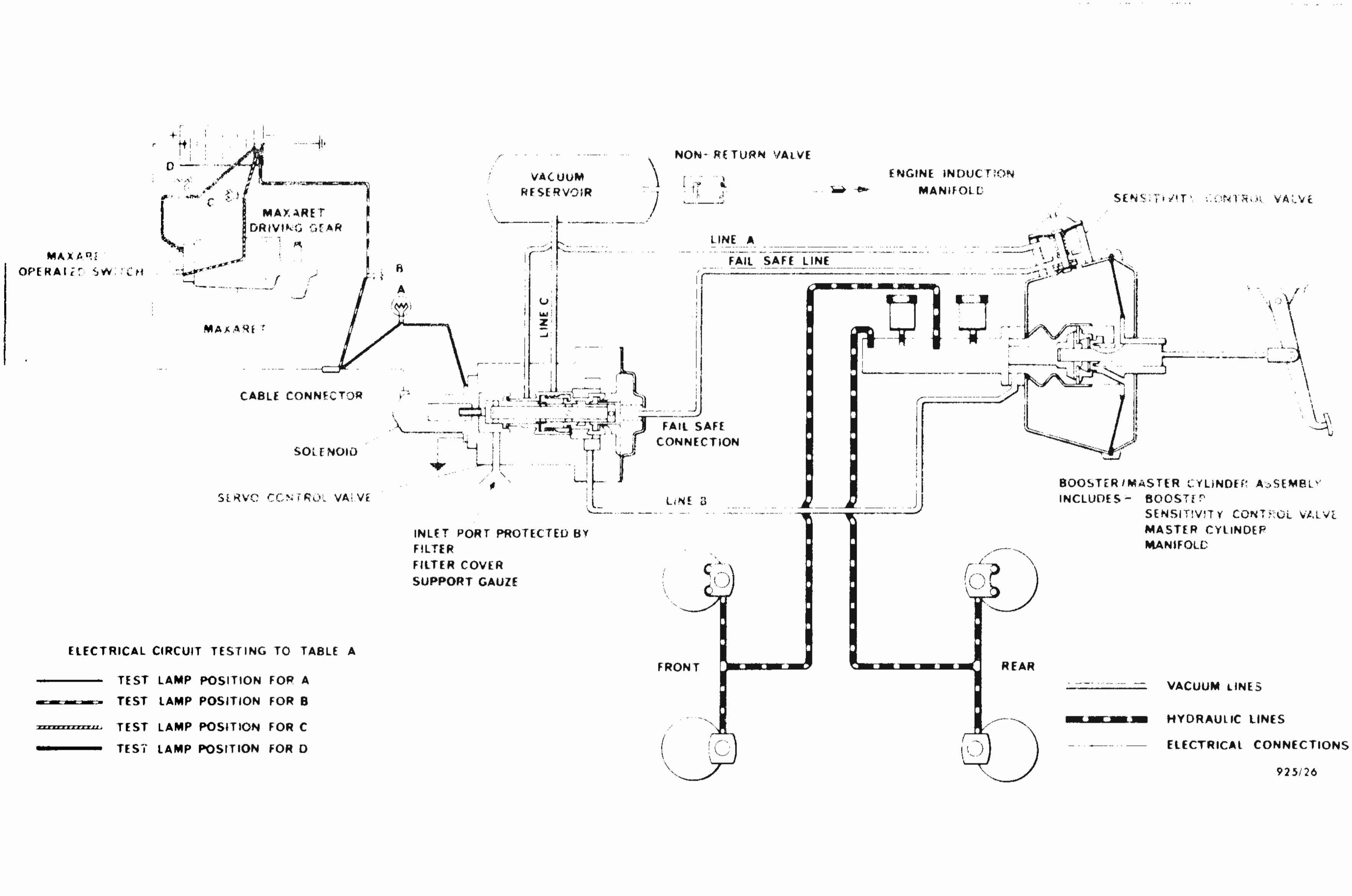


Fig. G.16 BRAKE TEST DIAGRAM

G.29 JENSEN F.F. - SKID CONTROL SYSTEM

DEFECT ANALYSIS - TABLE A

(See Fig. G.16)

DEFECT: Skid Control In-operative - Vacuum Servo Operating Normally (i.e. Pedal Effort Normal)

	TEST	ACTION
a.	Carry out Periodic Check Test (1) with 12V bulb wired between Solenoid lead connector and earth on Solenoid body.	If bulb lights - Replace Solenoid If bulb does not light proceed to (b)
b.	Repeat (a), but with 12V bulb connected between Solenoid lead connector and battery negative terminal. FEED - BROWN RETURN - BLACK WITH GREEN BAND (Solenoid Wire Colours)	If bulb lights - make good Solenoid earth If bulb does not light proceed to (c)
c.	Repeat (a), but with 12V bulb connected between Maxaret Switch output terminal (lead colour - Black with Green Band) and battery negative terminal.	If bulb lights - make good the lead between Switch and Solenoid If bulb does not light proceed to (d)
d.	Connect 12V bulb between Maxaret Switch input and battery negative terminal (Black and green lead).	If bulb does not light - make good the Switch Input Lead If bulb lights replace Maxaret Unit complete.

e.	Carry out Periodic Check Test (1)	If now satisfactory for pedal push-back; road test to confirm and return car to customer. If not satisfactory proceed to (f)
f.	Unfasten hose clips at Servo Control Valve ends of line A and B. Cover exposed tube connection ends with fingers. Run engine to produce suction at line A connection and no suction at line B connection. (If these conditions are not produced - defect diagnosis is incorrect).	
	Carry out Periodic Check (1) (Note:- No pedal push-back will be felt due to disconnection of lines A and B)	If no momentary reversal of suction is felt (i.e. Suction at line B connection - no suction at line A connection) replace Servo Control Valve complete. If momentary reversal of suction is felt - contact Service Department of Jensen Motors Limited

JENSEN F.F. - SKID CONTROL SYSTEM

DEFECT ANALYSIS - TABLE B

DEFECT: Skid Control In-operative - Vacuum Servo Providing No Assistance (i.e. Pedal Effort Heavy)

TEST	ACTION
a. Disconnect Solenoid lead at adjacent cable connector. Depress brake pedal with left foot, run engine "Blipping" throttle to produce maximum vacuum.	If pedal moves down as vacuum builds up - replace Maxaret Unit complete, re-connect Solenoid, carry out Periodic Check Test (1) to prove. If pedal does not move down as vacuum builds up - re-connect Solenoid and proceed to (b)
b. Disconnect line C at Servo Control Valve end, run engine and check for suction at open end of line C, either by covering with a finger or preferably, by connecting to a Vacuum Gauge.	If no suction felt (or no vacuum indicated) - make good the vacuum supply to the Servo Control Valve and carry out Periodic Check Test (1) to prove. If good suction felt (or 20" Hg. vacuum min. indicated) - re-connect line C to Servo Control Valve and proceed to (c)
c. Disconnect line A at Servo Control Valve end, run engine and check for suction at open end of line A connection to Servo Control Valve, either by covering with finger or preferably, by connecting to a Vacuum Gauge.	If no suction felt (or no vacuum indicated) - replace Servo Control Valve complete and carry out periodic Check Test (1) to prove. If good suction felt (or Hg. vacuum indicated) - contact Service Department of Jensen Motors Limited

JENSEN F.F. - SKID CONTROL SYSTEM

DEFECT ANALYSIS - TABLE C

DEFECT: Fail-Safe Valve Function Incorrectly During Periodic Test (2)

TEST	ACTION
1. NO MOVEMENT FORWARD OF BRAKE PEDAL	
a. Remove Filter Cover, Filter and Support Gauze. Run engine, "Blipping" throttle to produce maximum vacuum. Cover exposed inlet port with fingers, and feel for suction.	If suction is felt (Note:- It may be slight so that good sealing of the Inlet port with the fingers is essential) - replace Servo Control Valve complete, and carry out Periodic Check Test (2) to prove. If no suction detectable - replace Support Gauze, Filter (replace with new if showing signs of clogging) and Filter Cover and proceed to 1 (b).
b. Carry out Periodic Check Test (2) and with pedal pushing back firmly against foot, disconnect fail-safe line at Servo Control Valve end. Feel for pedal movement forward on disconnection.	If no movement forward, examine hole in fail-safe connection for blockage and remedy, and if still no movement forward of brake pedal - replace Servo Control Valve complete and carry out Periodic Check Test (2) to prove. If brake pedal movement forward occurs - proceed to 1 (c).

c. Disconnect Fail-safe line from Sensitivity Control Valve and examine bore for foreign matter. Examine tube generally for signs of leaks, paying particular attention to ends which engage onto connections (test for leaks with low pressure air (15-20 p.s.i.) under water if facilities available.

If any foreign matter present, carefully clean out and refit, or replace with new (particularly if any likelihood of leaks), carry out Periodic Check Test (2) to prove. If no foreign matter present, or still unsatisfactory after above action replace Sensitivity Control Valve, re-connect Fail-safe line into system and carry out Periodic Check Test (2).

If still unsatisfactory contact Service Department of Jensen Motors Limited.

2. MOVEMENT FORWARD OF BRAKE PEDAL DELAYED FOR LONGER THAN ONE SECOND

As 1 (c)

As 1 (c) but also examining hole in Fail-safe connection on Servo Control Valve for blockage and remedy.

3. MOVEMENT FORWARD OF BRAKE PEDAL DELAYED FOR LESS THAN ONE SECOND

a. Proceed as for 1 (a)

If suction is felt proceed as outlined in 1 (a).

If suction is not felt replace Filter parts and proceed to 3 (b).

b Exami.e Fail-safe Line for possible leaks, paying particular attention to end connections. Remove tube and test as outlined in 1 (c), if facilities are available.

If leakage is detected or suspected - replace Fail-safe Line with new part and carry out Periodic Check Test (2) to prove.

If no leakage detectable, or if still unsatisfactory after foregoing action - contact Service Department of Jensen Motors Limited.

G.14A BRIEF DESCRIPTION

The Interceptor III and S.P. cars are fitted with vented disc brakes on all four wheels. The footbrake is hydraulically operated by a tandem master cylinder, and incorporated in the system is a direct-acting servo unit. Brake pad adjustment is automatic. In addition, a load conscious apportioning valve is fitted, to control the braking effect at the rear wheels in proportion to the weight carried by those wheels at any instant. This device obviates premature locking of the rear wheels, the cause of dangerous sliding.

The handbrake operates through independent mechanical calipers to the rear discs, and the brake pads are automatically adjusted.

SETTING LOAD CONSCIOUS APPORTIONING VALVE

(a) Position a block of wood, 3.5 in. (89 mm) in depth, between the rubber bump stop, and the rear axle. Load the car such that the block of wood just takes the weight.

Note: As a guide, an unladen car, with a driver or his equivalent weight in the driver's seat, will approximate the required condition.

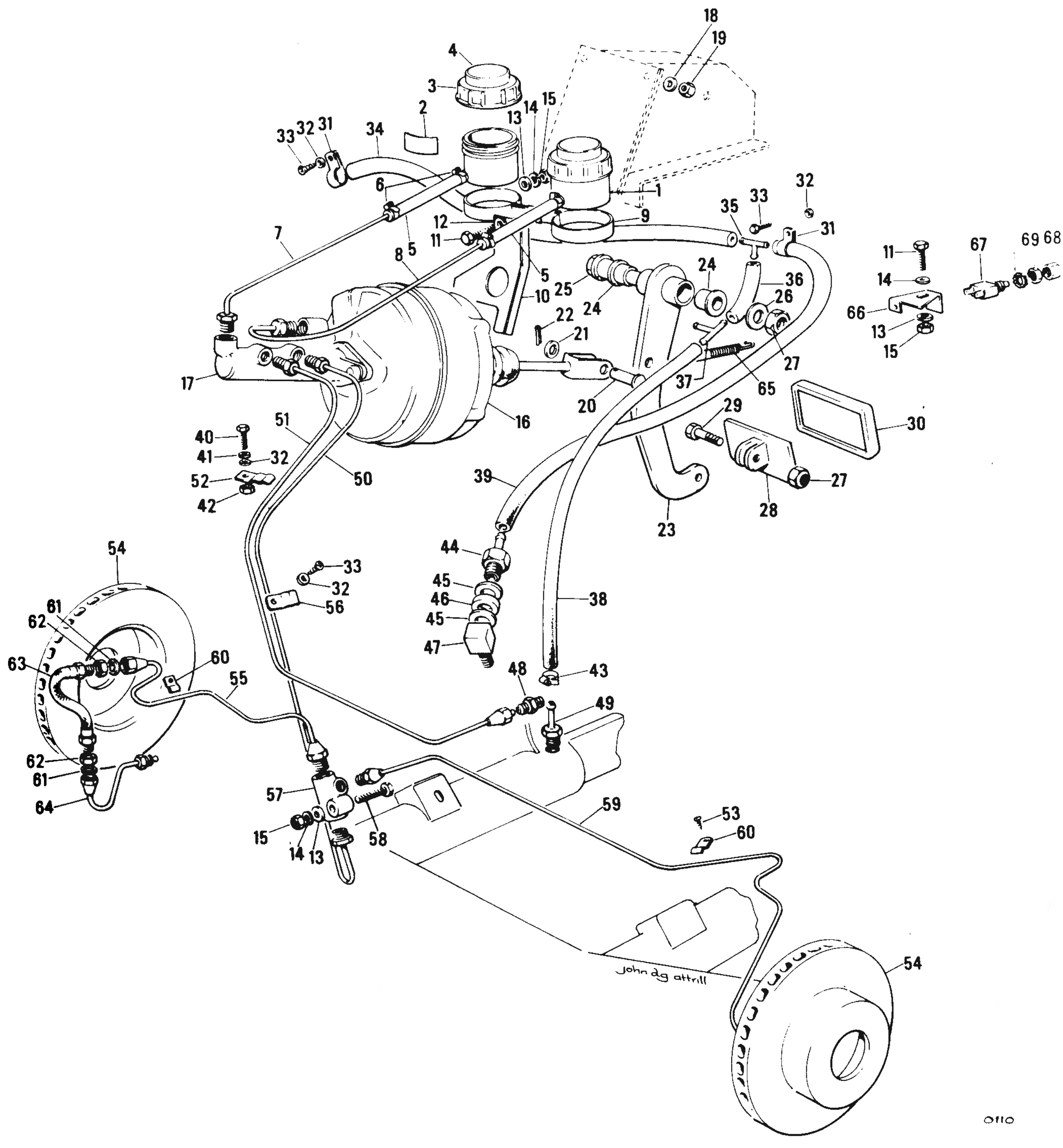
(b) Position the free end of the connecting link (attached to the valve sensing spring) in the lower hole of the rear axle bracket.

(c) Set the gap, between outer end of the piston valve and the actuating lever adjusting screw, to 0.020 in. (0.5 mm).

(d) Lock the adjusting screw, and apply a torque loading of 15/12 lb.ft. (2.06/1.65 kg.m) to the locknut.

(e) Remove the connecting link from the lower hole, and attach to the upper hole in the axle bracket.

(f) Road test the car, and, if necessary, re-set the gap by repeating the above procedure.



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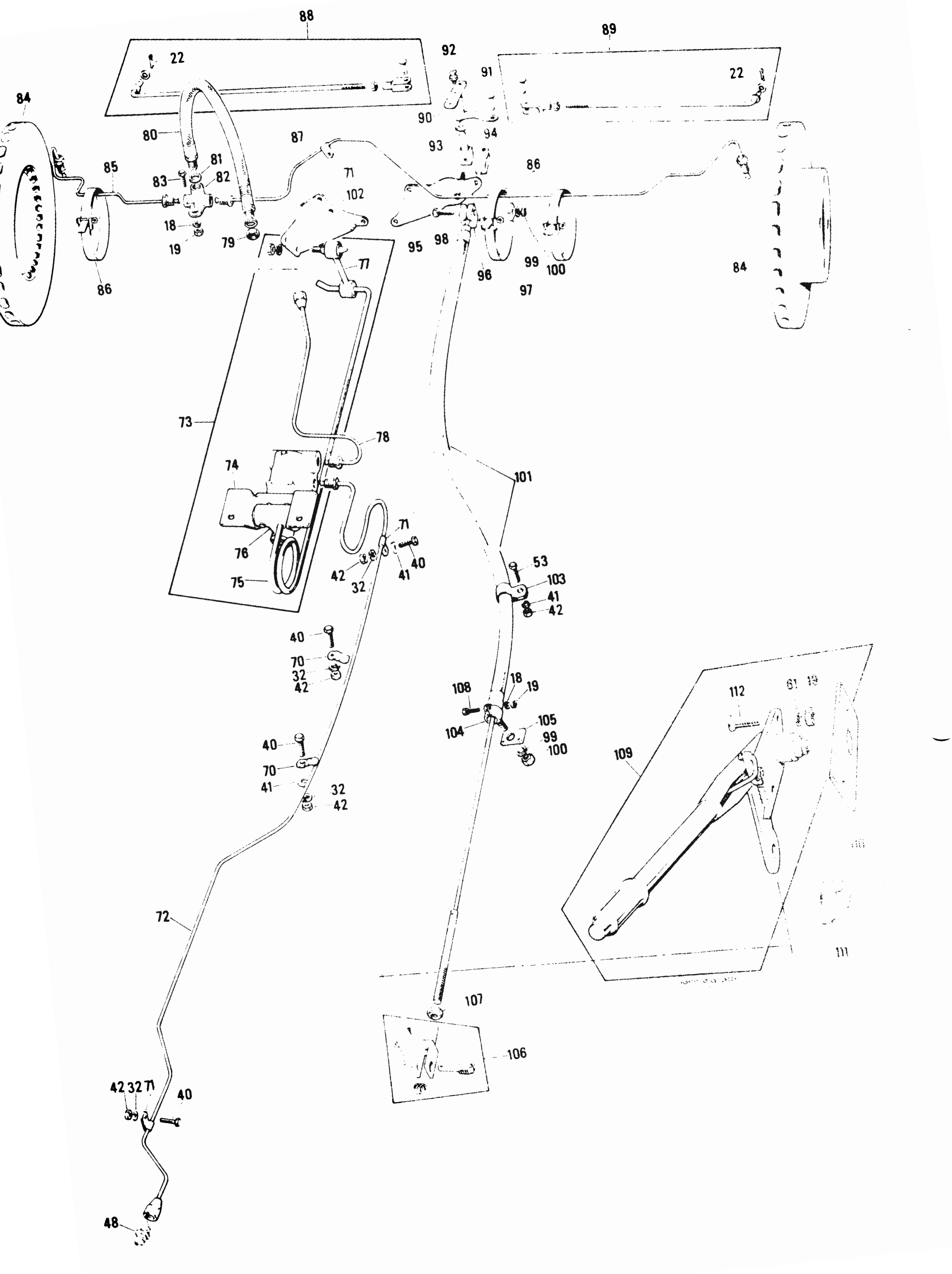
1. Fluid reservoir.
2. Fluid level label.
3. Reservoir cap.
4. Warning light switch.
5. Inlet pipe hose.
6. Hose clip.
7. Rear brakes inlet pipe.
8. Front brakes inlet pipe.
9. Reservoir clip.
10. Mounting bracket.
11. Screw.
12. Large plain washer.
13. Plain washer.
14. Spring washer.
15. Nut.
16. Servo.
17. Master cylinder.
18. Spring washer.
19. Nut.
20. Clevis pin.
21. Plain washer.
22. Split pin.
23. Pedal lever.
24. Pedal lever bush.
25. Pivot bolt.
26. Plain washer.
27. Lock nut.
28. Pedal plate.
29. Bolt.
30. Pedal rubber pad.
31. Clip.
32. Plain washer.
33. Self tapping screw.
34. Servo to 'T' connection hose.
35. 'T' connection.
36. 'T' connection to 'T' connection hose.
37. 'T' connection.
38. 'T' connection to chassis connection hose.
39. 'T' connection to non-return valve hose.
40. Screw.
41. Spring washer.
42. Nut.
43. Hose clip.
44. Engine manifold non-return valve.
45. Non-return valve gasket.
46. Non-return valve spacer.
47. Vacuum adaptor.
48. Double ended connector.
49. Chassis tube connector.
50. Master cylinder to 3-way connector pipe.
51. Master cylinder to double ended connector pipe.
52. Double pipe clamp.
53. Screw.
54. Front brake disc.
55. 3-way connector to front hose pipe - R.H.
56. Triple pipe clamp.
57. 3-way connector.
58. Bolt.
59. 3-way connector to front hose pipe - L.H.
60. Single pipe clamp.
61. Shakeproof washer.
62. Lock nut.
63. Front hose.
64. Front hose to caliper pipe.
65. Brake pedal return spring.
66. Stop light switch bracket.
67. Stop light switch.
68. Switch end stop.
69. Switch lock nut.

Fig. G8A Braking system - front



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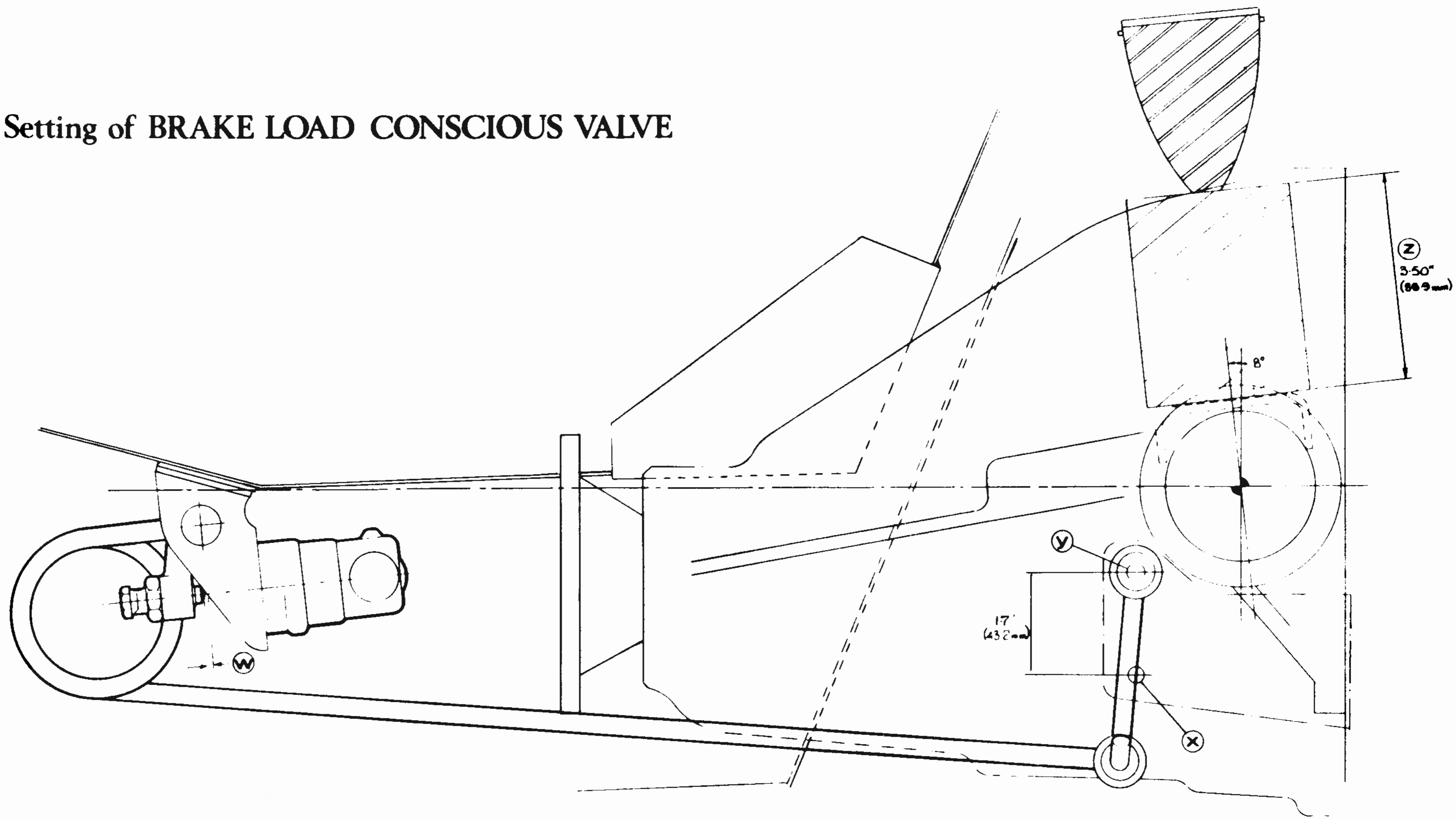
18. Spring washer.
19. Nut.
22. Split pin.
32. Plain washer.
40. Screw.
41. Spring washer.
42. Nut.
48. Double ended connector.
53. Screw.
61. Shakeproof washer.
70. Single pipe clamp.
71. Pipe clip.
72. Double ended connection to load conscious apportioning valve pipe.
73. Load conscious apportioning valve assembly.
74. Load conscious apportioning valve and bracket.
75. Load conscious apportioning valve spring.
76. Load conscious apportioning valve lever.
77. Load conscious apportioning valve link.
78. Load conscious apportioning valve to rear hose pipe.
79. Lock nut.
80. Rear hose.
81. Sealing washer.
82. 3-way connector.
83. Screw.
84. Rear brake disc.
85. 3-way connector to caliper pipe - R.H.
86. Strap clamp.
87. 3-way connector to caliper pipe - L.H.
88. Handbrake rod assembly - R.H.
89. Handbrake rod assembly - L.H.
90. Handbrake compensator.
91. Clevis pin.
92. Grease nipple.
93. Balance lever carrier.
94. Felt washer.
95. Compensator bracket.
96. Handbrake cable abutment.
97. Abutment spacer.
98. Screw.
99. Spring washer.
100. Nut.
101. Handbrake assembly cable.
102. Load conscious apportioning valve to axle bracket.
103. Cable clip.
104. Handbrake cable abutment.
105. Abutment spacer.
106. Clevis assembly.
107. Nut.
108. Screw.
109. Handbrake lever assembly.
110. Handbrake lever spacer.
111. Handbrake warning light bracket.
112. Socket cap screw.

Fig. G.8B Braking system - rear.

Setting of BRAKE LOAD CONSCIOUS VALVE



EXHAUST SYSTEM

INDEX.

H.1 BRIEF DESCRIPTION

The dual exhaust system consists of two manifolds, two primary pipes, two silencers, two tailpipes and two tailpipe extensions.

The silencers are suspended at each end on rubber mountings and the tailpipes are suspended on flexible strips.

A heat control valve is fitted between the L.H. manifold and primary pipe flanges. This valve directs the exhaust gases to a heat chamber beneath the carburettor mounting flange to help vaporise the fuel until normal running temperature is achieved.

H.2 EXHAUST SYSTEM COMPLETE - REMOVE AND REFIT

Disconnect:-

1. Primary pipe to exhaust manifold flange by removing two 7/16 lock nuts and washers. (On L.H. system the heat valve is situated between these two flanges and a steel gasket is fitted to both flanges.)
2. Tailpipe attachment by removing the two top 5/16 bolts, nuts and washers securing the insulating strap to the frame bracket.
3. Silencer by removing the two 3/8 lock nuts, two plain washers and two rebound washers situated above the rubber mountings.

The complete system for either cylinder bank can then be withdrawn from below the car.

To refit the system reverse the above procedure, and run the engine to check the complete system for leaks.

H.3 HEAT CONTROL VALVE

Servicing

Operation of the manifold heat control valve should be inspected periodically. With the engine idling, accelerate momentarily to wide open throttle. The counter weight should move anti-clockwise. If no movement is observed, the shaft is binding due to accummulation of deposits, or the thermostat is weak or broken.

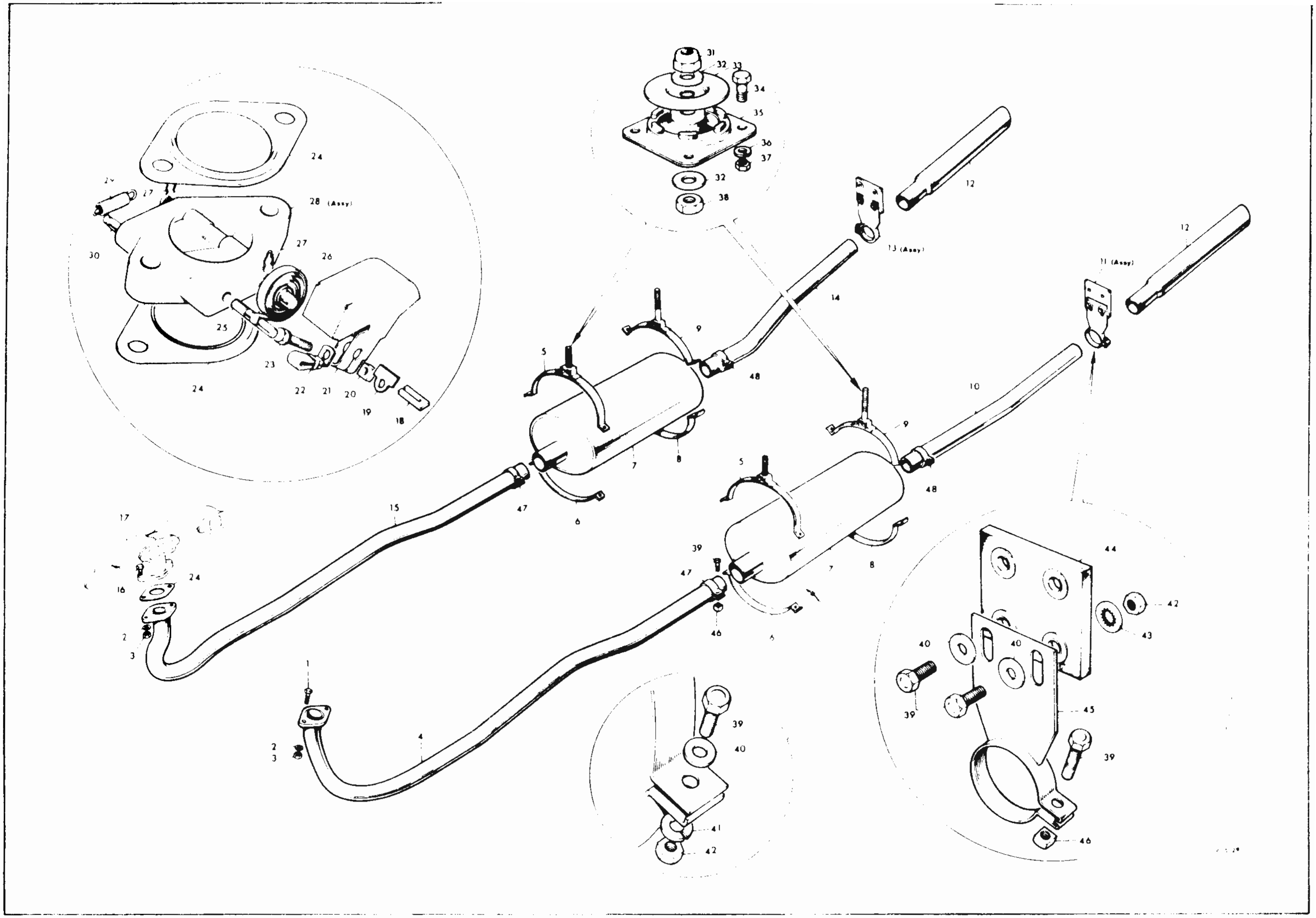


Fig. H.1 EXHAUST SYSTEM

1. Bolt.
2. Washer.
3. Nut.
4. Primary pipe - L.H.
5. Silencer Mounting strap - front upper.
6. Silencer Mounting strap - front lower.
7. Silencer.
8. Silencer Mounting strap - rear lower.
9. Silencer Mounting strap - rear upper.
10. Tail pipe - L.H.
11. Tailpipe support assembly - L.H.
12. Tailpipe extension.
13. Tailpipe support assembly - R.H.
14. Tailpipe - R.H.
15. Primary pipe - R.H.
16. Bolt.
17. Exhaust Manifold.
18. Tab.
19. Lock.
20. Nut.
21. Counterweight.
22. Bumper
23. Clamp bolt.
24. Gasket.
25. Stop-pin.
26. Thermostat.
27. Retainer.
28. Heat control valve assembly.
29. Anti-rattle spring.
30. Pin.
31. Nut.
32. Washer.
33. Rebound Washer.
34. Bolt.
35. Silencer mounting.
36. Washer.
37. Nut.
38. Nut.
39. Bolt.
40. Washer.
41. Washer.
42. Nut.
43. Washer.
44. Tailpipe mounting rubber.
45. Tailpipe clip.
46. Nut.
47. Silencer pipe clip - front.
48. Silencer pipe clip - rear.

Fig. H 1. EXHAUST SYSTEM

The application of a suitable manifold heat control valve solvent to both ends of the shaft at the bushes, will keep the valve working freely. The solvent should be applied when the engine is C O O L and allowed to soak a few minutes to dissolve the deposits. Then work the valve back and forth until it turns freely. A suitable solvent is Shell Donax P (Penetrating oil).

Removal

The counterweight and the thermostat can be serviced individually without the necessity of complete dismantling.

Remove counterweight and bumper from outer end of valve shaft by loosening clamp bolt. Unhook thermostat from stop pin and slide from valve shaft. An anti-rattle spring is fitted on the inner end of the valve shaft.

Thermostat and Installation

1. Ensure that shaft retainer is in place on valve shaft. Then, turn valve in the extreme clockwise position.
2. Install a new thermostat in slot in end of shaft with outer end in upper right-hand position. Press inner end of thermostat into shaft and seat firmly.
3. Wrap outer end of thermostat clockwise, and engage over stop pin.
4. Install anti-rattle spring on inner end of valve shaft.

Counterweight Installation

1. Ensure that shaft retainer is in position.
2. Install counterweight and bumper on outer end of valve shaft. The bumper should be on the left-hand side of the hub section of the counterweight and below the stop pin.
3. Tighten clamp bolt to 50 lb./in. Test operation of valve for freedom of movement.

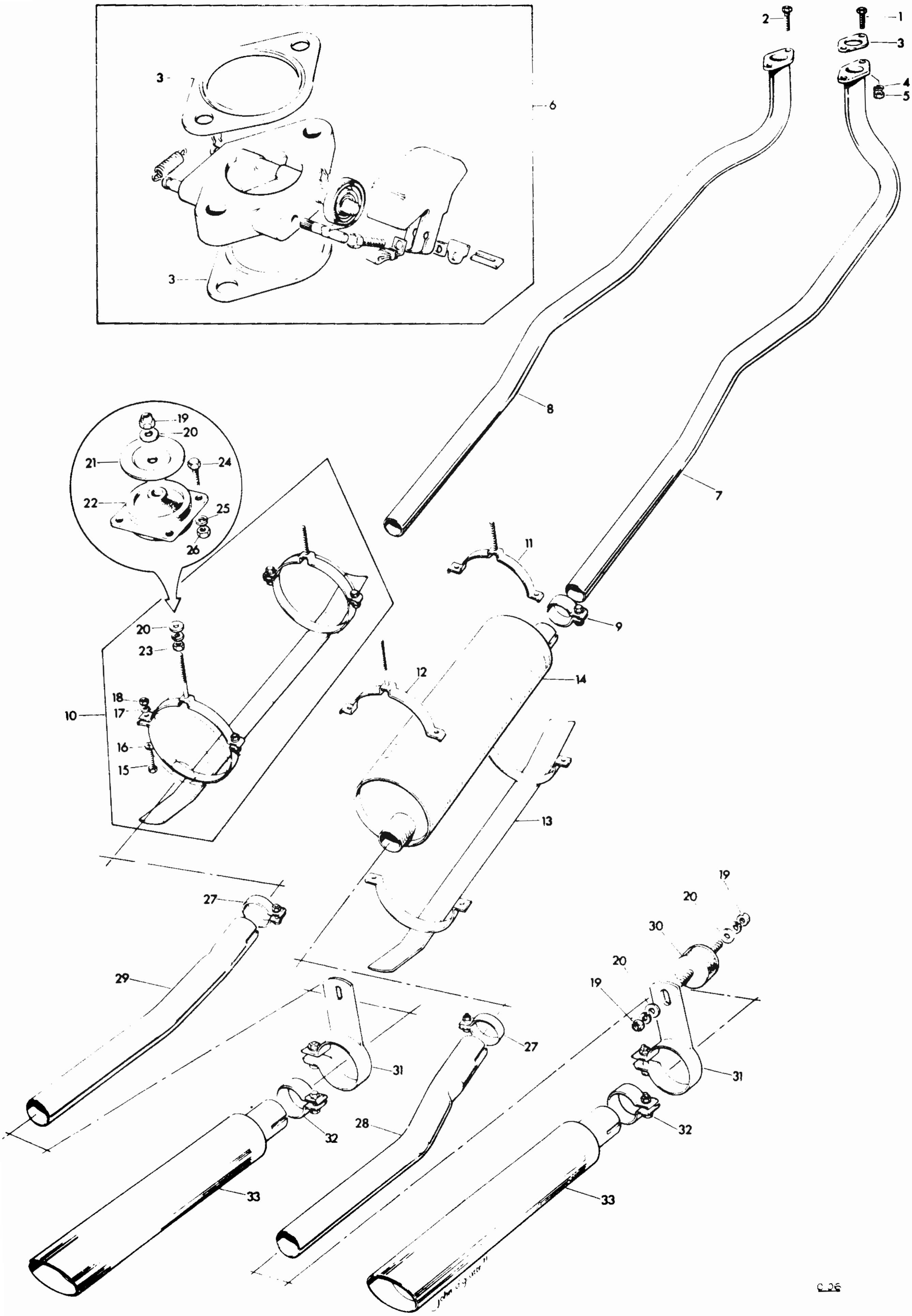
H.2A EXHAUST SYSTEM COMPLETE - REMOVAL AND INSTALLATION

1. Disconnect the primary pipe from the exhaust manifold flange by removing the two 7/16 in. (11 mm) locknuts, and washers. (The exhaust system on the left side (right side for Interceptor III) has the heat valve located between these two flanges, and a steel gasket interposed between the valve and each flange).

2. Disconnect the tail pipe attachment by removing the nuts, and washers, securing the clamp bracket to the mounting insulator.

3. Disconnect the silencer by removing the two $\frac{3}{8}$ in. (9.5 mm) locknuts, plain and rebound washers situated above the rubber mountings. The complete system can then be withdrawn from beneath the car.

4. Fit the exhaust system by using the dismantling procedure in reverse. Finally, run the engine to check the system for leaks.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1. Bolt.
2. Bolt.
3. Exhaust pipe gasket.
4. Plain washer.
5. Lock nut.
6. Heat control valve (integral with exhaust manifold on '4' series).
7. Primary pipe - R.H.
8. Primary pipe - L.H.
9. Front clip c/w nut and bolt.
10. Silencer suspension bracket assembly.
11. Front upper bracket.
12. Rear upper bracket.
13. Suspension lower bracket.
14. Silencer.
15. Screw.
16. Plain washer.
17. Spring washer.
18. Nut.
19. Lock nut.
20. Plain washer.
21. Rebound washer.
22. Silencer mounting.
23. Thin nut.
24. Screw.
25. Spring washer.
26. Nut.
27. Rear clip c/w nut and bolt.
28. Intermediate tail pipe - R.H.
29. Intermediate tail pipe - L.H.
30. Tail pipe mounting insulator.
31. Clamp c/w nut and bolt.
32. Tail pipe clip c/w nut and bolt.
33. Tail pipe.

Fig. H.1A Exhaust system.

FUEL SYSTEM

INDEX

J.1 DATA SHEET

Carburettor Type	Four barrel Downdraught of CARTER manufacture. Refer to relevant Chrysler manual for specification
Fuel Pump Type	Mechanical
Fuel Tank	20-galls.(IMP) 23¾ galls.(U.S.)
Total Capacity	90 litres

Tightening Torques

POSITION	SIZE	TORQUE
Carburettor to Manifold	5/16 - 24	7 lb./ft.

J.2 BRIEF DESCRIPTION

The 20 Imperial gallon (23¾ U.S. gallon, 90 litres) fuel tank is located beneath the floor of the boot, from where fuel is pumped to the carburettor by means of a diaphragm type pump, incorporating two non-return valves, and a filtering unit. A further filter is fitted in the line between the tank and the fuel pump.

The single tank unit located in the top of the tank incorporates a fuel gauge float and warning light switch. Access to the tank unit can be obtained by removing metal cover plate in the boot floor.

A vent is fitted at both sides of the fuel tank and the drain plug is situated immediately below the tank unit.

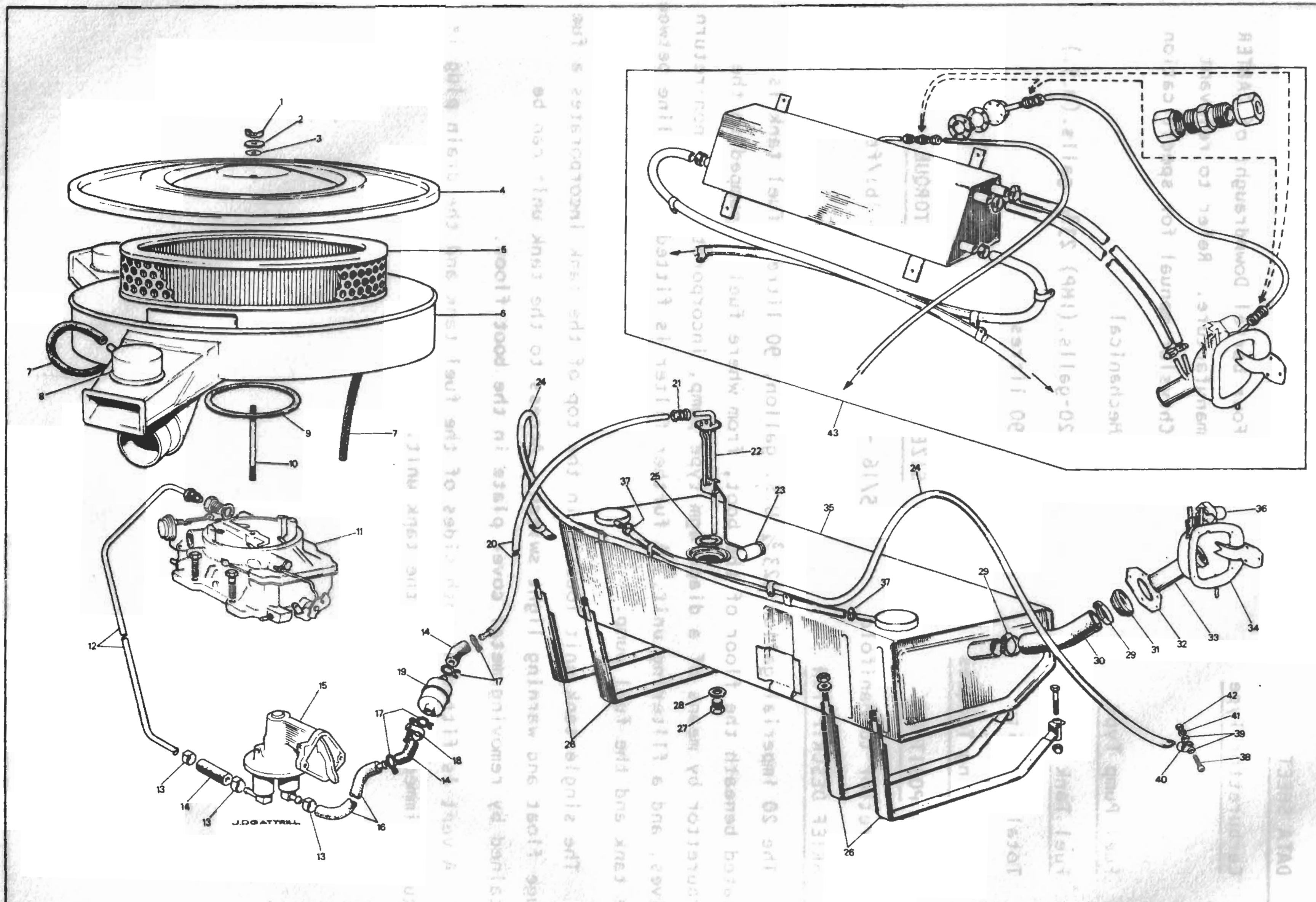


Fig. J.4 Fuel System

1. Wing nut.
2. Washer (steel).
3. Washer (fibre).
4. Air cleaner lid.
5. Air cleaner element
6. Air cleaner bowl.
7. Vacuum pipe - carburettor to intake flap operating unit.
8. Air intake flap operating unit.
9. Gasket.
10. Stud.
11. Carburettor.
12. Fuel pipe-pump to carburettor.
13. Connector clip.
14. Pipe connector.
15. Fuel pump.
16. Fuel pipe - line filter to pump.
17. Connector clip.
18. Securing clip.
19. Line filter.
20. Fuel pipe - tank unit to line filter.
21. Coupling - fuel pipe to tank unit.
22. Tank gauge unit and warning light switch.
23. Float.
24. Tank breather pipe assembly
25. Tank gauge unit gasket.
26. Tank strap assembly.
27. Drain plug.
28. Drain plug gasket.
29. Clip.
30. Filler hose.
31. Grommet.
32. Plate.
33. Filler neck.
34. Filler bowl and door lock.
35. Fuel tank assembly.
36. Solenoid.
37. Clip breather hose.
38. P.K. screw.
39. Washer (plain).
40. Clip.
41. Washer lock.
42. Nut.
43. Fuel expansion tank assembly (U.S. Federal Regs.).

Fig. J.4 Fuel System

J.3 THROTTLE LINKAGE

The throttle and automatic gearbox controls are interconnected and it is important to maintain the correct relationships between the two (see relevant Chrysler manual).

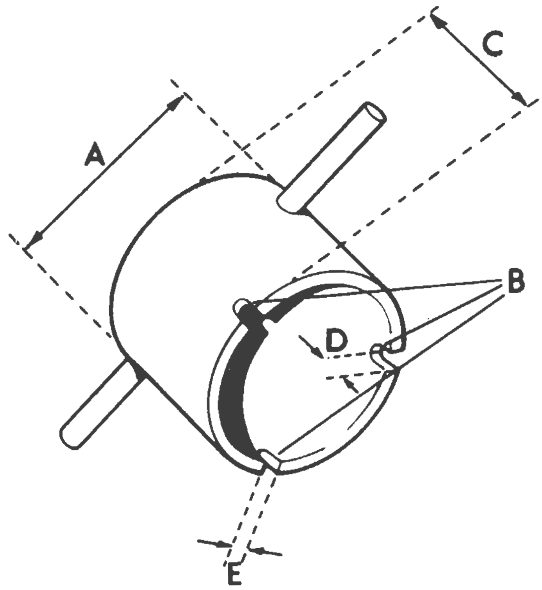
J.4 REMOVING THE FUEL TANK

All tank fixings with the exception of the tank unit and leads are accessible from beneath the car.

1. Disconnect leads to tank unit after removing access plate on boot floor.
2. Drain away the fuel.
3. Disconnect the fuel feed pipe at its union on the forward face of the tank.
4. Remove plastic cover plate below L.H. wheel arch which is secured on two bolts and two pairs of screws.
5. Release the filter hose clip and ease the hose away from the tank stem pipe.
6. Seal the tank opening to prevent possible ingress of foreign matter.
7. Disconnect the two breather pipes at the hoses which are secured under the wheel arches by jubilee clips.
8. Remove exhaust tailpipes and also the spare wheel and spare wheel carrier which is secured by three bolts.
9. The tank is held to the frame by two straps and after releasing them it can be withdrawn downwards and clear of the car.

J.5 FUEL TANK GAUGE UNIT

This unit may be removed from the tank as a complete assembly. Using the special spanner, which can be made as illustrated (see Fig.J.3), turn the tank unit locking ring in an anti-clockwise direction and withdraw the tank unit. Care should be taken to prevent the float lever from being bent or strained otherwise subsequent gauge readings may be seriously affected.



A 2in. (63 mm.) diameter.

B Three slots equally spaced.

C 2 in. (50 mm.).

D $\frac{1}{4}$ in. (6 mm.).

E $\frac{3}{16}$ in. (4.5 mm.).

Fig. J.3 TOOL FOR TANK UNIT

Great care must be taken when refitting the gauge to ensure that the rubber joint washer is in position. It is essential that a petrol-tight joint should be made between the tank and the face of the unit. If there is any apparent damage to the washer it must be replaced by a new one.

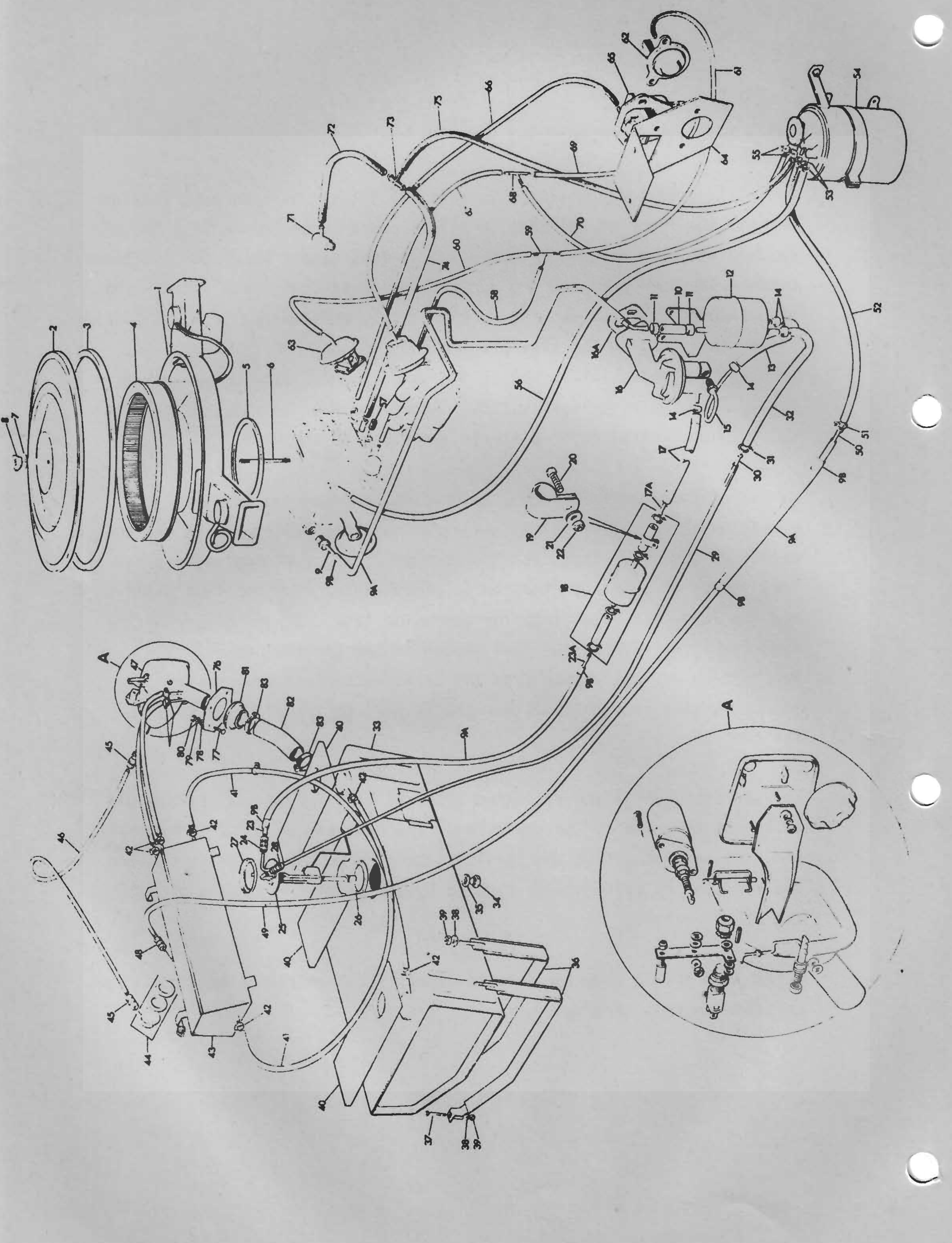
J.2A BRIEF DESCRIPTION

The 20 Imperial gallon (23¾ U.S. gals, 91 litres) fuel tank is located beneath the floor of the boot. Fuel is pumped from the tank to the carburettor by a diaphragm-type pump. A fuel vapour separator is fitted between the fuel pump and the carburettor to prevent vapour lock. The pump incorporates two non-return valves, and a filtering unit. A further filter is fitted in the line between the tank and the fuel pump. A tank unit, located in the top of the tank, incorporates a fuel gauge float, and a warning light switch. Access to the tank unit is obtained by removing a metal cover-plate in the floor of the boot.

An evaporation control system, comprising an expansion tank with a pressure vacuum relief valve, a sealed fuel tank filler cap, a charcoal canister, and vent pipes, is incorporated in the fuel system to prevent fuel vapour escaping to atmosphere. Fuel vapour from the tank filler, and the fuel tank, vent into the expansion tank. A vent pipe from the expansion tank carries the fuel vapour to the charcoal canister. Ventilation of fuel vapour from the carburettor fuel bowl is effected through a vent pipe which allows the vapours to travel by gravity into the canister.

The canister containing activated charcoal also includes a replaceable filter at the base of the container. The canister absorbs, and retains, the fuel vapours whilst the car is parked. When the engine is running, the canister is purified, or cleared by air drawn through the pipe to the P.C.V. valve.

Refer to relevant Chrysler service manual for maintenance details on the emission control systems.



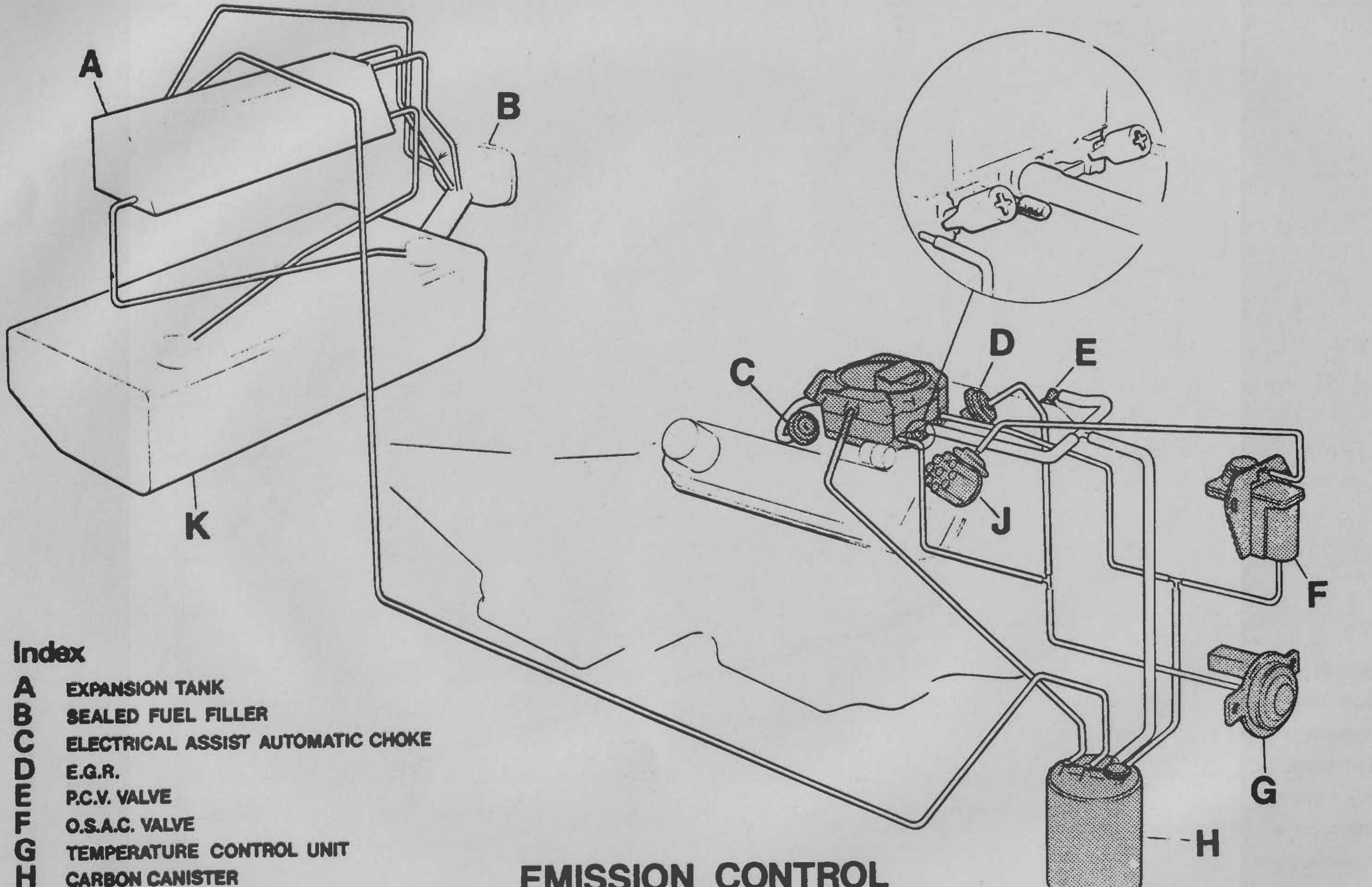
A
A

1. Air cleaner body.
2. Air cleaner cover.
3. Air cleaner cover gasket.
4. Air cleaner filter element.
5. Air cleaner to carburettor gasket.
6. Air cleaner to carburettor stud.
7. Plain washer.
8. Wing nut.
9. Carburettor-to-fuel vapour separator pipe.
9A. Glass fibre sleeving.
9B. Silicone rubber sleeving.
10. Connector hose for carburettor-to-fuel vapour separator pipe.
11. Hose clip.
12. Fuel vapour separator.
13. Connector hose for fuel vapour separator-to-fuel pump pipe.
14. Hose clip.
15. Hose connector-to-fuel pump pipe.
16. Fuel pump.
16A. Fuel pump gasket.
17. Fuel pump-to-filter pipe.
17A. Fuel pump-to-filter pipe connector tube.
18. Filter assembly.
19. Pipe clip.
20. Screw.
21. Spring washer.
22. Nut.
23. Filter-to-fuel tank float assembly pipe.
24. Reducer coupling.
25. Fuel tank float assembly.
26. Float assembly sealing ring.
27. Float assembly locking ring.
28. Reducer coupling.
29. Float assembly-to-fuel vapour separator pipe.
30. Float assembly-to-F.V.S pipe connector tube.
31. Pipe clip.
32. Connector hose for float assembly-to-F.V.S pipe.
33. Fuel tank.
34. Drain plug.
35. Drain plug gasket.
36. Tank strap.
37. Bolt.
38. Plain washer.
39. Lock nut.
40. Felt strip.
41. Breather pipe.
42. Pipe clip.
43. Expansion tank.
44. Relief valve assembly.
45. Reducer coupling.
46. Expansion tank-to-filler bowl return pipe.
47. Filler bowl.
48. Reducer coupling.
49. Expansion tank-to-hose from carbon canister pipe.
50. Connector tube for expansion tank-to-carbon canister pipe.
51. Pipe clip.

Fig. J.4A Fuel system

52. Hose in expansion tank-to-carbon canister pipe.
53. Hose clip.
54. Carbon canister.
55. Hose clip.
56. Carbon canister-to-carburettor hose.
57. Cap.
58. Carburettor-to-tee piece hose (E.G.R system).
59. Tee piece.
60. Tee piece-to-E.G.R unit hose.
61. Tee piece-to-temperature sensor unit hose.
62. Temperature sensor unit.
63. Exhaust gas recirculation (E.G.R) unit.
64. OSAC and temperature sensor unit mounting bracket.
65. Orifice spark advance control (OSAC) valve.
66. OSAC valve-to-distributor vacuum base.
67. Carburettor-to-tee piece hose (OSAC system)
68. Tee piece.
69. Tee piece-to-OSAC valve hose.
70. Tee piece-to-carbon canister hose.
71. Positive crankcase ventilation (PCV) valve.
72. Tee piece-to-P.C.V valve hose (crankcase ventilation system).
73. Tee piece.
74. Tee piece-to-carburettor hose.
75. Tee piece-to-carbon canister hose.
76. Sealing plate.
77. Screw.
78. Plain washer.
79. Spring washer.
80. Nut.
81. Grommet.
82. Fuel tank-to-filler bowl hose.
83. Hose clip.

Fig. J.4A Fuel system

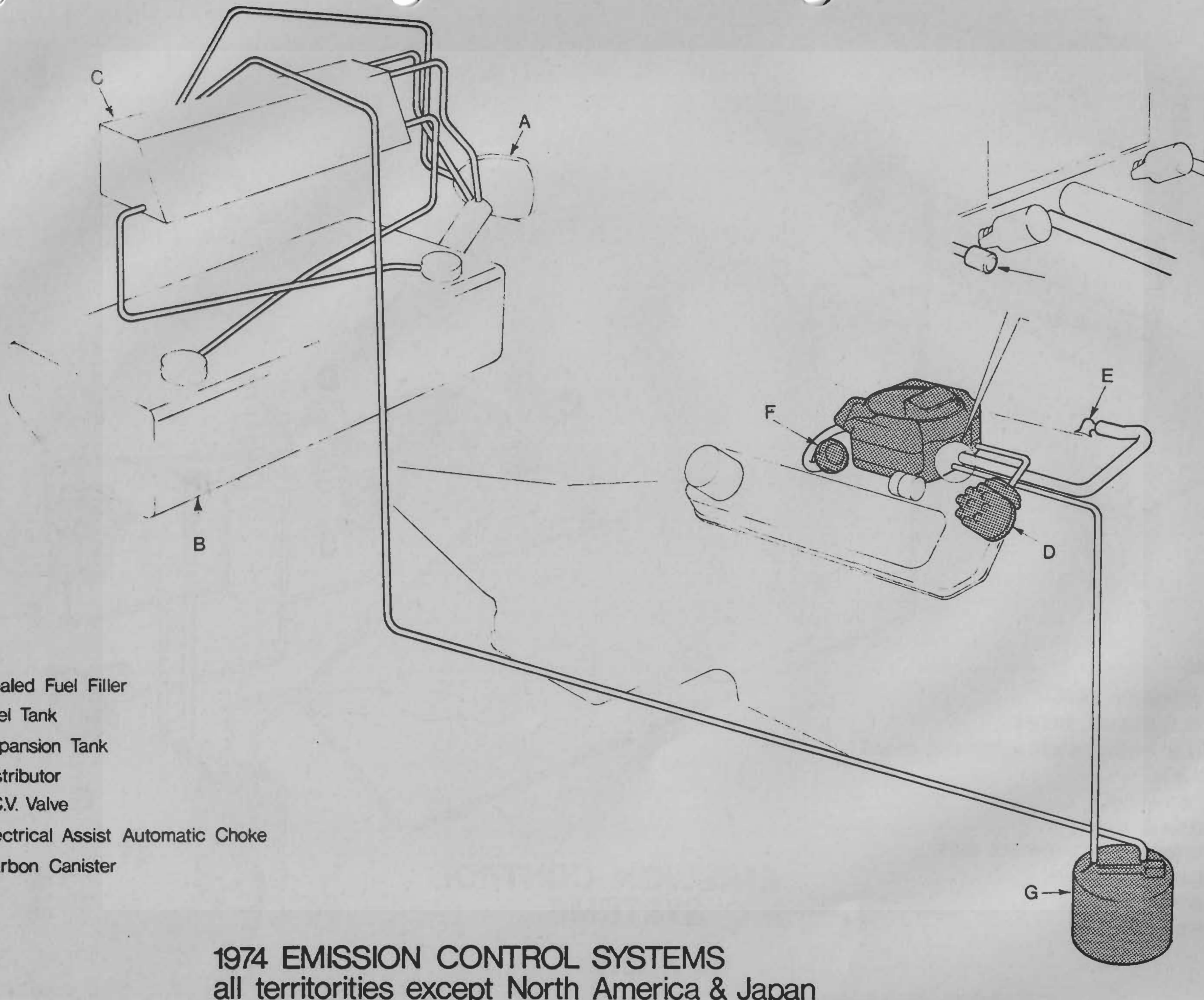


Index

- A EXPANSION TANK
- B SEALED FUEL FILLER
- C ELECTRICAL ASSIST AUTOMATIC CHOKE
- D E.G.R.
- E P.C.V. VALVE
- F O.S.A.C. VALVE
- G TEMPERATURE CONTROL UNIT
- H CARBON CANISTER
- J DISTRIBUTOR
- K FUEL TANK

EMISSION CONTROL SYSTEMS.

1973 VEHCLES

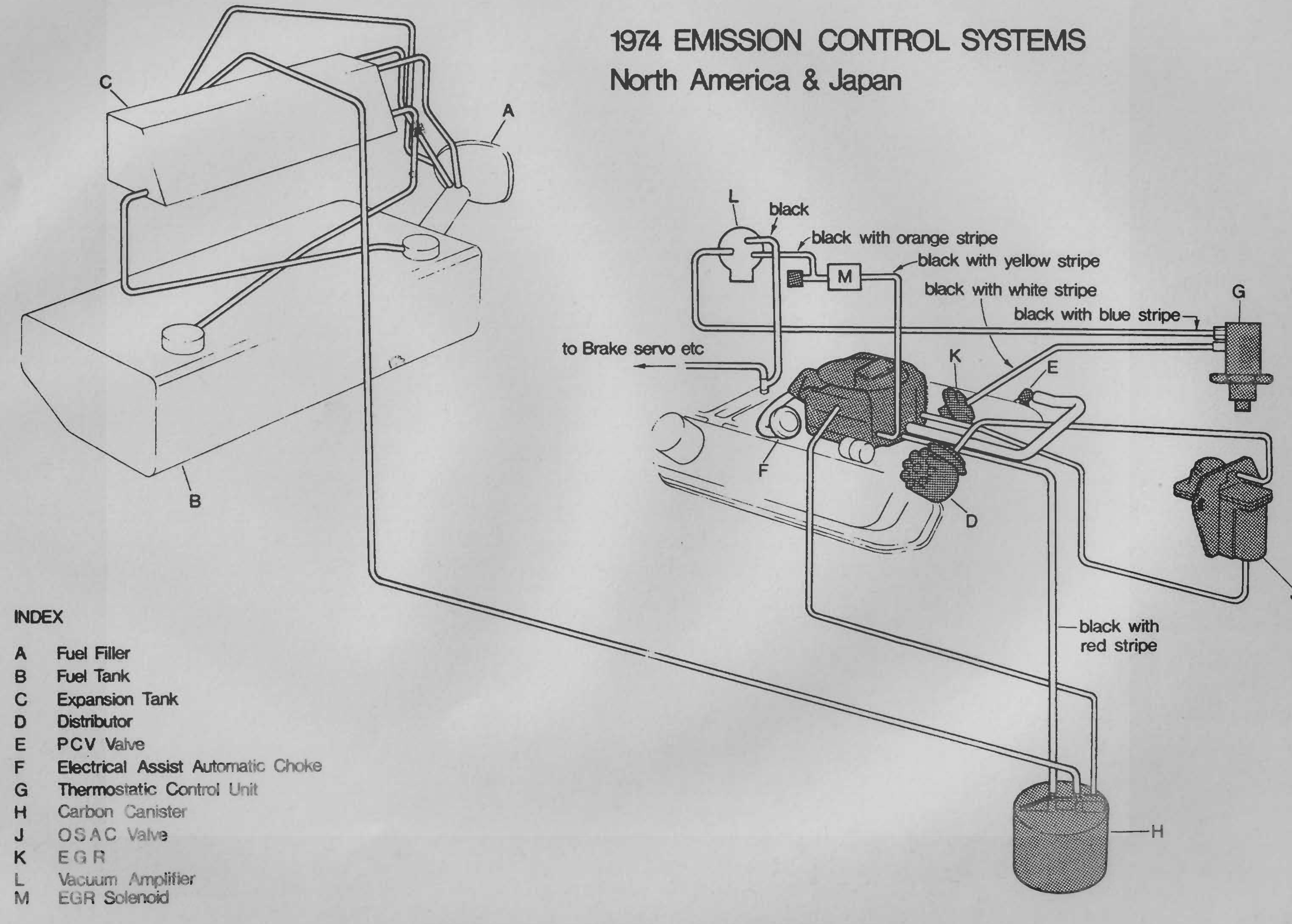


INDEX

A Sealed Fuel Filler
B Fuel Tank
C Expansion Tank
D Distributor
E P.C.V. Valve
F Electrical Assist Automatic Choke
G Carbon Canister

1974 EMISSION CONTROL SYSTEMS
all territories except North America & Japan

1974 EMISSION CONTROL SYSTEMS
North America & Japan



INDEX

- A Fuel Filler
- B Fuel Tank
- C Expansion Tank
- D Distributor
- E PCV Valve
- F Electrical Assist Automatic Choke
- G Thermostatic Control Unit
- H Carbon Canister
- J OSAC Valve
- K EGR
- L Vacuum Amplifier
- M EGR Solenoid

SECTION K

WORKSHOP MANUAL

INTERCEPTOR & FF

ACCELERATOR, AND GEARSHIFT CONTROL

INDEX

K.1 ACCELERATOR

The accelerator pedal operates a cable which is connected to the carburettor throttle lever.

K.2 GEAR SHIFT

To Remove and Replace Gear Selector Control Cable (See Fig. K.4)

1. Remove grubscrew (7) from control knob and unscrew knob.
2. Remove panel (65) by removing two screws at rear, accessible from inside companion box.
3. Withdraw three hexagon screws from control box (4).
4. Disconnect panel light bulbs.
5. From underneath car remove clevis pin (10).
6. Remove two bolts (46) from lower fixing bracket (59).
7. Remove control box and cable from car.
8. It will now be possible to withdraw cable and fit replacement.
9. To reassemble reverse the above procedure.

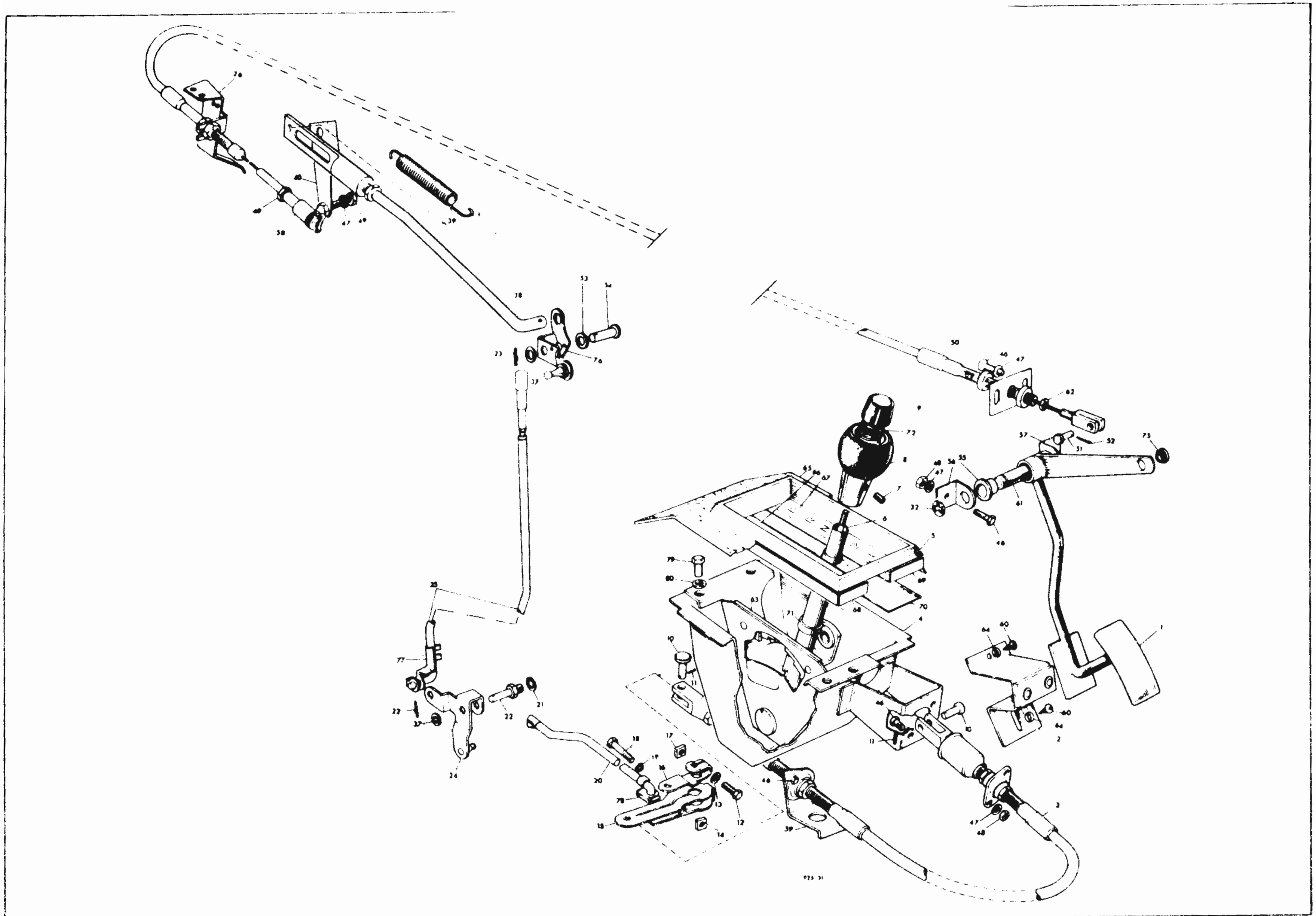


Fig. K.4 Accelerator and Gear Shift Control

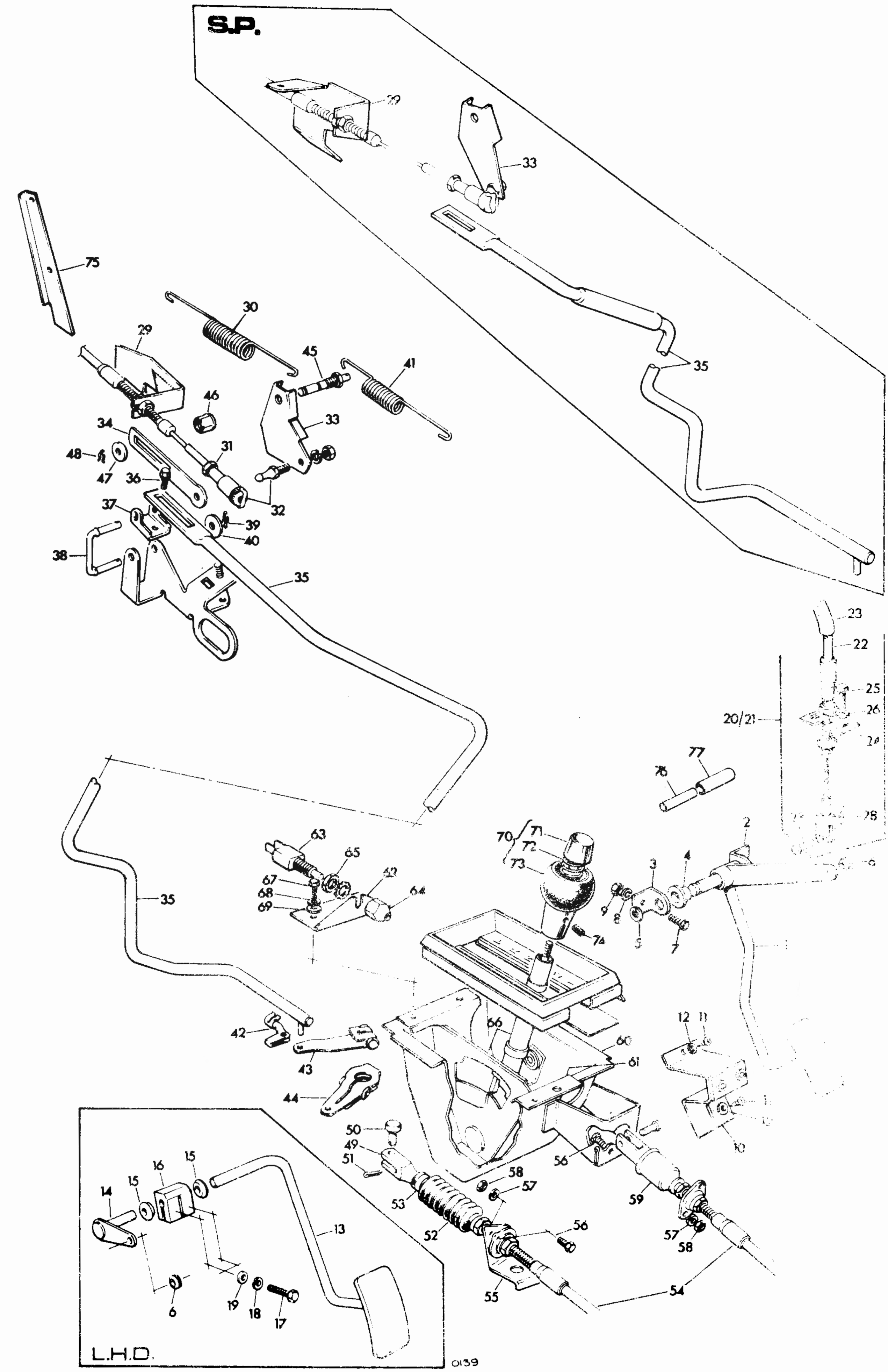
1. Accelerator pedal.
2. Pedal stop.
3. Selector control cable.
4. Sealing box.
5. Gear selector bezel.
6. Gear lever.
7. Grub screw.
8. Gear lever knob.
9. Reverse button.
10. Clevis pin.
11. Split pin.
12. Bolt.
13. Washer.
14. Nut.
15. Selector control lever.
16. Lever-selector control spindle.
17. Nut.
18. Bolt.
19. Washer.
20. Rod assembly - T.V. lever to bell crank.
21. Washer.
22. Stud-bell crank mounting.
23. Pin clip.
24. Bell crank.
25. Rod assembly - bell crank to bell crank.
26. Accelerator cable and return spring bracket.
32. Circlip.
38. Rod assembly - bell crank to carburettor.
39. Return spring.
40. Carburettor lever.
46. Bolt.
47. Washer.
48. Nut.
49. Nut.
50. Throttle control cable assembly.
51. Clevis pin.
52. Split pin.
53. Washer.
54. Clevis pin.
55. Bush-pedal shaft.
56. Bracket pedal shaft L.H.
57. Bracket pedal shaft R.H.
58. Ball joint.
59. Bracket - gear shift cable.
60. Screw.
61. Pedal lever shaft.
62. Circlip.
63. Gear lever bracket and gate assembly.
64. Washer.
65. Selector panel.
66. Positional indicator.
67. Numerical indicator.
68. Retainer L.H.
69. Retainer and bulb holder assembly R.H.
70. Sliding panel.
71. Anti-rattle sleeve.
72. Spring reverse button.
75. Bush shaft lever.
76. Bell crank.
77. Clip.
78. Clip.
79. Bolt.
80. Spring washer.

Fig. K.4 Accelerator and Gear Shift Control

K.3 GEARSHIFT

To Remove and Replace Gear Selector Control Cable (See Fig. K.4)

1. Remove grubscrew (7), from control knob (8) and unscrew knob.
2. Remove panel (65) by removing two screws at rear, accessible from inside companion box.
3. Withdraw three hexagon screws from control box (4).
4. Disconnect panel light bulbs.
5. From underneath car remove clevis pin (10).
6. Remove two bolts (46) from lower fixing bracket (59).
7. Using suitable jack, lower gearbox approximately 2½ in. after removing four bolts holding rear crossmember to chassis frame.
8. Remove control box and cable from car.
9. It will now be possible to withdraw cable and fit replacement.
10. To reassemble reverse the above procedure.



S.P.
L.H.D.
0139

1. Accelerator pedal assembly - R.H.D.
2. Pivot and mounting bracket assembly - R.H.D.
3. Mounting bracket - R.H.D.
4. Pedal shaft bush - R.H.D.
5. Pivot spring clip - R.H.D.
6. Pedal lever bush - R.H. and L.H.D.
7. Mounting bracket retaining screw.
8. Spring washer.
9. Nut.
10. Stop bracket - R.H. and L.H.D.
11. Self tapping screw.
12. Plain washer.
13. Accelerator pedal assembly - L.H.D.
14. Lever and shaft assembly - L.H.D.
15. Bearing - L.H.D.
16. Shaft clamp block - L.H.D.
17. Screw.
18. Spring washer.
19. Plain washer.
20/21. Accelerator cable c/w and ball joint, R.H and L.H.D.
22. Accelerator cable.
23. Asbestos sleeve.
24. Fixing plate - R.H and L.H.D.
25. Screw.
26. Spring washer.
27. Clevis pin.
28. Split pin.
29. Cable support bracket.
30. Accelerator return spring.
31. Lock nut.
32. Ball joint.
33. Carburettor adaptor lever.
34. Carburettor to transmission rod link.
35. Carburettor to transmission rod.
36. Screw and washer.
37. Retainer.
38. Stabiliser.
39. Clip.
40. Plain washer.
41. Transmission rod return spring.
42. Rod to lever clip.
43. Transmission/throttle control lever.
44. Transmission control lever.
45. Carburettor lever stud.
46. Carburettor lever stud nut.
47. Plain washer.
48. Clip.
49. Gear shift cable clevis.
50. Clevis pin.
51. Split pin.
52. Gaiter bellows.
53. Gaiter clip.
54. Gear shift cable.
55. Cable bracket.
56. Screw.
57. Spring washer.
58. Nut.
59. Cable grommet.
60. Gear selector sealing box.
61. Gear selector box packer.
62. Gearshift switch bracket.
63. Gearshift switch.
64. Gearshift switch and stop.
65. Gearshift switch lockn t.
66. Gearshift actuator assembly.
67. Bolt.
68. Spring washer.
69. Plain washer.
70. Gearshift knob assembly.
71. Gearshift knob button.
72. Gearshift knob spring.
73. Knob.
74. Set screw.
75. Throttle return spring bracket.
76. Pedal return stop roll pin.
77. Roll pin nylon tube.

Fig. K.4A Accelerator and gearshift control.

SECTION L
WORKSHOP MANUAL
INTERCEPTOR & FF

RADIATOR AND COOLING SYSTEM

INDEX

L.15 GENERAL DATA

Coolant Capacity	28 pints (IMP) 33.6 pints (U.S.) 15.9 litres
Type	Cross-flow thermo-syphon with impeller and electric fans
Temperature Control	Thermostat
Thermostat Settings	Engine: fully open at 93°C Fans: cut-in at 87°C Cut-out at 78°C
Pressurized	13 p.s.i.
Coolant Pump	Centrifugal
Drive	V. Belt

L.16 BRIEF DESCRIPTION

The engine cooling system operates on the conventional thermo-syphon principle, and is impeller assisted.

A transmission oil cooler is located in the LH side tank of the radiator. (See relevant Chrysler manual)

The radiator is of the cross-flow type and an expansion tank is fitted on the RH wheel arch.

The radiator is pressure tested at 20 p.s.i. and is fitted with a valveless cap. The expansion tank is fitted with a 13 p.s.i. pressure cap. The bulb for the capillary type temperature indicator is screwed into the water pump housing.

A thermostat is fitted below the outer elbow flange, the opening temperature being 81°C.

Two electric fans are mounted on the cross tube behind the radiator and these are brought into operation only when the coolant temperature rises above normal. Control is effected by a thermostatic switch fitted in the LH side tank of the radiator which cuts in at approximately 87°C and cuts out at approximately 78°C.

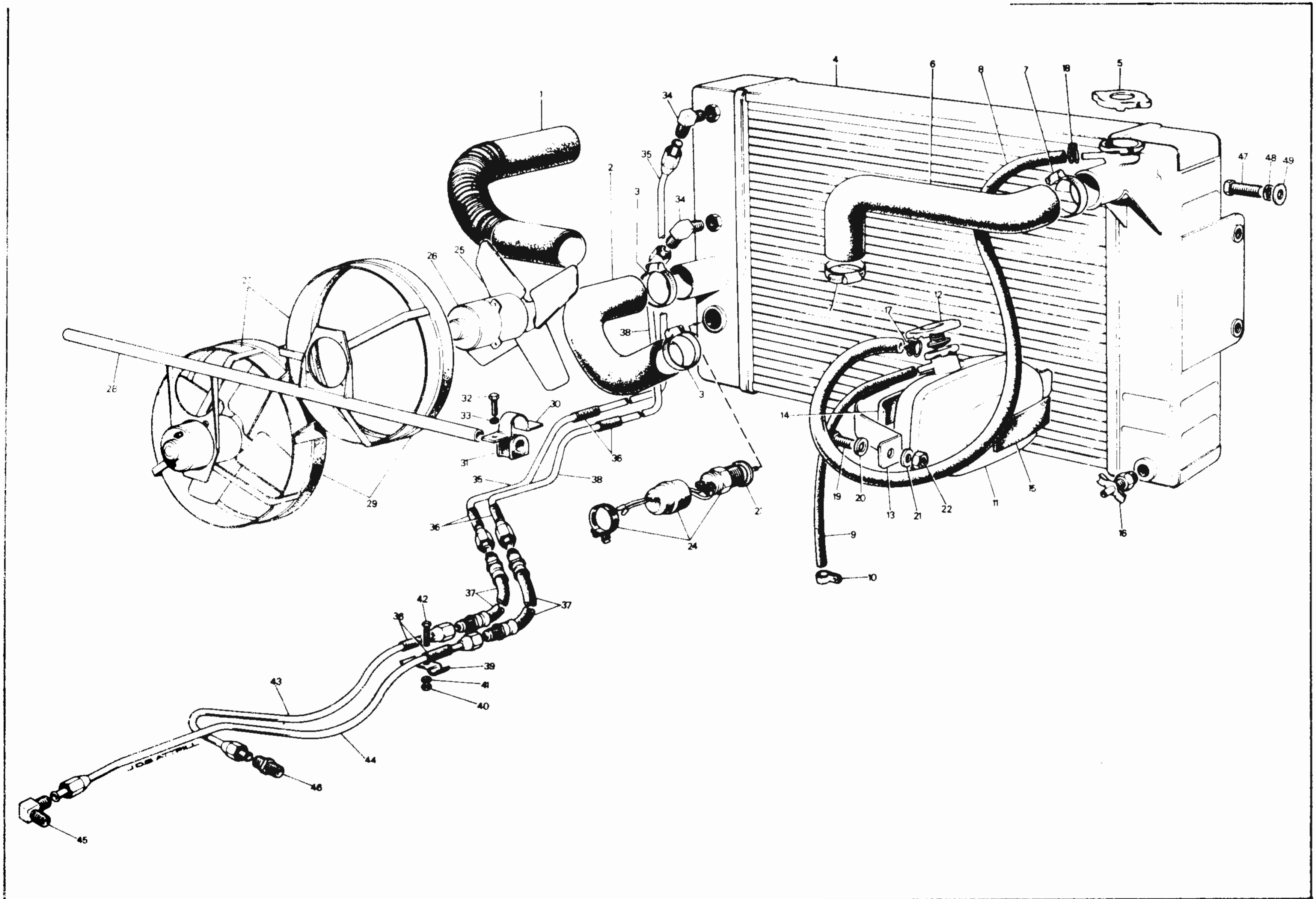


Fig. L.4 Radiator and Cooling System

1. Bottom hose (L.H.D.).
2. Bottom hose (R.H.D.).
3. Hose clip.
4. Radiator assembly.
5. Filler cap.
6. Top hose.
7. Hose clip.
8. Hose radiator to expansion tank.
9. Overflow tube.
10. Clip overflow tube to wheel arch.
11. Expansion tank.
12. Expansion tank cap.
13. Expansion tank retaining strap.
14. Retaining strap lining.
15. Rubbing strip.
16. Radiator drain tap.
17. Hose clip to expansion tank.
18. Hose clip to radiator.
19. Bolt.
20. Washer.
21. Washer.
22. Nut.
23. Thermostat switch gasket.
24. Thermostat switch assembly.
25. Fan assembly.
26. Fan motor assembly.
27. Fan cowls assembly.
28. Fan mounting tube assembly.
29. Fan cowl sealing strip.
30. Strap-mounting.
31. Mounting rubber.
32. Screw.
33. Spring washer.
34. Connector oil cooler pipe to radiator.
35. Pipe-long oil cooler (front).
36. Rubber sleeve.
37. Flexible hose assembly.
38. Pipe-short oil cooler (front).
39. Clip oil cooler pipe.
40. Nut.
41. Washer.
42. Screw.
43. Pipe-short-oil cooler (rear).
44. Pipe-long-oil cooler (rear).
45. Connector to gearbox.
46. Connector to gearbox.
47. Screw.
48. Spring washer.
49. Plain washer.

Fig. L.4 Radiator and Cooling System

L.17 REMOVING COOLING FANS

1. Disconnect wires from lucar connections on fan motors and remove supporting tape.
2. Remove 2 bolts from brackets on each end of mounting bar and remove bar together with fans.

   To refit - reverse procedure using new tape.

L.18 RADIATOR

Removal

1. Remove fans as above.
2. Drain cooling system.
3. Disconnect hoses.
4. Disconnect thermostat switch (below bottom hose).
5. Disconnect transmission oil cooler pipes from radiator and seal ends.
6. Remove top rad. shield panel, 4 screws on Interceptors only.
7. Remove 4 retaining bolts and withdraw radiator.

Installation

1. Ease the radiator into position and install the four attachment bolts.
2. Reconnect transmission oil cooler lines and the coolant hoses. Connect switch leads.
3. Charge the cooling system to $1\frac{1}{4}$ in. below the radiator filler neck seat and the expansion tank up to the level of the indicator bar with water and rust inhibitor, or water and a sufficient supply of anti-freeze.
4. Measure the transmission oil level after warm up and add oil as required.

Cleaning

1. Drain the cooling system and re-charge with clean soft water and add the contents of one can (No. 1 Top Compartment) of Motor Cooling System Cleaner or equivalent.
2. Operate the engine at a fast idle for half to three quarters of an hour.
3. Drain the cooling system and refill with clean water.
4. Pour the container (No. 2 Bottom Compartment) into the radiator and run engine for ten minutes.
5. Flush the entire cooling system until water runs clean.

6. Re-charge the radiator with clean soft water.
7. Use radiator rust inhibitor during the summer months.

L.19 ACCESSORY DRIVING BELT TENSION

See relevant Chrysler Manual.

L.20 REPAIRING OIL COOLER

1. Remove radiator from vehicle (see L.18).
2. Remove radiator LH side tank.
3. Melt the soft solder holding the cooler to the tank.
4. Remove the stamped retainer nuts holding the cooler fittings to the bottom tank and remove the cooler.
5. Install a new cooler or repair the old cooler with silver solder and re-install as follows:
6. Position the oil cooler in the bottom tank and install the stamped retainer nuts on the oil cooler fittings.
7. Use soft solder to secure the cooler in the tank.
8. Attach the side tank to the radiator using soft solder and weld saw cut in cradle.
9. Install the radiator as described above.
10. Fill the cooling system and test for leaks. If the transmisssion opera properly after repairing the leak, drain the transmission and torque converter while hot, remove the transmission oil pan and inspect for sludge, rust, dirty or plugged inlet filter. If none of these conditio is found, reconditioning may not be necessary. Re-assemble, using transmission fluid type "AQ-ATF" Suffix "A".

L.21 COOLANT PUMP

See relevant Chrysler manual.

L.16A BRIEF DESCRIPTION

The engine cooling system operates on the conventional thermo-syphon principle, and is impeller assisted.

A transmission oil cooler is located in the left side tank of the radiator. (see relevant Chrysler manual)

The radiator is of the cross-flow type, and an expansion tank is fitted to the wheel arch on the right side.

The radiator is pressure tested at 20 lb./sq.in (1.4 kg./sq.cm.), and is fitted with a valveless cap. The expansion tank is fitted with a 13 lb./sq.in (0.91 kg./sq.cm.) pressure cap. The bulb for the capillary-type temperature indicator is screwed into the water pump housing.

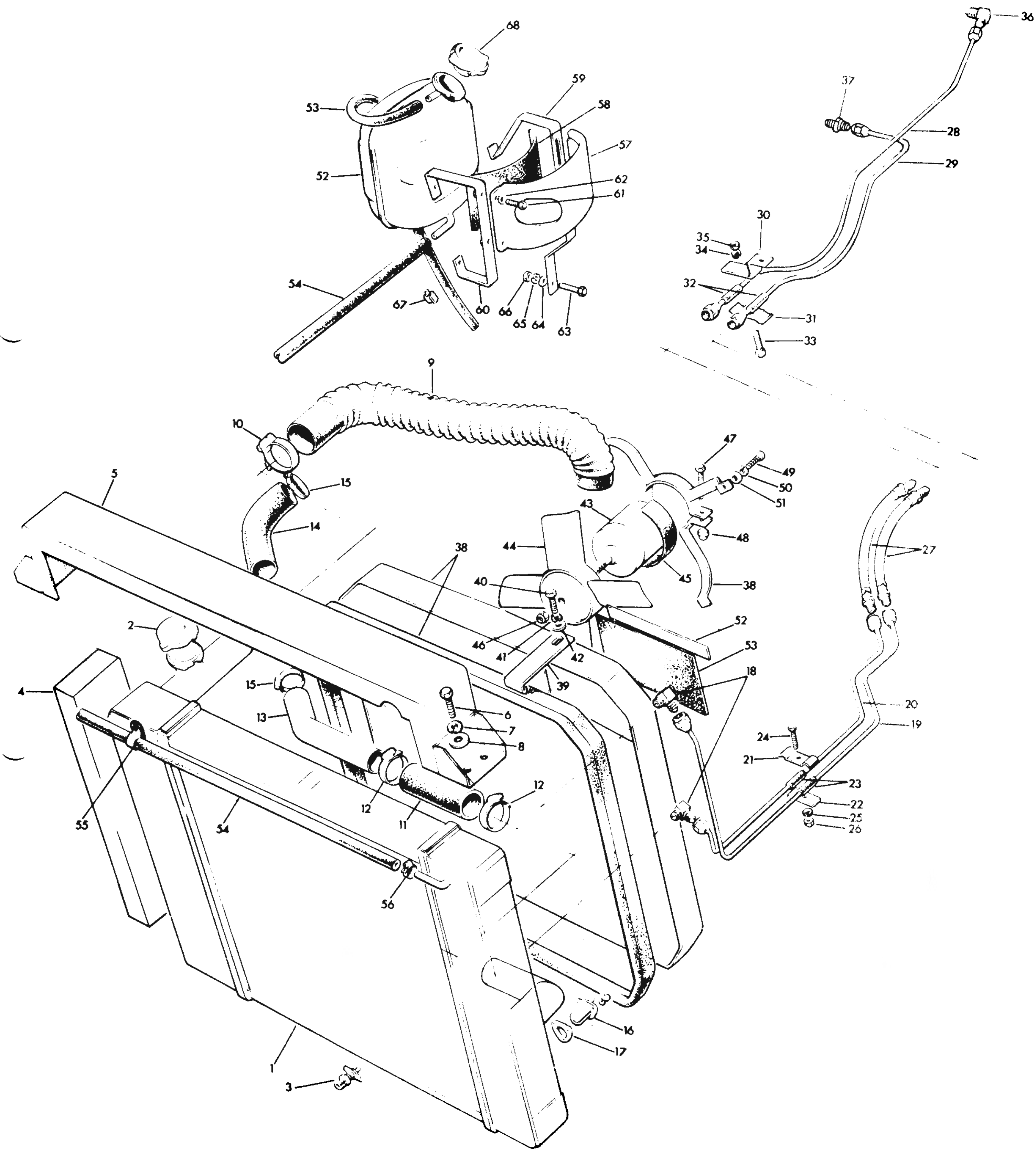
A thermostat is fitted above the radiator outlet on the left side, the opening temperature for which is 81°C.

Two electric fans are mounted on a cowl assembly secured to the rear of the radiator by fixing brackets, two each at the top and bottom. The fans are brought into operation only when the coolant temperature rises above normal. Control is effected by a thermostatic switch fitted in the left side tank of the radiator. The switch cuts in at approximately 87°C, and cuts out at approximately 78°C.

L.17A COOLING FANS - REMOVAL AND INSTALLATION

1. Disconnect the electrical leads from the connections on the fan motors.

2. Remove the four bolts securing the cowl fixing brackets, and withdraw the cowl assembly together with the two fans.
3. Remove the fans from the cowl assembly by withdrawing the eight bolts securing the fan motor locating brackets to the cowl assembly.
4. Install cooling fans using the removal procedure in reverse.



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1. Radiator assembly.
2. Radiator filler cap.
3. Drain tap.
4. Side packing.
5. Radiator fixing bracket.
6. Bolt.
7. Spring washer.
8. Plain washer.
9. Top hose.
10. Hose clip.
11. Radiator-to-pipe connecting hose.
12. Hose clip.
13. Radiator-to-engine pipe.
14. Pipe-to-engine connecting hose.
15. Hose clip.
16. Thermostat switch.
17. Thermostat switch gasket.
18. 90^{0} elbow.
19. Upper pipe-front.
20. Lower pipe - front.
21. Double pipe clip.
22. Plate.
23. Rubber sleeve.
24. Screw.
25. Spring washer.
26. Nut.
27. Hose connecting front and rear pipes.
28. Upper pipe - rear.
29. Lower pipe - rear.
30. Bracket.
31. Double pipe clip.
32. Rubber sleeve.
33. Screw.
34. Spring washer.
35. Nut.
36. 90^{0} connector.
37. Double ended connector.
38. Fan cowl assembly.
39. Fan cowl fixing bracket.
40. Screw.
41. Spring washer.
42. Plain washer.
43. Fan motor.
44. Fan blades.
45. Rubber strip.
46. Fan motor nut.
47. Screw.
48. Nut.
49. Screw.
50. Spring washer.
51. Plain washer.
52. Expansion tank.
53. Breather pipe.
54. Radiator header tank-to-expansion tank pipe.
55. Pipe clip.
56. Pipe Clip.
57. Strap.
58. Strap lining.
59. Expansion tank rear mounting bracket.
60. Expansion tank front mounting bracket.
61. Screw.
62. Shakeproof washer.
63. Screw.
64. Plain washer.
65. Spring washer.
66. Nut.
67. Clip.
68. Expansion tank filler cap.

Fig. L.4A Radiator and cooling system.

L.18A RADIATOR - REMOVAL AND INSTALLATION

1. Remove the cooling fans as described above (L.17A).
2. Drain the cooling system.
3. Disconnect the hoses.
4. Disconnect the thermostat switch (above the lower hose).
5. Disconnect the transmission oil cooler pipes from the radiator; seal the pipe ends.
6. Lift off the radiator securing channel section, located at the top of the radiator, by first unscrewing the four retaining bolts.
7. With draw the radiator.
8. Install the radiator using the removal procedure in reverse.
9. Charge the cooling system to 1¼ in. (32 mm) below the radiator filler neck seat, and the expansion tank, up to the level of the indicator bar, with water and rust inhibitor, or water and anti-freeze solution.
10. Check the transmission oil level after warm up, and add oil as required.

CLEANING

1. Drain the cooling system. Re-charge the system using a solution of SOFT water, and one can of No. 1 top compartment motor cooling-system cleaner, or an equivalent.
2. Run the engine at a fast idle speed for between ½ and ¾ of an hour.
3. Drain the cooling system, and re-fill with clean water.
4. Pour the contents of No. 2 bottom compartment container into the radiator, then run the engine for 10 minutes.
5. Flush the cooling system until clean water is running through.
6. Fill the radiator with clean soft water.
7. Use radiator rust inhibitor during the summer months.

HEATER

INDEX

HEATER

M.4 BRIEF DESCRIPTION

A powerful and comprehensive heating system of 5 kilowatts output is fitted and allows any appropriate combination of temperature and airflow to be selected and maintained. Two automatic flap valves in the rear quarter panels provide through-flow ventilation, thus ensuring that there is a minimum build-up of pressure in the car and a constant change of air inside the car. The car interior is heated in an orthodox manner by ambient air drawn from outside the car and passed over a radiator matrix supplied with coolant from the engine.

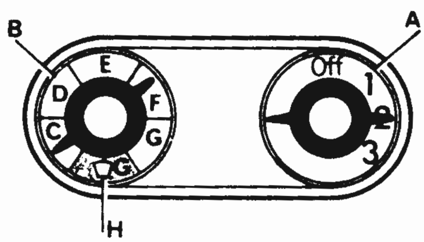
It will therefore be appreciated that the heater will not be fully effective until the engine has reached its normal operating temperature.

M.5 CONTROLS AND OPERATION

(See Fig. M.2)

There are two heater controls mounted at the base of the switch panel. These are: (A) Heater master switch and blower speed switch. (B) Temperature and distribution control.

Fig. M.2



C. DARK BLUE
D. BLUE
E. GREEN
F. YELLOW
G. RED
H. WHITE

As the master switch (A) controls not only the electrical circuits but also the vacuum system operating the flap valve on the air intake, it is essential that this switch is operated before the heater will function. The three positions provide for slow, medium and fast fan operation. The temperature and distribution control (B) regulates the temperature of the air entering the car, cold or ambient temperature air resulting when the pointer is set to the green sector and warm or hot air when this pointer is set to the yellow or red segments. Clockwise rotation of this temperature control over the yellow and red segments results in progressive temperature increase Turning this control fully clockwise to bring the pointer opposite the small white segment (H) will give maximum temperature with all air directed to the windscreen for de-frost or de-mist. Should it be desirable to close the flap valve in the air intake to prevent exhaust fumes from entering the car in heavy traffic conditions, the temperature control should be turned fully anti-clockwise.

Two systems entirely independent of the heater provide for additional ventilation in the car and operate as follows:-

1. Footwell Ventilation

Small panels on the interior of the outer wall of each footwell are connected to intakes behind the radiator grille. These are operated by a forward movement of the slide. The flow of air through these is dependent on the speed of the car.

2. Directional Ventilation

Four adjustable vents are provided. The flow of air from these vents is controlled by the integral valves which are opened and closed by a rotary motion of the central knob. Boosting is effected by use of the main fan.

M.6 CHECKING HEATING SYSTEM (Engine Idling)

Fig. M.3

1		OFF H	OFF 1 2 3	Recirculation valve shut (flap fully forward). Blower off.
2		OFF H	OFF 1 2 3	Switch on and off a number of times to check recirculation valve movement.
3		OFF H	OFF 1 2 3	Recirculation valve open (flap fully rearwards). Three steps of blower speed at 1, 2 and 3. All interior air (hot) to four defrost outlets. No leak to footwell outlets.
4		H	OFF 1 2 3	Cold air to interior. Recirculation valve open (fully rearwards).
5		ON H	OFF 1 2 3	Face level air, two front and two rear, should be cold.
6		ON H	OFF 1 2 3	Hot air to interior footwell outlets. Slight bleed to defrost outlets.
7	DETENT	ON H	OFF 1 2 3	Cold air to interior footwell outlets. Slight bleed to defrost outlets.

M.7 HEATER - REMOVAL

1. Remove transmission cover, console and facia assembly. See Section P.
2. Drain cooling system.
3. Remove air cleaner.

4. Remove 3 screws on the front and 2 underneath the heater ducting at the second joint from the blower motor.
5. Disconnect heater matrix water pipes.
6. Pull off drain tube under heater box.
7. Remove felt and insulation, as necessary, from heater box.
8. Remove 2 bolts holding heater flap valve, situated on right-hand side of heater box (inside car), slacken control rod bolt and withdraw vacuum unit.
9. Remove 4 screws holding heater box to bulkhead and withdraw heater box from inside.

To replace heater assembly reverse the above procedure, taking particular care when replacing the screws retaining the heater box. The rawl nut should be removed from the bulkhead and partially assembled on the screws/heater box. The whole assembly should then be fitted in the bulkhead.

The adjustment on Section 8 is obtained by pushing the flap as far as it will go forward. Push the rod in the vacuum unit to its lowest position, then tighten the locking screw.

AIR CONDITIONING

M.8 GENERAL DATA

Weight of refrigerant for complete charge . . . . .2 lb. (0,9 mg.

Compressor oil level:	Dipstick depth	Fluid ounces	Pints Imp.	Pints U.S.	Litres
Initial Charge	$1\frac{1}{8}$ in. (28 mm.)	10	0.5	0.625	0.28
Minimum level	$\frac{7}{8}$ in. (22 mm.)	6	0.3	0.375	0.17

Torque tightening values:

Securing bolt, compressor clutch . . . . 16 lb./ft. (2.2 kg.m.

Oil recommendation:

Shell Clavus 33.

Refrigerant recommendation:

The air conditioning equipment is manufactured for use only with Refrigerant 12. This includes Freon 12 and Arcton 12.

Care must be taken not to use any of the methylchloride refrigerants as these react with the aluminium used in the system.

> NOTE:
>
> The cooling system should at <u>all</u> times contain a 25% solution of ANTI-FREEZE in order to prevent the heater matrix from freezing when the air conditioning is in operation.

M.9 GENERAL DESCRIPTION

The air conditioning system is designed to provide cool, dry air for increased driver and passenger comfort. This is achieved by the refrigeration of air circulating within the vehicle.

The air within the car is blown through the evaporator by a centrifugal blower housed within the console unit. The air is cooled by the evaporator matrix and excess moisture in the air condenses on the coil, and is drained off beneath the car.

> CAUTION:
>
> All work involving the handling of refrigerants requires special equipment, a knowledge of its proper use, and attention to safety measures.

Any service work that requires loosening of a refrigerant line connection should be performed only by qualified service personnel (see Section M.12).

Principles of refrigeration

Refrigeration is a process of removing heat. A substance existing in a solid, liquid or gaseous state can be converted from one state to another by the addition or removal of heat. A familiar example is the change of water into steam or ice.

All liquids have a definite boiling point - i.e. change of state from liquid to gaseous - that is dependent on the pressure applied. Water will boil at 212°F (100°C) only at sea level atmospheric pressure. If the pressure is increased, as in a pressurised cooling system, water will not boil until a higher temperature is reached.

The refrigerant used is Refrigerant 12. This boils at 21.7°F below zero (-30°C) at atmospheric pressure but can be prevented from boiling if it is kept under high pressure.

When a liquid boils, turning into vapour, it absorbs a great amount of latent heat without changing temperature. Conversely, when the vapour is condensed the process is reversed, and the same amount of heat is released in converting the vapour to liquid. The principle of large heat absorption or release that occurs when a liquid changes its state is the basis of a modern refrigeration system.

Components.

(See Fig. M.1)

Evaporator (9)

The evaporator coil is located in the heater box which is connected by ducting to the blower motor. Air is blown through the evaporator matrix into the car interior in a cool and dehumidified condition.

High pressure liquid refrigerant flows through the expansion valve at a controlled rate into the low pressure side of the evaporator. The refrigerant immediately boils and vapourises, thus cooling the evaporator and the warm moist air of the car interior and, as previously noted, moisture in the air condenses on the coil and is drained off beneath the car.

Compressor (17)

This component is mounted on the left-hand side of the engine and is belt driven by means of the engine crankshaft pulley through an electro-magnetic clutch. When the compressor is working it converts low pressure vapour from the evaporator to high pressure vapour - up to 275 p.s.i. (19.3 k/sq.cm.) - that is discharged to the condenser. Only approved refrigerant oil should be used for the compressor. See Data (M.8) for recommended oils.

Magnetic clutch and pulley (39)

The compressor pulley assembly contains an electrically controlled magnetic clutch, permitting the compressor to operate only when air-conditioning is selected. The compressor shaft is not driven when the

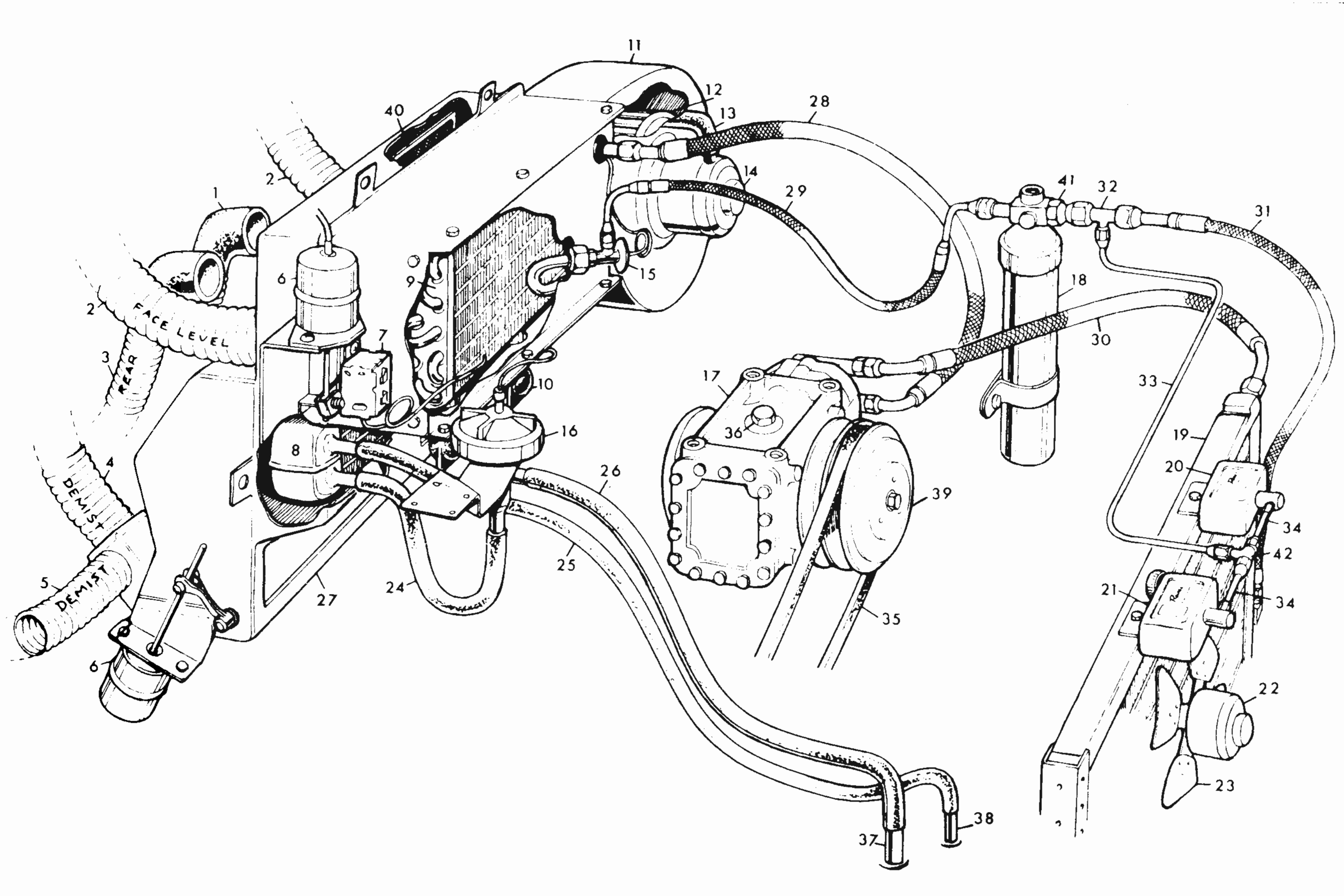


Fig. MA.1 Air Conditioning System

1. Elbow.
2. Hose.
3. Hose.
4. Hose.
5. Hose.
6. Actuator.
7. Cold thermo. control.
8. Heater matrix.
9. Evaporator unit.
10. Drain valve.
11. Blower casing.
12. Blower fan.
13. Hose.
14. Blower motor.
15. Expansion valve.
16. Thermostat.
17. Compressor unit.
18. Receiver-dryer unit.
19. Condenser.
20. High pressure cut-out.
21. Cut-in switch for condenser cooling fan.
22. Fan motor.
23. Fan blade.
24. Hose.
25. Hose.
26. Hose.
27. Heat exchange box
28. Hose.
29. Hose.
30. Hose.
31. Hose.
32. T-piece.
33. Pipe.
34. Pipe
35. Compressor belt.
36. Filler plug.
37. Stub pipe - outlet.
38. Stub pipe - inlet
39. Pulley and electro-magnetic clutch assembly
40. Evaporator filter.
41. Connector.
42. T-piece.

Fig. MA.1 Air-conditioning System

clutch is disengaged, although the pulley is still being driven by the engine crankshaft pulley and belt.

Condenser (19)

Located in front of the car radiator. Air passing over the surfaces cools the 'hot' high pressure refrigerant gas, causing it to condense into high pressure liquid refrigerant. The condenser is similar to a car radiator, but is designed to withstand much higher pressures.

Receiver-dryer (18)

Mounted in the engine compartment its function is to ensure a supply of liquid refrigerant to the expansion valve under working conditions. The dryer is incorporated in the base, and is to absorb moisture present in the system on assembly, and also to trap foreign matter which may be present in the system.

Sight glass

This is in the top of the receiver-dryer, and the liquid passing through it to the expansion valve is visible.

High pressure cut-out switch (20)

This switch is mounted in the engine compartment adjacent to the receiver-dryer, and is connected by a pressure line to the receiver-dryer. It is essentially a safety valve to protect the system in the event of excessive pressure. When operated, it opens the electrical circuit to the magnetic clutch, thus switching off the compressor. Cut-out pressure 300 p.s.i., cut-in 260 p.s.i.

The switch is not adjustable for service purposes.

Cut-in switch for condenser cooling fan (21)

This switch is actuated by the compressor outlet pressure. It cuts the fan in at 220 p.s.i., and cuts it out at 180 p.s.i.

Expansion valve (15)

Located at the side of the evaporator, the expansion valve thermostatically meters the flow of high pressure liquid refrigerant into the evaporator.

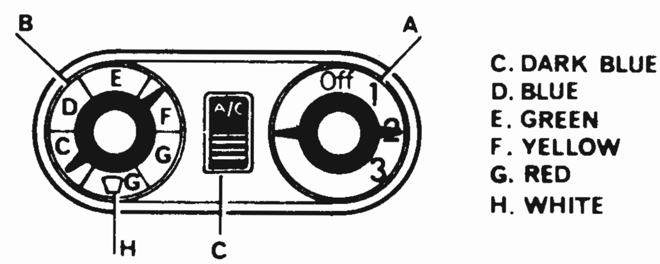
The refrigerant supply is controlled by a capillary tube strapped to the outlet pipe of the evaporator, so that temperature changes at this point result in a change of refrigerant flow through the valve. If the evaporator core receives more liquid than is needed the evaporator outlet temperature is lowered, and the expansion valve reduces the flow of liquid refrigerant.

It is important that the expansion valve matches the evaporator it is being used with. Five-feed evaporators require an externally compensated valve, whilst single and twin-feed evaporators require uncompensated valves.

The expansion valve is preset. No external adjustment is possible.

M.10 AIR CONDITIONING CONTROLS

Fig. MA.2



A blower motor mounted on the front bulkhead draws ambient air through the scuttle intake on minimum air conditioning, and recirculating air through grill on passenger's side of facia on full air conditioning. The air is cooled by passing it through the evaporator unit and it is then expelled through louvres into the car interior.

The air flow is activated by a blower motor having three speeds. This motor is controlled by the right-hand knob (A) on the panel. From the 'OFF' position clockwise rotation gives low, medium and high speeds. With the blower in the 'OFF' position the whole system is cut off. Always switch off the blower before attempting to start the engine.

The left-hand control knob (B) regulates the thermostat which gives the required air temperature. To select the lowest temperature the control knob pointer should be set at the lowest part of the blue window. From this position clockwise rotation of the knob will progressively raise the temperature. As the knob pointer passes from green to yellow the cooling system is isolated and the heating system takes over.

The knob which controls the temperature, simultaneously controls the air distribution. At maximum temperature setting the pointer is opposite a small white window (H), this being the 'full demist' position.

When it is required to use the refrigeration system it is necessary to start the engine, as the refrigerant compressor is driven by the engine.

The tumbler switch (C) between the control knobs is an overriding switch for the compressor and is in the 'ON' position when the serrated portion of the switch is flushed with the panel.

Since cool air is available within the car it is not necessary to open the windows during hot weather, and occupants can travel free from draughts, noise and the ingress of dust, etc. Indeed, it is recommended that the windows be kept closed to assist the refrigeration to function efficiently.

The air conditioning system will be most effective if the following recommendations are taken:-

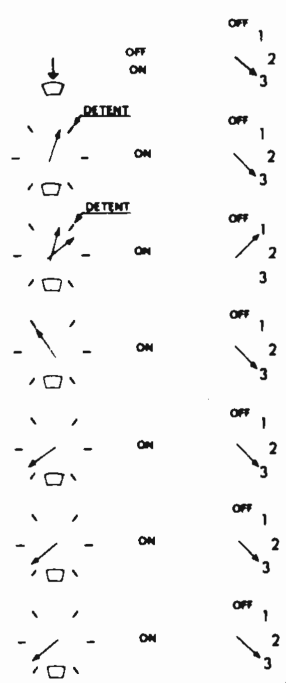
1. Always switch off the blower before attempting to start the engine.
2. If the car is heat-soaked and very hot inside, wind down the windows. Immediately after the engine has started select No. 3 blower position and expel the hot air from inside the car. After two or three minutes wind up the windows so that the air from the air conditioning system will become cooler, until a comfortable temperature is achieved.
3. If at any time the air flow diminishes from the air outlet, the system should be operated for a few minutes with the pointer of the temperature control knob (B) turned to twelve o'clock, to prevent ice build-up on the evaporator core.

Ducting

The ducting used in a car with refrigeration is similar to that normally fitted, a single blower motor being used in both cases.

M.11 CHECKING AIR SYSTEM (ENGINE IDLING)

(Fig. M.A.3)



1	Operate switch a number of times. Compressor clutch should engage and disengage freely. Check for excessive compressor noise at 1500 and 3000 r.p.m.
2	Cold air to interior footwell outlets. Temperature switch fully up.
3	Turn knob across detent several times. Check that compressor clutch engages and disengages.
4	Cold air to interior. Temperature switch lever mid-way. Recirculation valve open (flap fully rearwards)
5	Cold air to interior. Temperature switch lever fully down. Recirculation valve shut (flap forward).
6	Disconnect two rear fans, check front fan cuts in (engine r.p.m. 1500). Note: Cut-in pressure 220 psi. Differential 40 p.s.i.
7	Disconnect two rear fans and front fan. Check that compressor clutch disengages (engine r.p.m. 1500.). Note: Cut-out pressure 300 p.s.i. Differential 40 p.s.i.

M.12 SERVICING PROCEDURE

All work involving the handling of refrigerants requires special equipmen a knowledge of its proper use, and attention to safety measures. Any service work that requires loosening of a refrigerant line connection should be performed only by qualified service personnel.

In order to save distributors and dealers the expense of obtaining the necessary special equipment for air conditioning it is proposed that the following service procedure be adopted.

Home market.

1. Distributor or dealer contacts the nearest York Refrigeration dealer and arranges an examination of the air conditioning system on the distributor or dealer's premises.

2. The York Refrigeration dealer will check the system for leaks and compressor operation.

3. If the compressor is at fault a replacement unit will be obtained from Jensen Motors Spares Department.

4. The distributor or dealer will fit the replacement unit and call in the York Refrigeration dealer to check and recharge the refrigeration system.

5. The York Refrigeration dealer will invoice the Jensen distributor or dealer who should pay this amount and then claim from Jensen Motors Limited under warranty if this is appropriate.

Countries outside the U.K.

The main York Refrigeration dealer is also a storage point for complete spare compressors, and the following procedure should be adopted.

1. Distributor or dealer contacts the York Refrigeration distributor for the country who will advise of the nearest York Refrigeration dealer.

2. The York Refrigeration dealer will check the system for leaks and compressor operation.

3. If the compressor is at fault a replacement unit must be obtained by the Jensen distributor direct from the York Refrigeration distributor for the country.

4. The distributor will fit the replacement unit and call in the local York Refrigeration dealer to check and recharge the refrigeration system.

5. The York Refrigeration distributor for the country will invoice the Jensen distributor who should pay this amount and claim from Jensen Motors Limited under warranty if this is appropriate.

6. The displaced unit should be retained by the Jensen distributor for examination by Jensen Motors Limited service personnel at the next service visit.

7. Jensen Motors Limited Warranty Department will pay the Jensen distributor's claim for both labour and material.

A list of the York Refrigeration distributor's is shown in Section M.13.

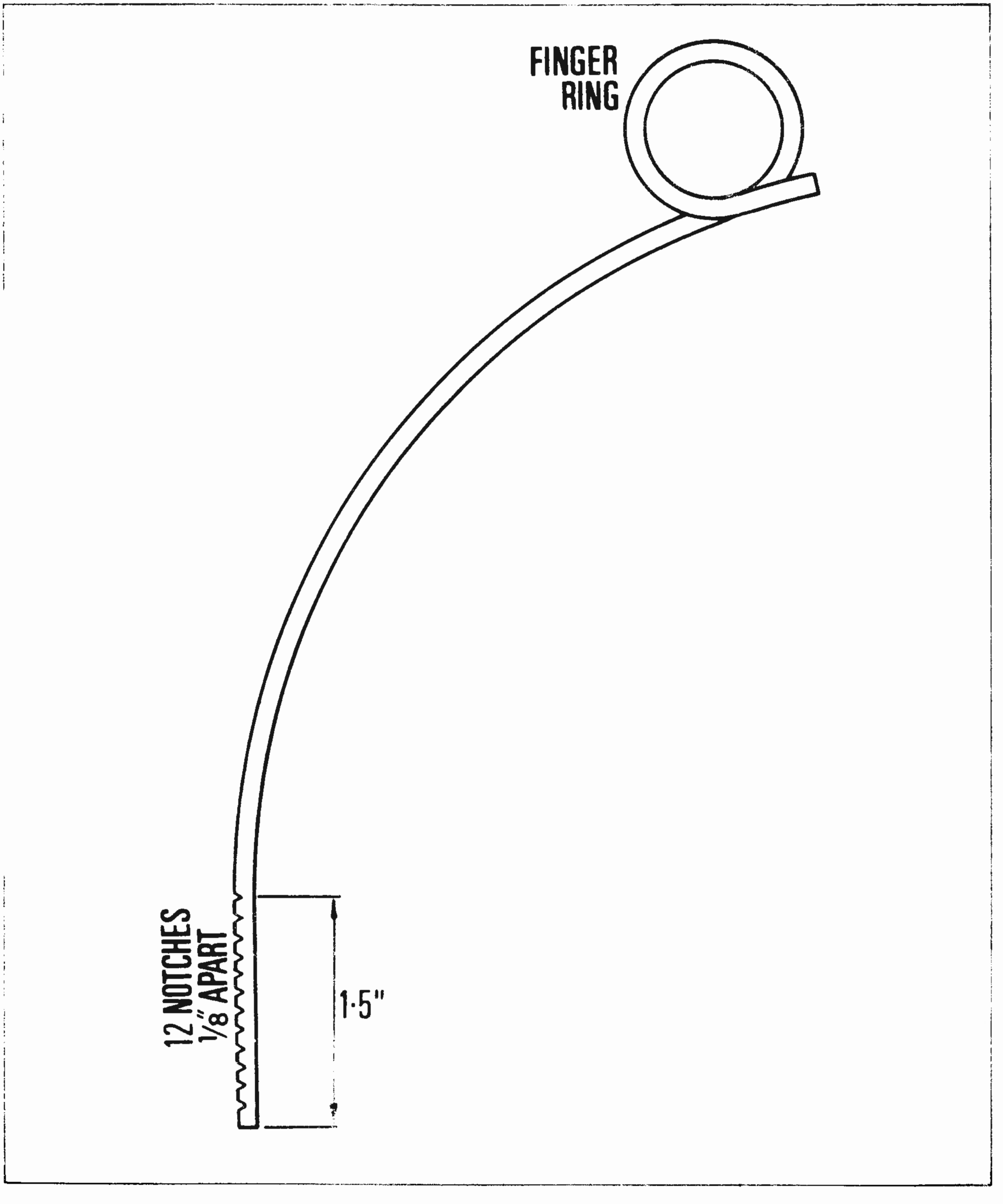


Fig. MA.4 Compressor Dipstick Details

M.14 CHECKING OIL LEVEL ON COMPRESSOR

Type DA210

1. The oil level should be checked every twelve months. In countries with climatic changes this will usually be the spring in readiness for summer operation.

2. Back-seat (fully counter-clockwise) both service valves.

3. Start the engine, turn the temperature control to maximum - fully clockwise position, and the blower control to HIGH speed. Operate the system for five minutes at 1,200 - 1.500 r.p.m.

4. Reduce the engine speed to idling, and SLOWLY forward-seat (turn clockwise) the suction service valve on the compressor, until it is just closed.

5. Stop the engine at this point and quickly forward-seat the suction service valve and discharge service valve firmly.

   It is important to close the suction service valve slowly during the first part of the operation to avoid a sudden pressure reduction in the compressor crankcase that could cause a large amount of oil to leave the compressor.

6. Loosen the oil level plug and unscrew it slowly by 5 turns to bleed off crankcase pressure. This can be up to 5 p.s.i.

7. Remove the oil level plug, wipe the dipstick and insert it as near vertical as possible to the lowest point of the crankcase. It may be necessary to turn the compressor crank to obtain clearance.

8. Withdraw the dipstick and determine the depth of oil. The depth should be 1 1/8 in. (28 mm.) maximum, with a minimum of 7/8 in. (22 mm.).

   1 1/8 in. (28 mm.) depth corresponds to 10 ounces or 0.5 pints Imperial, 0.625 pints U.S., 0,28 litres.

   7/8 in. (22 mm.) depth corresponds to 6 ounces or 0.3 pints Imperial, 0.375 pints U.S., 0,17 litres.

9. Add a quantity of the recommended type of special refrigerant oil as necessary, taking care not to overfill. See Data for oil recommendations.

10. Lubricate a new '0' ring with refrigerant oil, fit it over the threads of the level plug without twisting, and tighten the level plug.

11. Back-seat (fully counter-clockwise) both service valves. Start and run the engine at 1,200 r.p.m. and check for a leak at the compressor level plug. Do not over-tighten to correct a leak. In the event of a leak, isolate the compressor as in items 4, 5 and 6 above and check the '0' ring and seats for dirt, etc.

12. Stop the engine.

13. Refit the protection caps to the valve stem and gauge connections of the service valves.

Type DA209

This type of compressor is fitted with Schraeder valves in place of service valves and in this case it is necessary to discharge the refrigeration system before a check of the compressor oil level can be made.

Following discharge of the system the procedure is the same as Section M.14 from paragraph 7 onwards.

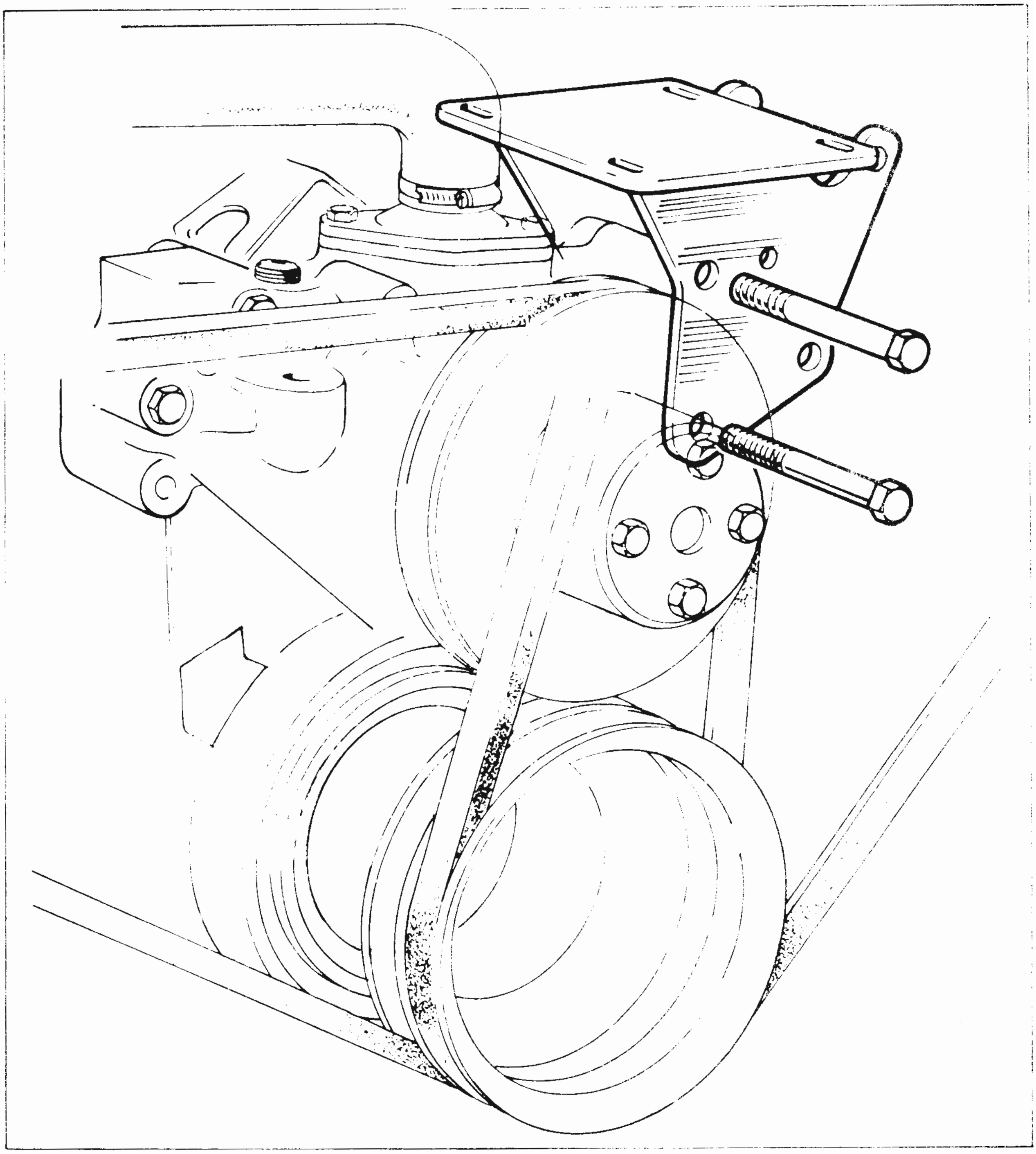


Fig. MA.5 Details of Compressor Mounting bracket and bolts

M.15 COMPRESSOR DRIVING BELT TENSION, TO ADJUST

(See Fig. MA5)

1. Release the nut securing the alternator mounting bracket.
2. Pivot the bracket inwards or outwards as required.
3. Tighten the securing nut.
4. Check that the driving belt can be deflected $\frac{1}{4}$ in. with 5 lb. pressure exerted midway between the compressor and alternator pulleys.

M.16 TO REMOVE HEATER ON AIR CONDITIONED CARS

1. Follow M.7 to 4.

2. Air conditioning system should now be discharged following the recognised procedure.

3. Disconnect the inlet and outlet pipes on the evaporator.

4. Remove hexagon headed bolts from heater box (11 on R.H., 8 on L.H.) front panel and slide panel forwards.

5. Remove compressor thermostat sensing probe, taking care not to damage the evaporator or probe.

6. Follow procedure laid down in M.7 from 5 onwards.

To refit, reverse the above procedure.

M.17 TO REMOVE EVAPORATOR ONLY

1. Remove air cleaner.

2. Discharge air conditioning following the recognised procedure.

3. Disconnect the inlet and outlet pipes on the evaporator.

4. Remove hexagon headed bolts (11 on R.H., 8 on L.H.) from heater box front panel and slide panel forwards.

5. Remove compressor thermostat sensing probe, taking care not to damage the evaporator or probe.

6. Remove 4 retaining bolts and withdraw evaporator.

To refit, reverse the above procedure.

M.18 TO REMOVE HEATER/AIR CONDITIONING BLOWER MOTOR

1. Remove felt and insulation as necessary.

2. Remove 3 screws on ducting on second joint from blower motor.

3. Remove 2 Lucar connections from motor.

4. Remove 2 screws on outside flange of cowl and withdraw assembly.

M.19 HEAT CONTROL VALVE

The Ranco heat control valve is vacuum operated and is bolted onto bulkhead under bonnet on the opposite side to the blower motor with a sensing probe running through the bulkhead and into the heater ducting where it is clipped.

In order to remove this unit it will be necessary to remove the heater by the procedure laid down in Section M.16.

When the heater is clear, the probe can be unclipped from the ducting, the water pipes and retaining screws removed, and the unit removed.

M.20 ELECTRO-MAGNETIC CLUTCH, REMOVE AND REFIT

> IMPORTANT
>
> The electro-magnetic clutch must be removed as detailed in this operation, otherwise irreparable damage to the clutch may result.

Electro-magnetic clutch, remove

1. Release the driving belt tension and remove the driving belt from the compressor pulley. Disconnect the lead off the magnetic clutch from the snap connector.
2. Remove the bolt and washer securing the compressor pulley to the crankshaft.
3. Screw a 5/8 in. UNC bolt into the thread provided in the pulley bore to extract the pulley from the crankshaft, and remove the extractor bolt.
4. Remove the four bolts and washers securing the magnetic clutch to the compressor crankcase. Remove the clutch and base plate assembly.

Electro-magnetic clutch, refit.

1. Reverse the removal procedure, but do not tighten the pulley securing bolt.
2. Connect the clutch lead to the positive terminal of a 12 volt battery and connect the compressor crankcase to the battery negative terminal. Connect the clutch lead into its snap connector in the loom and switch on the ignition and the air conditioning blower control. A wrench for holding the clutch is available from York Refrigeration Company.
3. With the clutch energised as in item 2, tighten the pulley securing bolt to 16 lb. ft. torque (2,2 kg.m.).

4. Disconnect the battery, or switch off the ignition, as applicable.

5. Refit the compressor driving belt, and adjust the driving belt tension. (See M.15).

M.21 CHARGING PROCEDURE

1. Prepare System

(a) Check that compressor oil level is $1\frac{1}{8}$ in. If necessary top up with Shell Clavus oil.

(b)1 DA209 Compressors
Remove protective cap from low pressure valve on compressor (bottom valve) and connect charging line. Valve is automatically opened, (ensure that rubber seals in charging line are in sound condition - replace if necessary).

(b)2 DA210 Compressors
Remove protective caps from lower pressure valve on compressor and connect charging line. Turn compressor inlet valve until midway between fully out and fully in.

2. Evacuate System

(a) Ensure that charging valve and vacuum pump valves are closed.

(b) Switch on mains.

(c) Switch on vacuum pump.

(d) Open vacuum pump valve.

(e) Whilst evacuation is taking place check that all pipe connections are fully tight, taking care not to strain evaporator and condenser connections. Fill charge cylinder with refrigerant. See Item 3.

(f) After about 5 minutes the vacuum gauge should read below 20 in. Hg., after 15 mins. 24 in. - 26 in. Hg., continue pump down for 20 mins.

(g) Close vacuum pump valve and switch off vacuum pump.

(h) Hold vacuum for 10 mins. Vacuum should not drop below 26 in. Hg. If vacuum drops below 26 in. Hg. check tightness of all connections and repeat item 2(c - h). If vacuum is held proceed with item 4 (a - f).

3. Fill Charge Cylinder (To be carried out whilst evacuating system).

(a) Open valve on bulk supply cylinder.

(b) Slowly open valve on side of trolley and observe refrigerant entering charge cylinder. Bleed off air on valve at top of charge cylinder.

IMPORTANT
Goggles must be worn to protect eyes from gas when carrying out bleeding operation.

(c) When required level (40 oz.) is reached close valve on side of trolley and close valve on bulk supply cylinder.

(d) Switch on heater.

(e) When temperature/pressure reading is 100°F/120 p.s.i. (indicated on gauge on top of charge cylinder) switch off heater.

4. Charging System

(a) Start engine and run at 1250 r.p.m.

(b) Turn heater control to '3', turn on compressor switch. Turn L.H. heater control fully anti-clockwise.

(c) Slowly open charge valve allowing gas to flow into the system (charging pressure not to exceed 40 p.s.i.).

(d) When gas level in charge cylinder has dropped to 15 oz. (25 oz. in system) check sight glass on receiver dryer, when clear (no bubbles apparent) close charge valve. Quantity of gas in system 25 - 28 oz.

(e) On DA210 compressors back-seat compressor inlet valve.

(f) Disconnect charging line and replace protective cap on compressor valve.

5. Check System

(a) Recheck sight glass on receiver/drier as in item 4d.

(b) Switch off engine and test for leaks with propane burner using a 1 in. long flame. Leaks are indicated by a yellow/green brilliant blue coloration. Place snifter tube underneath each joint as gas is heavier than air.

M.22 TEST PROCEDURE

Special Tools - Thermometer

On hot days a fan should be played on condenser, when windows and doors are open, for any test duration over five minutes.

Test Procedure.

1. Place the car in a ventilated, shaded area free from excessive draught, with the car doors and windows open.
2. Check that the surface of the condenser is not restricted with dirt, leaves, flies, etc. Do not neglect to check the surface between the condenser and the car radiator. Clean as necessary.
3. Switch on the ignition and the air conditioner blower. Check that the blower is operating efficiently at low, medium and high speeds.
4. Check that the evaporator condensate drains are open and clear.
5. Check the tension of the compressor driving belt, (see item M.15) and adjust if necessary.
6. Inspect all connections for the presence of refrigerant oil. If oil is evident check for leaks (see item M.21 5(b)) and repair as necessary. (The compressor oil is soluble in Refrigerant 12 and is deposited when the refrigerant evaporates from a leak.)
7. With the engine running, set the temperature control to maximum cooling (fully anti-clockwise) and switch the air conditioner blower control on and off several times, checking that the magnetic clutch on the compressor engages and releases each time.
8. With the temperature control at maximum cooling and the blower control at high speed, warm up the engine and fast idle at 1,000 r.p.m. Check the sight glass in the top of the receiver dryer for bubbles or foam. The sight glass should be generally clear after five minutes running, occasional bubbles being acceptable. Continuous bubbles may appear in a serviceable system on a cool day, or if there is insufficient air flow over the condenser at a high ambient temperature.
9. Repeat at 1,800 r.p.m.

10. Gradually increase the engine speed to the high range, and check the sight glass at intervals.

11. Check for frosting on the service valves and evaporator fins.

12. Check the high pressure pipes and connections by hand for varying temperature. Low temperature indicates a restriction or blockage at that point.

13. If the system is still suspect proceed to pressure test (item M.24).

M.23 FAULT DIAGNOSIS (Passenger Compartment)

Introduction

The following charts cover general fault diagnosis from symptoms encountered in the passenger compartment. Continue with pressure check diagnosis for suspected faults in the refrigeration system.

If a fault is suspected in the refrigeration system, it is recommended that the test procedure (item M.22) is carried out. Symptoms that are apparent during this test can be located in this section, and appropriate additional tests and remedies performed.

General Fault Diagnosis

Control Position	Symptom	Possible Cause	Remedy
RH control 'OFF' LH control Blue	1. Cold air leak to foot level	Fresh air flap open:	
		(a) Control not venting	Change control
		(b) Linkage between vacuum motor and flap valve jammed	Remove unit and rectify
		(c) Vacuum pipes crossed at control	Remove control, check pipes
	2. Blower motor operates	(a) Switch broken	Change RH control

Control Position	Symptom	Possible Cause	Remedy
	21. Air temperature gradually decreases	Leaking water valve:	
		(a) Control venting	Change control
		(b) Water valve faulty	Remove unit and change water valve
		(c) Vacuum supply fails	Replace pipe as necessary
		(d) Leaking hose	As 17 (e)

M.24 PRESSURE TEST

Special Tool - Valve Key - Compound and High Pressure Gauges

Pressure Test

1. Connect compound gauge to suction valve on compressor and high pressure gauge to discharge valve.
2. Run the engine at 1,000 - 1,200 r.p.m. with the air conditioner blower at high speed and the temperature control at normal cooling operating position (half of cooling movement)
3. At normal shop temperatures 65 - 70°F check the high pressure gauge reading - discharge side - discharge 190 - 210 lbf./in.^{2}, suction 35 - 45 lbf/in.^{2}.

   The pressure gauge readings will vary within the range quoted with the rate of flow of air over the condenser, the higher readings resulting from a low air flow. It is advisable to place a fan for additional air flow over the condenser if the system is to be operated for a long time. Always use a fan if temperatures are over 80°F so that consistent analysis can be made of readings.
4. Stop the engine, back-seat both service valves (fully counter-clockwise) and disconnect the gauges.
5. Refit the protection caps to the valve stems and gauge connections on the charging station.

Control Position	Symptom	Possible Cause	Remedy
RH control 1 LH control Blue	3. Blower motor does not run	(a) Fuse blown (b) Wire off switch terminal (c) Resistor's failed (d) Lead not connected to motor inside unit (e) Switch failed	Find reason and change fuse Remove switch, replace wire Remove unit and replace resistor's Remove unit and replace lead Replace RH control
	4. Blower motor runs at high speed	(a) Switch wiring incorrect (b) Check loom connections all round for crossing leads	Check and rectify
	5. Unit runs but rattles and/or delivers no air	(a) Motor faulty (b) Runner has come off motor spindle (c) Motor running backwards	Remove unit and replace motor Remove unit, replace and tighten runner Reverse motor leads
	6. Unit delivers uncooled air	Compressor not engaged: (a) Clutch defective (b) Wiring fault in switch or clutch (c) Thermostat contacts failed (d) Vee-belt broken or slack (e) High pressure switch failed (f) Restriction in pipe (g) Compressor faulty (h) Condenser dirty or blocked (HP switch cuts out)	Replace Trace and rectify Remove unit and replace Replace or tighten Replace Locate restriction and change pipe, recharge Change and re-charge Clean or replace

Control Position	Symptom	Possible Cause	Remedy
RH control 1 LH control Blue (cont.)	6. Unit delivers uncooled air (cont.)	(i) Blocked expansion valve (HP switch cuts out)	Change valve and recharge
		(j) Expansion valve capillary damaged	Change valve and recharge
		(k) Capillary not touching evaporator outlet pipe	Tighten spring clip
		Compressor engaged:	
		(l) Complete loss of charge	Find leak and recharge
		(m) Low charge due to leak (look for bubbles in sight glass)	Find leak and recharge
		(n) Liquid receiver connected wrong way round	Reverse
		Outboard outlet warmer than inboard:	
		(o) Air is passing between evaporator and evaporator case	Seal all such air leaks
	6A. Unit delivers heated air to feet	Water valve not working: (p) as 15 (a-c)	
RH control 2	7. Blower motor runs at high or low speed	(a) Switch faulty	Change RH control
		(b) Incorrect connections	Check and rectify
	8. Unit delivers uncooled air	As 6(a) to (m)	
RH control 3	9. Blower motor runs at low or medium speed	As 7(a) (b)	
	10. Unit delivers uncooled air	As 6(a) to (m)	

Control Position	Symptom	Possible Cause	Remedy
LH control Blue	11. Unit delivers uncooled air	As 6(a) to (m)	
RH control 3 for rest of checks	12. Air not cooled to maximum, also fumes enter car	Fresh air valve is open: (a) Piping incorrect	Check piping
Rotate LH control blue through green	13. Air remains at maximum coldness	(a) Thermostat not working (b) Thermostat vacuum motor locking (c) Thermostat vacuum not connected at control or motor (d) Vacuum pipes crossed at control (e) Capillary has become detached from evaporator fins	Replace Remove unit Check and replace Check and rectify Remove unit, replace
	14. Air not cooled sufficiently	(a) Air from bonnet leaking to suction side of air circuit	Find leak and seal
Rotate LH control yellow through red	15. Very cold air comes out of foot level outlets	Water valve not working: (a) Vacuum pipe off valve (b) Water valve broken (c) Vacuum pipe off control	Replace Remove unit and replace Remove control and replace
	16. Air is diverted to screen before 'DEFROST' position is reached	(a) Defrost valve motor leaking (b) Vacuum pipes crossed	Replace motor Remove control and rectify

Control Position	Symptom	Possible Cause	Remedy
Rotate LH control yellow through red (cont.)	17. Air does not increase in temperature as control is rotated clockwise	Water valve not opening: (a) Vacuum pipe off valve or control (b) Water valve faulty (c) Control has vacuum leak (d) Water valve capillary not in position (e) Water hose leaking	 Trace and rectify Remove unit and change valve Change control Remove unit, assembly capillary correctly Trace leak. Tighten clip or replace hose
	18. Air increases temperature to maximum instantly as control is rotated slightly clockwise	Water valve opening fully and not metering: (a) Control applying full vacuum (b) Water valve broken	 Check control Remove unit and replace valve
	19. During normal heating, windows mist up	Compressor has disengaged: (a) Compressor clutch faulty (b) Wiring fault, switch or clutch (c) Vee-belt broken or slipping (d) High pressure switch failed (e) Condenser blocked	 Replace clutch Trace and rectify Replace or adjust Replace switch Clean
Rotate LH control into 'DEFROST' position White	20. Airflow not diverted to screen	Defrost valve not closing: (a) Linkage sticking (b) Vacuum pipes crossed (c) Vacuum motor faulty	 Remove unit and adjust flap Remove control and rectify Replace motor

M.25 FAULT DIAGNOSIS - continued

Refrigeration System

Symptom	Possible Cause	Test and remedy
A. Compressor discharge pressure too high	1. Engine overheated	1. See section L
	2. Condenser air flow blocked	2. Thoroughly clean the condenser and radiator surfaces, including the space between them
	3. Discharge service valve partially closed	3. Fully back-seat the discharge service valve
	4. Restrictions in high pressure flexible connections, pipes or components	4. Evident to the touch by cold spot at the restriction. Remove, inspect, clean or replace as necessary. See items 8, 9 and 10
	5. Too much lubricating oil in system	5. Check compressor oil level (item M.14)
	6. Overcharge of refrigerant	6. Discharge some refrigerant by opening the high pressure gauge valve a. If discharge pressure drops slowly it indicates excessive refrigerant. Depressurise with system working until bubbles appear in sight glass, then add 4 fluid ounces of refrigerant b. If discharge pressure drops rapidly it indicates air and possible moisture in the system. See item 7

Symptom	Possible Cause	Test and remedy
A. Compressor discharge pressure too high (cont.)	6. Overcharge of refrigerant (cont.)	c. If discharge pressure remains high there is a restriction in the high pressure side of the system. See items 3, 8, 9 and 10
	7. Air in system	7. Pour cold water on the condenser. If there is excessive refrigerant the discharge pressure will momentarily fall. If the pressure remains high suspect air in the system. Evacuate the system. (item M.21) and recharge with refrigerant.
	8. Restriction at expansion valve	8. Feel the valve body and pipes with the hand The inlet pipe to the evaporator should feel warm, whereas a restriction will cause a cold line Depressurise the system remove and flush the expansion valve
	9. Restriction in the condenser	9. Remove, inspect, clean or replace condenser
	10. Restriction in receiver-dryer	10. Replace receiver dryer
	11. Compressor suction pressure too high	11. See 'Suction pressure too high'. Symptom F
	12. Condenser fan inoperative	12. Check fan motor, wiring and Ranco switch (cut in 220 lbf./in^2, cut out 180 lbf./in^2, both $\pm$10 lbf./in^2)

Symptom	Possible Cause	Test and remedy
B. Fluctuation of discharge pressure	1. Moisture in expansion valve	1. Alternate high and low readings of the high pressure gauge, together with a low reading of the compound gauge, indicate moisture in the expansion valve, causing internal icing. Depressurise the system, remove, flush and dry out the expansion valve. Replace the receiver-dryer. Evacuate the system for at least 20 minutes. Recharge with refrigerant and re-test
C. Compressor discharge pressure too low	1. Insufficient refrigerant because of low initial charge or leak in system	1. Check the sight glass for bubbles or foam after five minutes running. If bubbles persist check the system for leaks (see M.21(5)). If no leaks are evident, add refrigerant until sight glass clears then add additional ¼ fluid ounces
	2. Compressor defective	2. Slowly front-seat the suction valve fully clockwise. If vacuum is applied too quickly the residual oil may be drawn out. The compound gauge should quickly record a high vacuum. If not,

Symptom	Possible Cause	Test and remedy
C. Compressor discharge pressure too low (cont.)	2. Compressor defective (cont.)	the compressor valves, head plate, pistons, etc. are suspect. Remove and examine compressor
	3. Compressor suction pressure too low	3. See 'Suction pressure too low', Symptom E
D. Compressor cycles too frequently	1. High heat load system overloaded	1. High pressure cut-out switch operating as normal, causing the compressor to cut out. Reduce the heat load and/or improve condenser cooling
	2. Intermittent electrical fault in compressor supply	2. Check electrical wiring, relay, switches, etc.
	3. High pressure switch faulty	3. Operate the system under high heat load condition with manifold gauge set fitted, temperature control and blower at maximum, and ventilation to the condenser restricted. Discharge pressure should rise to 300 lb. ± 10 lb./p.s.i. before the high pressure switch operates. Cut-in pressure should be 40 lb. below cut-out pressure. Replace switch if operating below these figures

Symptom	Possible Cause	Test and remedy
E. Suction pressure too high	1. Thermal bulb of expansion valve loose on evaporator outlet, or capillary tube broken	1. The expansion valve will show signs of frosting. Clean the contact areas and refit the capillary tube or replace the expansion valve if the capillary is broken
	2. Expansion valve faulty	2. If this is combined with a low reading of the high pressure gauge and the sight glass is clear, replace the expansion valve
	3. Overcharge of refrigerant	3. See symptom A, item 6
F. Suction pressure too low	1. Restriction in high pressure lines, flexible connections or components	1. Evident to the touch by cold spot at point of restriction. See Symptom A, items 3, 4, 8, 9 and 10
	2. Suction service valve partially closed	2. Fully back-seat the suction service valve
	3. Leak in system	3. See Symptom C, item 1
	4. Capillary tube of expansion valve broken or faulty	4. Wrap the capillary tube with a warm hand, this should cause the expansion valve to flood and give a high suction pressure. If pressure does not rise replace the expansion valve.
	5. Insufficient refrigerant	5. See Symptom C, item 1.

M.5A CONTROLS AND OPERATION (See Fig M.2A)

There are two heater controls mounted at the base of the switch panel. These are: (A) Heater master switch, RAM air, and blower speed switch. (B) Temperature and distribution control.

As the master switch (A) controls not only the electrical circuits but also the vacuum system operating the flap valve on the air intake, it is essential that this switch is operated before the heater will function. In addition to the heater OFF position, the three positions provide for RAM air, and slow or fast fan operation.

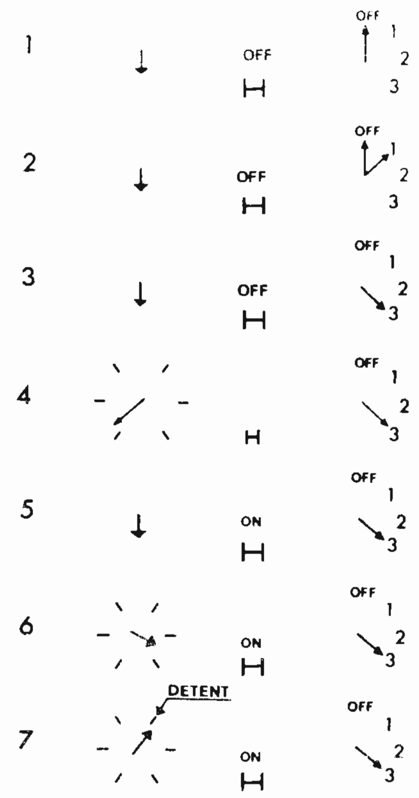
The temperature and distribution control (B) regulates the temperature of the air entering the car. Cold or ambient temperature is obtained when the pointer is set to the BLUE sectors, and warm or hot air when the pointer is set to the ORANGE OR RED sectors. Clockwise rotation of the temperature control over the orange and red sectors results in progressive temperature increase. Turning the control fully clockwise, to bring the pointer opposite the DEF sector, will give maximum temperature with all air directed to the windscreen for de-frost or de-mist. Should it be desirable to close the flap valve in the air intake to prevent exhaust fumes from entering the car in heavy traffic conditions, the temperature control should be turned fully anti-clockwise.

A system, entirely independent of the heater, provides for additional ventilation in the car, and operates as follows:-

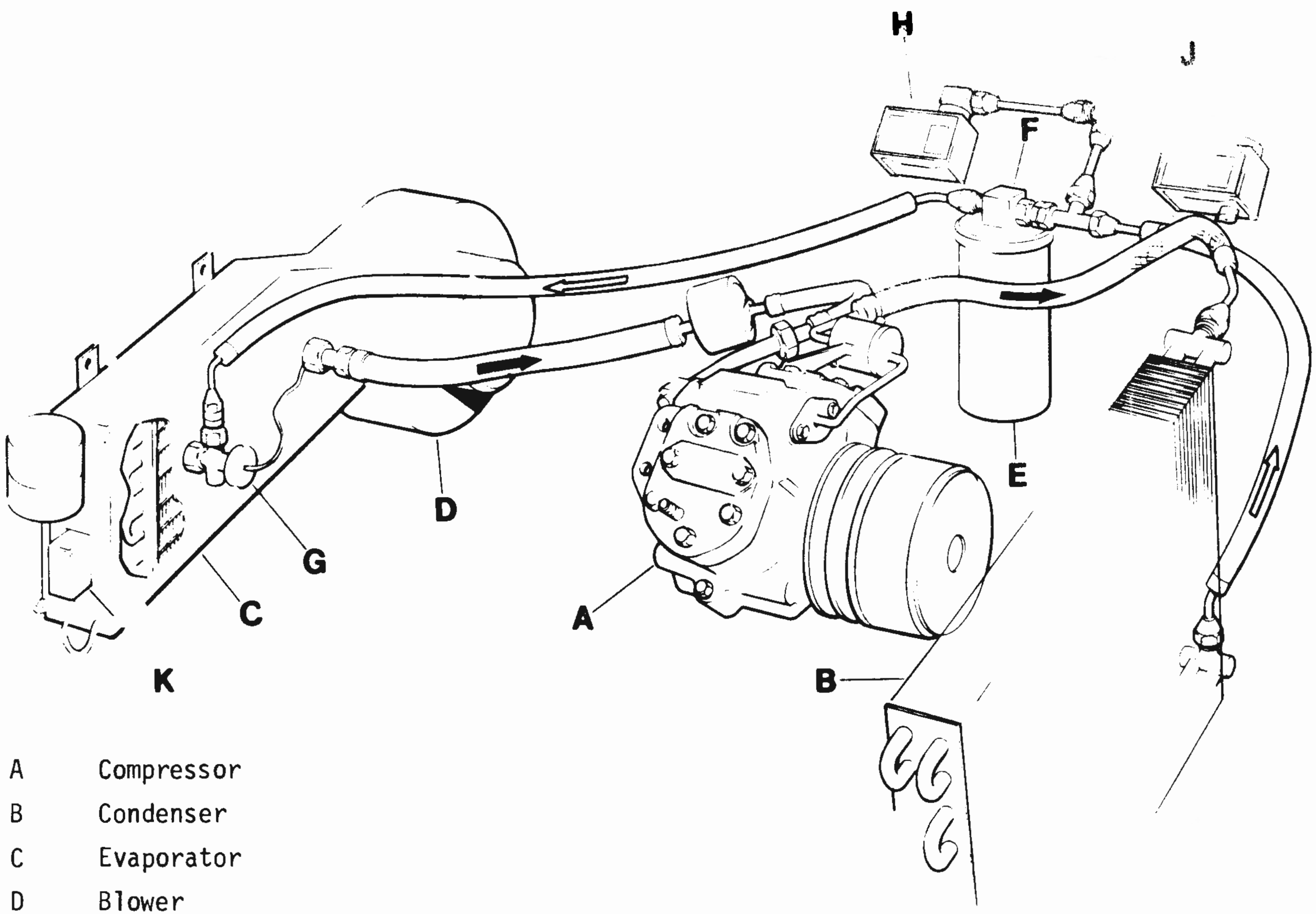
Directional ventilation

Four adjustable vents are provided. The flow of air from these vents is controlled by the integral valves which are opened and closed by a rotary motion of the central knob. Boosting is effected by use of the main fan.

M.6A CHECKING HEATING SYSTEM (Engine idling) Fig. M3A



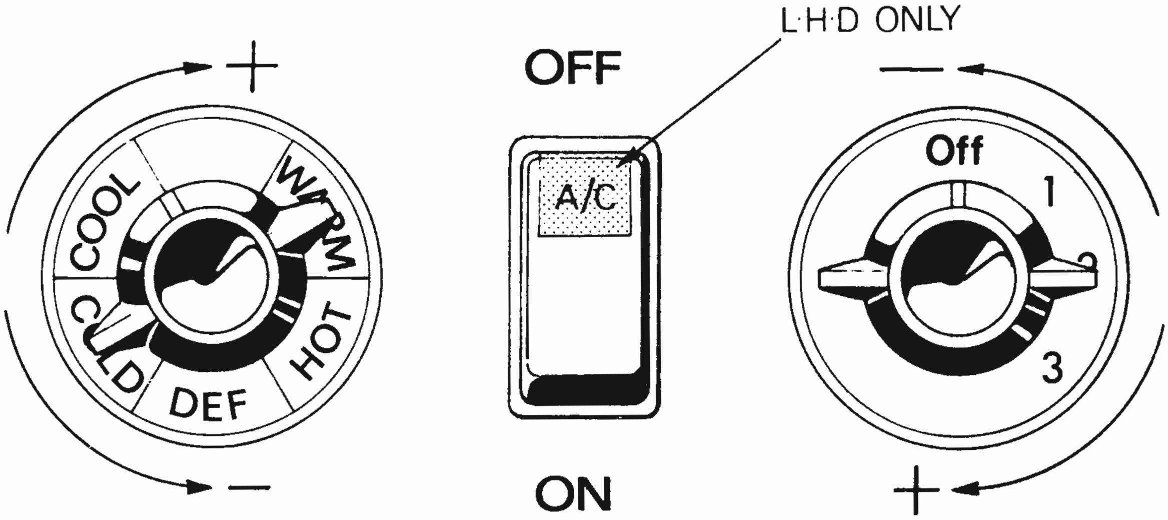
1. Re-circulation valve shut (flap fully forward). Blower off.
2. Switch on and off a number of times to check re-circulation valve movement.
3. Re-circulation valve open (flap fully rearwards). Two steps of blower speed at 2 and 3. All interior air (hot) to four de-frost outlets.
4. Cold air to interior. Re-circulation valve open (fully rearwards).
5. Face level air, two front and two rear, should be cold.
6. Slight bleed to de-frost outlets.
7. Slight bleed to de-frost outlets.



A	Compressor
B	Condenser
C	Evaporator
D	Blower
E	Receiver-arier
F	Sight glass
G	Expansion valve
H	High pressure cut-out switch
J	Cut-in switch
K	Cold thermo-control

Fig. MA.1A Air conditioning system.

M.10A AIR CONDITIONING CONTROLS



A blower motor mounted on the front bulkhead draws ambient air through the scuttle intake on minimum air conditioning, and re-circulating air, through the grille on the passenger's side of the facia, on full air conditioning. The air is cooled by passing through the evaporator unit, and is then expelled through louvres into the car interior.

The air flow is activated by a blower motor having two speeds. The motor is controlled by the right-hand knob (A) on the panel. From the 'OFF' position, clockwise rotation gives 'RAM' air, low speed, and high speed. With the knob in the 'OFF' position, the whole system is cut off. Always switch off the blower before attempting to start the engine.

The left-hand control knob (B) regulates the thermostat, which gives the required air temperature. To select the lowest temperature, the control knob pointer should be set at the lowest part of the blue sector. From this position, clockwise rotation of the knob will progressively raise the temperature. As the knob pointer passes from green to orange, the cooling system is isolated, and the heating system takes over.

The knob which controls the temperature, simultaneously controls the air distribution. At maximum temperature setting, the pointer is opposite the sector marked DEF, this being the 'full demist' position.

When the refrigeration system is to be used, the engine must be running, as the refrigerant compressor is driven by the engine.

The tumbler switch (C), between the control knobs, is an overriding switch for the compressor, and is in the 'ON' position when the serrated portion of the switch is flush with the panel. On L.H.D. cars only, the switch incorporates a blue light for identification in the dark. The light will illuminate when the panel lights are switched on.

Since cool air is available within the car, it is not necessary to open the windows during hot weather, and occupants can travel free from draughts, noise, and the ingress of dust, etc. Indeed, for assisting the refrigeration to function efficiently, it is recommended that the windows be kept closed.

The air conditioning system will be most effective if the following recommendations are taken:-

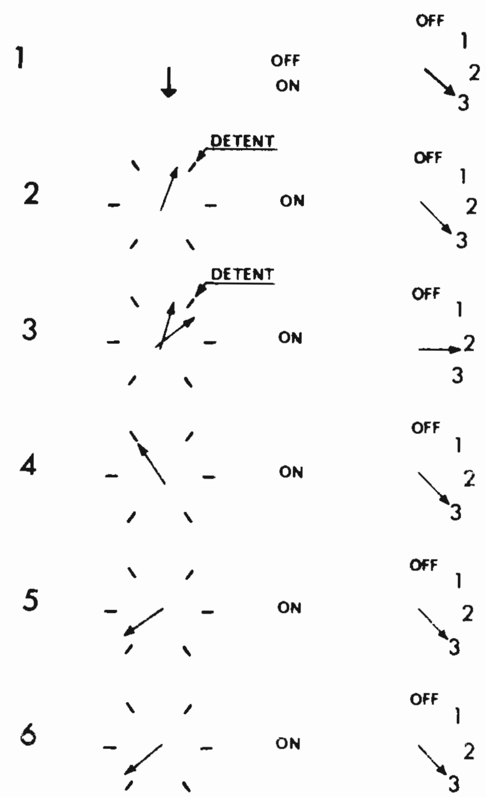
1. Always switch off the blower before attempting to start the engine.
2. If the car is heat-soaked, and very hot inside, wind down the windows. Immediately after the engine has started, select No. 3 blower position, and expel the hot air. After two or three minutes, wind up the windows so that the air from the air conditioning system will become cooler to achieve a comfortable temperature.

3. If at any time the air flow diminishes from the air outlet, the system should be operated for a few minutes with the pointer of the temperature control knob (B) turned to twelve o'clock. This will prevent ice build-up on the evaporator core.

Ducting

The ducting used in a car with refrigeration is similar to that normally fitted, a single blower motor being used in both cases.

M.11A CHECKING AIR SYSTEM (Engine idling) Fig. MA.3A

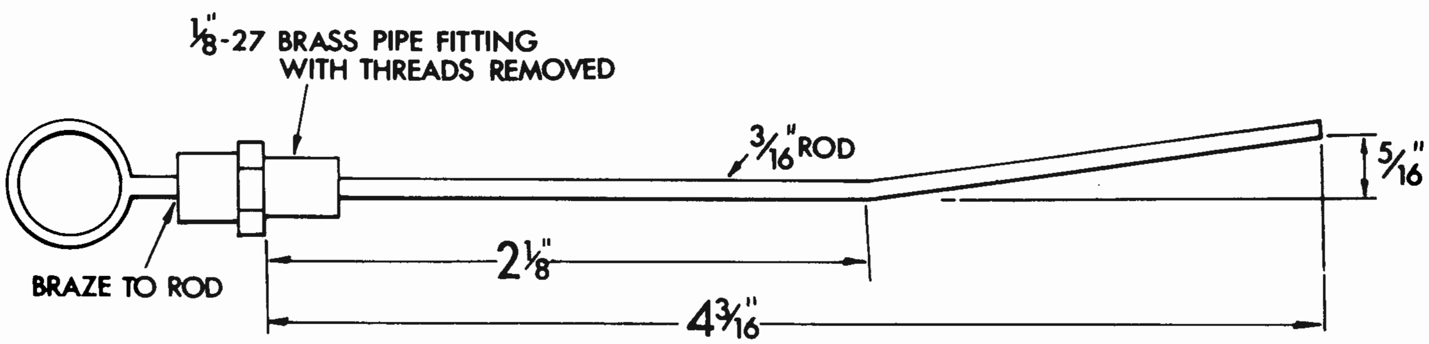


1. Operate switch a number of times. Compressor clutch should engage and disengage freely. Check for excessive compressor noise at 1500 and 3000 rev./min.
2. Temperature switch fully up.
3. Turn knob across detent several times. Check the compressor clutch engages and disengages.
4. Cold air to interior. Temperature switch lever mid-way. Re-circulation valve open (flap fully rearwards).
5. Cold air to interior. Temperature switch lever fully down. Re-circulation valve shut (flap forward).
6. Disconnect two fans. Check that compressor clutch disengages. (engine 1500 rev./min).

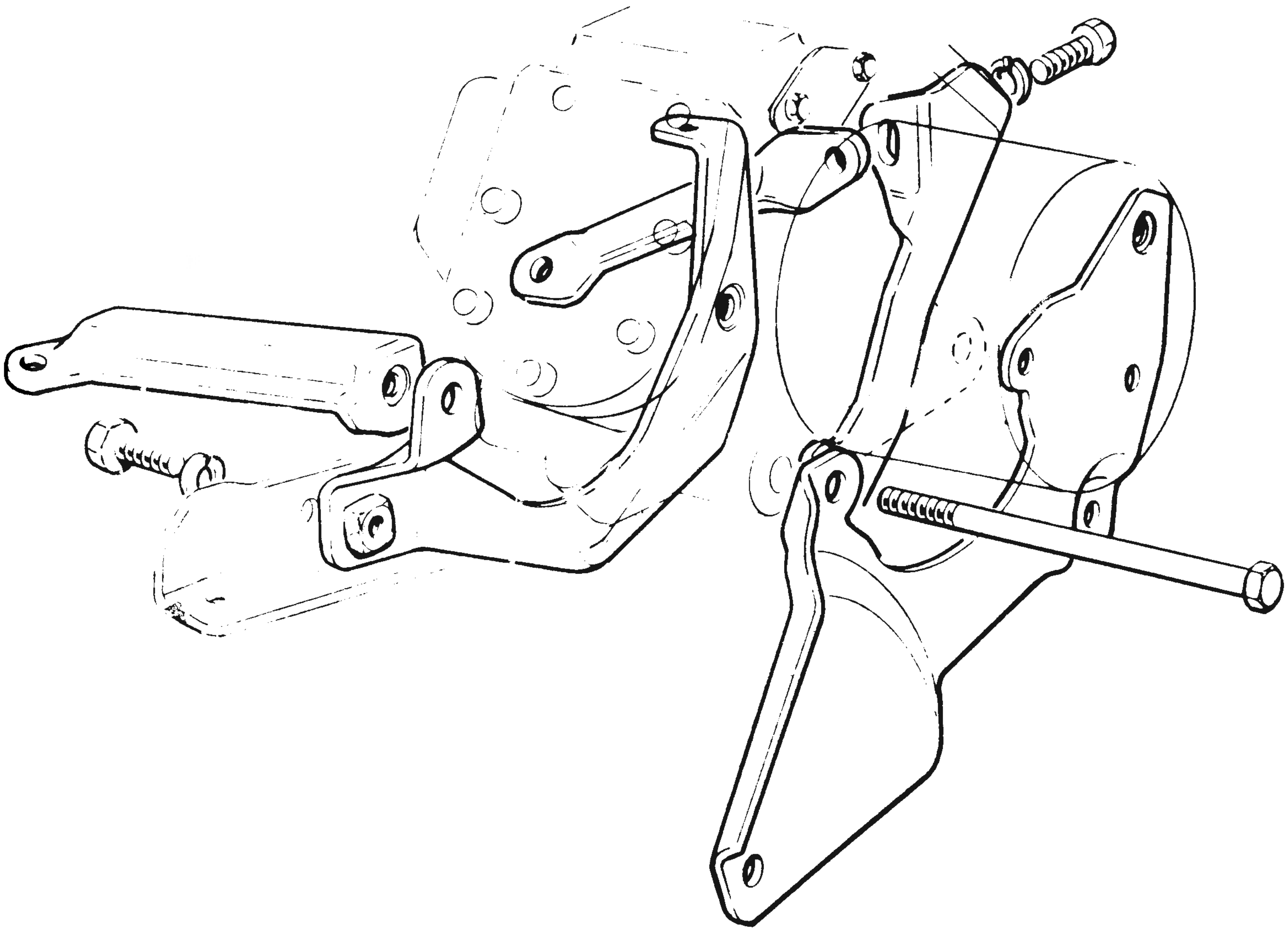
   Note: Cut-in pressure 220 lb./sq.in. (15,46 kg./sq.cm.).
   Differential 40 lb./sq.in. (2.81 kg./sq.cm.).

   Note: Cut-out pressure 300 lb./sq.in. (21.1 kg./sq.cm.)
   Differential 40 lb./sq.in. (2.81 kg./sq.cm.)

M.14A	CHECKING OIL LEVEL IN COMPRESSOR	See Chrysler Manual
M.15A	COMPRESSOR DRIVING BELT TENSION, TO ADJUST	See Chrysler Manual
M.20A	ELECTRO-MAGNET CLUTCH, REMOVE AND REFIT	See Chrysler Manual
m.21A	CHARGING PROCEDURE	See Chrysler Manual



COMPRESSOR DIPSTICK DETAILS



DETAILS OF COMPRESSOR MOUNTING
BRACKETS AND BOLTS.

M.22A TEST PROCEDURE

Special tools - Thermometer

On hot days a fan should be played on the condenser, when windows and doors are open, for any test with a duration exceeding five minutes.

Test procedure.

1. Place the car in a ventilated, shaded area free from excessive draught, with the car doors and windows open.
2. Check that the surface of the condenser is not restricted with dirt, leaves, flies, etc; do not neglect the surface between the condenser and the radiator. Clean as necessary.
3. Switch on the ignition, and the air conditioning blower. Check that the blower is operating efficiently at low and high speeds.
4. Check that the evaporator condensate drains are open and clear.
5. Check the tension of the compressor driving belt, (see item M.15) and adjust if necessary.
6. Inspect all connections for the presence of refrigerant oil. If oil is evident, check for leaks (see item M.21A 5(b)), and repair as necessary. (The compressor oil is soluble in Refrigerant 12, and is deposited when the refrigerant evaporates from a leak).
7. With the engine running, set the temperature control to maximum cooling (fully anti-clockwise), and switch the air conditioning blower control on and off several times, checking that the magnetic clutch on the compressor engages and releases each time.
8. With the temperature control at maximum cooling, and the blower control at high speed, warm up the engine, and fast idle at 1000 rev./min. Check the sight glass in the top of the receiver dryer for bubbles or foam. The sight glass should be generally clear after five minutes running, occasional bubbles being acceptable. Continuous bubbles may appear in a serviceable system on a cool day, or if there is insufficient air flow over the condenser at a high ambient temperature.
9. Repeat at 1800 rev./min.

10. Gradually increase the engine speed to the high range, and check the sight glass at intervals.
11. Check for frosting on the service valves, and evaporator fins.
12. Check the high pressure pipes, and connections, by hand for varying temperature. Low temperature indicates a restriction or blockage at that point.
13. If the system is still suspect, proceed to pressure test (item M.24).

M.23A FAULT DIAGNOSIS (Passenger Compartment)

Introduction

The following charts cover general fault diagnosis from symptoms encountered in the passenger compartment. Continue with pressure check diagnosis for suspected faults in the refrigeration system.

If a fault is suspected in the refrigeration system, it is recommended that the test procedure (item M.22A) is carried out. Symptoms that are apparent during this test can be located in this section, and appropriate additional tests and remedies performed.

General fault diagnosis.

Control Position	Symptom	Possible Cause	Remedy
RH control 'OFF' LH control Blue	1. Blower motor operates	(a) Switch broken	Change RH control
RH control 2 LH control Blue	2. Blower motor does not run	(a) Fuse blown	Find reason and change fuse
		(b) Wire off switch terminal	Remove switch, replace wire
		(c) Resistor's failed	Remove unit and replace resistor's
		(d) Lead not connected to motor inside unit	Remove unit and replace lead
		(e) Switch failed	Replace RH control
	3. Blower motor runs at high speed	(a) Switch wiring incorrect	Check and rectify
		(b) Check loom connections all round for crossing leads.	
	4. Unit runs but rattles and/ or delivers no air	(a) Motor faulty	Remove unit and replace motor
		(b) Runner has come off motor spindle	Remove unit, replace and tighten runner
		(c) Motor running backwards.	Reverse motor leads

Control Position	Symptom	Possible Cause	Remedy
	5. Unit delivers uncooled air	Compressor not engaged:	
		(a) Clutch defective	Replace
		(b) Wiring fault in switch or clutch	Trace and rectify
		(c) Thermostat contacts failed	Remove unit and replace
		(d) Vee-bolt broken or slack	Replace or tighten
		(e) High pressure switch failed	Replace
		(f) Restriction in pipe	Locate restriction and change pipe, re-charge.
		(g) Compressor faulty	Change and re-charge
		(h) Condenser dirty or blocked (HP switch cuts out)	Clean or replace
		(j) Blocked expansion valve. (HP switch cuts out)	Change valve and re-charge
		(k) Expansion valve capillary damaged	Change valve and re-charge
		(l) Capillary not touching evaporator outlet pipe	Tighten spring clip
		Compressor engaged:	
		(m) Complete loss of charge	Find leak and re-charge
		(n) Low charge due to leak (look for bubbles in sight glass)	Find leak and re-charge
		(p) Liquid receiver connected wrong way round	Reverse

Control Position	Symptom	Possible Cause	Remedy
		Outboard outlet warmer than inboard:	
		(q) Air is passing between evaporator and evaporator case	Seal all such air leaks
RH control 3	6. Blower motor runs at low speed	(a) Switch faulty	Change RH control
		(b) Incorrect connections	Check and rectify
	7. Unit delivers uncooled air	As 5 (a) to (n)	
LH control Blue RH control 3.	8. Unit delivers uncooled air	As 5 (a) to (n)	
for rest of checks.	9. Air not cooled to maximum also fumes enter car	Fresh air valve is open:	
		(a) Piping incorrect	Check piping
Rotate LH control blue through green	10. Air remains at maximum coldness	(a) Thermostat not working	Replace
		(b) Thermostat vacuum motor locking	Remove unit
		(c) Thermostat vacuum not connected at control or motor	Check and replace
		(d) Vacuum pipes crossed at control	Check and rectify
		(e) Capillary has become detached from evaporator fins.	Remove unit, replace
	11. Air not cooled sufficiently	(a) Air from bonnet leaking to suction side of air circuit	Find leak and seal
Rotate LH control orange through red	12. Air is diverted to screen before "DEFROST" position is reached.	(a) Defrost valve motor leaking	Replace motor
		(b) Vacuum pipes crossed	Remove control and rectify
	13. Air does not increase in temperature as control is rotated clockwise	Water valve not opening:	
		(a) Vacuum pipe off valve or control	Trace and rectify
		(b) Water valve faulty	Remove unit and change valve.

Control Position	Symptom	Possible Cause	Remedy
		(c) Control has vacuum leak	Change control
		(d) Water valve capillary not in position	Remove unit, Assemble capillary correctly.
		(e) Water hose leaking	Trace leak. Tighten clip or replace hose.
	14. Air increases temperature to maximum instantly as control is rotated slightly clockwise.	Water valve opening fully, and not metering:	
		(a) Control applying full vacuum	Check control
		(b) Water valve broken	Remove unit and replace valve
	15. During normal heating, windows mist up	Compressor has disengaged:	
		(a) Compressor clutch faulty	Replace clutch
		(b) Wiring fault, switch or clutch	Trace and rectify
		(c) Vee-bolt broken or slipping	Replace or adjust
		(d) High pressure switch failed	Replace switch
		(e) Condenser blocked	Clean
Rotate LH control into "DEFROST" position	16. Airflow not diverted to screen	Defrost valve not closing:	
		(a) Linkage sticking	Remove unit and adjust flap.
		(b) Vacuum pipes crossed	Remove control and rectify
		(c) Vacuum motor faulty	Replace motor
	17. Air temperature gradually decreases	Leaking water valve:	
		(a) Control venting	Change control.
		(b) Water valve faulty	Remove unit and change water valve
		(c) Vacuum supply fails	Replace pipes as necessary.
		(d) Leaking hose	As 13 (e)

M.24A PRESSURE TEST - See Chrysler Manual

SECTION N
WORKSHOP MANUAL
INTERCEPTOR & FF

INSTRUMENTS & ELECTRICAL SYSTEMS
INDEX

N.27 BRIEF DESCRIPTION

The 12v 69 AH battery has a negative earth and is maintained by an alternator. The alternator is fundamentally an AC current generator, with six built-in silicon rectifiers that convert AC current into DC current. Output voltage is controlled by a regulator.

The ignition, starting and charging systems are all of Chrysler origin and full servicing particulars are given in the appropriate Chrysler Manual.

Four headlamps are mounted in the radiator grille, these being of the quartz halogen type. Bulbs are fitted to all cars except those to federal specification where the units are sealed beam. The outer pair of lamps operate as main and dipped beams, the inner pair main beam only. The lighting equipment includes side, tail, stop, flasher, reversing lights with side repeater lamps for the flasher, and on federal cars, side marker lamps.

A switch and wiring to the front bumper for auxiliary lamps is provided.

A pair of electric horns are operated by a horn push in the centre of the steering wheel and via a relay. Air horns can be fitted in addition to the electric horns (standard on left-hand drive cars) and are operated via a change-over relay with a switch on the facia.

Interior equipment includes: courtesy light operated either by opening the doors or by an overriding switch, electric clock, razor/charging point, cigar lighter and radio.

Variable speed windscreen wipers of the self-parking type incorporate electrically operated screen washers.

The instruments are electrically operated through a voltage stabilizer and include, a tachometer and gauges for fuel, oil pressure, coolant temperature and voltage condition of the battery. There are seven warning lights.

Electric window winders are fitted to both doors and a red warning light appears in the rear door edge when the door is opened. Cars to federal specifications are fitted with a key removal warning buzzer in the left-hand door.

Boot and bonnet lights are fitted together with a flexible arm inspection lamp under bonnet.

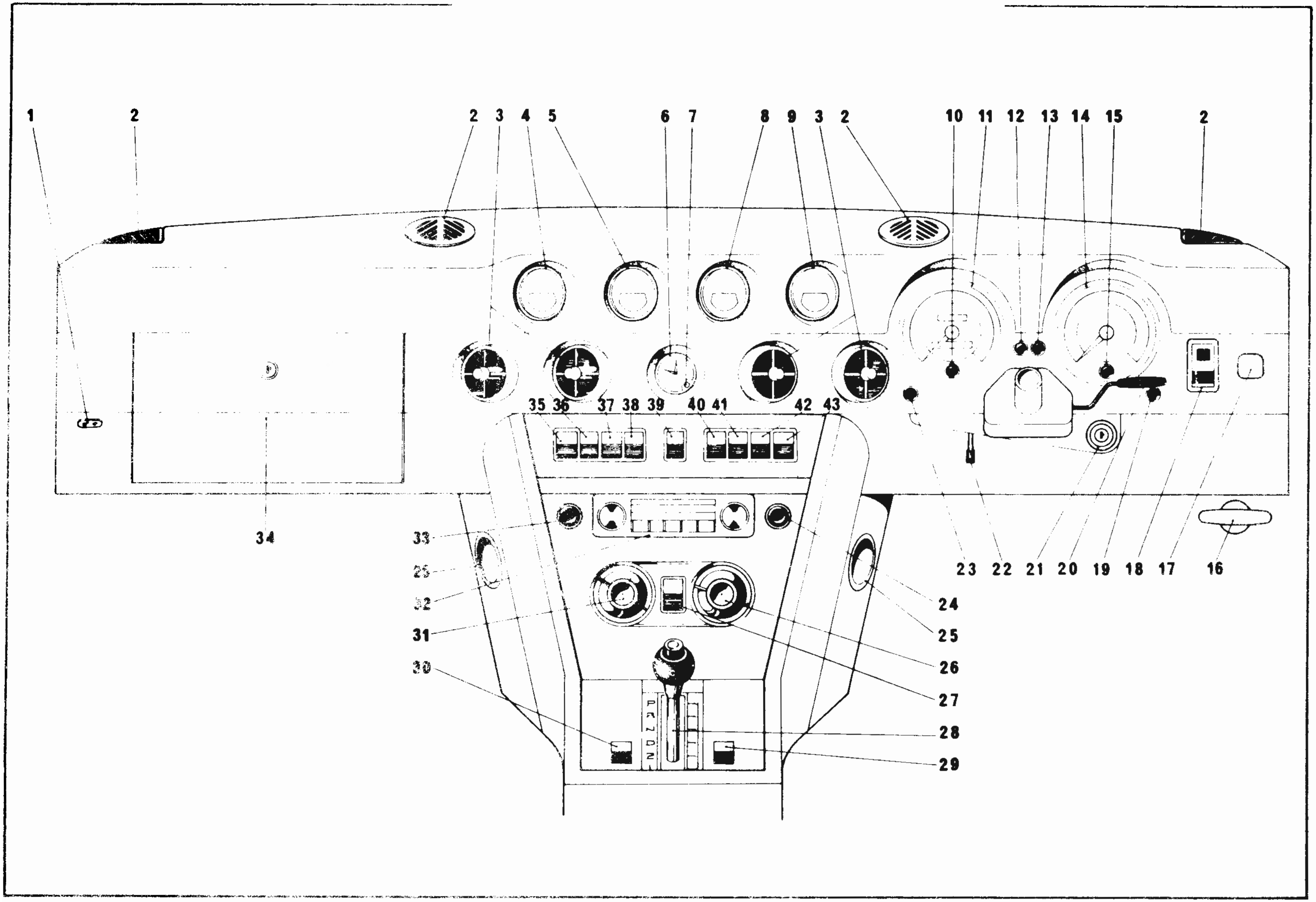


Fig. N.5 Controls and Instruments

1. Battery charging socket.
2. Demist duct.
3. Face level directional vent.
4. Voltmeter.
5. Fuel gauge.
6. Electric clock.
7. Hand adjusting knob.
8. Oil pressure gauge.
9. Engine coolant temperature gauge.
10. Main beam warning light (Blue).
11. Speedometer.
12. Oil pressure warning light (Red).
13. Fuel flap warning light (Red).
14. Tachometer.
15. Low fuel warning light (Amber).
16. Bonnet release.
17. Windscreen wipers/ washers.
18. Handbrake and fluid level warning light (Red).
19. Turn indicator warning light (Green).
20. Turn indicator and headlamp flasher switch.
21. Ignition/starter switch and steering lock.
22. Trip winder.
23. Turn indicator warning light (Green).
24. Speaker balance control.
25. Air duct.
26. Blower motor control.
27. Compressor overriding switch (air conditioning only).
28. Gear lever.
29. Window lift (R.H.).
30. Window lift (L.H.).
31. Temperature and distribution control.
32. Radio or tape record player.
33. Cigar lighter.
34. Glove box.
35. Hazard warning switch.
36. Spotlight switch.
37. Parking lights switch.
38. Fuel filler flap control.
39. Antenna switch.
40. Horn selector switch.
41. Heated backlight switch.
42. Panel lights switch.
43. Lights switch.

Fig. N.5 Controls and Instruments

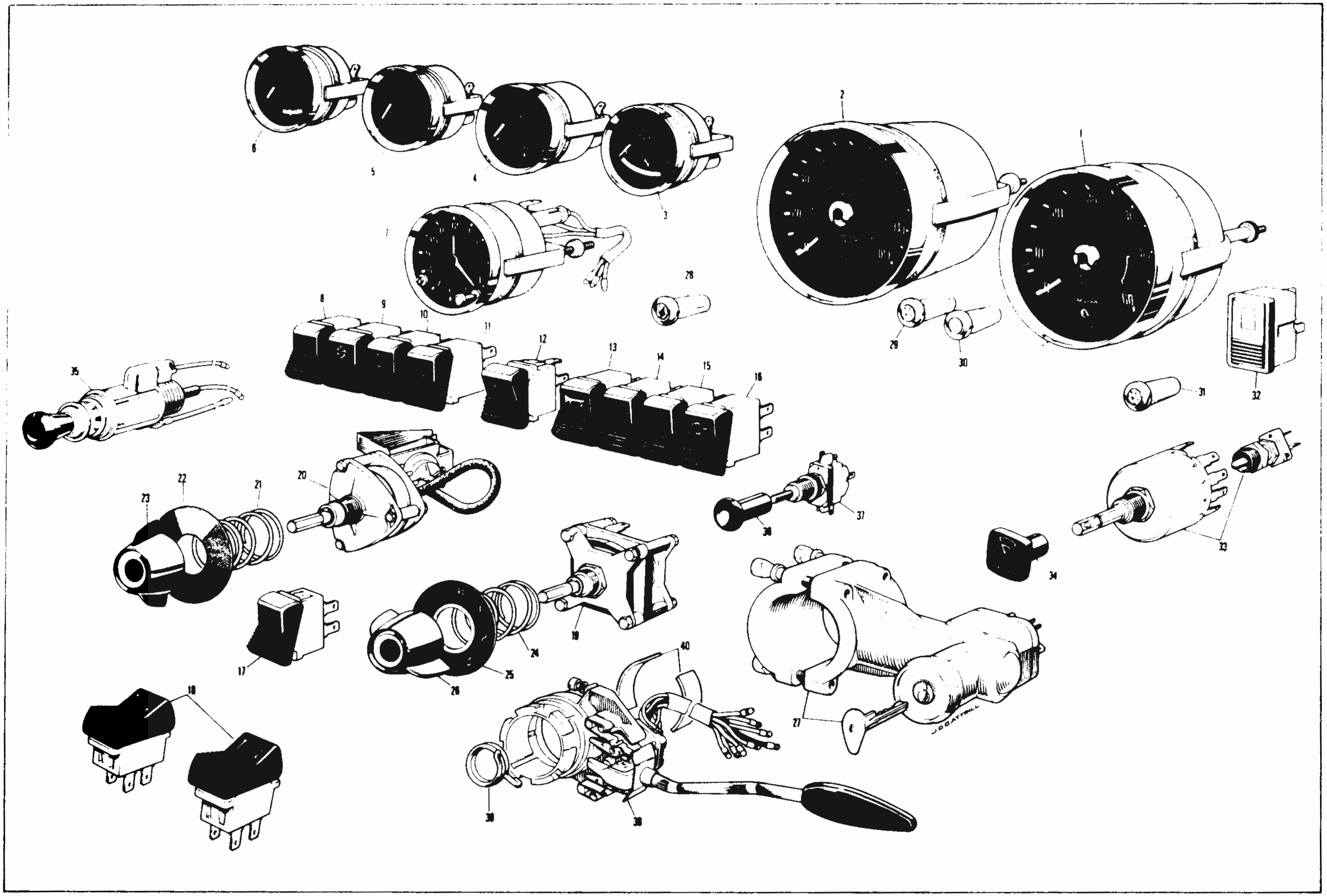


Fig. N.6 Instruments and Facia Lay-out

1. Tachometer.
2. Speedometer.
3. Engine coolant temperature gauge.
4. Oil pressure gauge.
5. Fuel gauge.
6. Voltmeter.
7. Electric clock.
8. Hazard warning switch.
9. Spotlight switch.
10. Parking lights switch.
11. Fuel filler flap control.
12. Antenna switch.
13. Horn selector switch.
14. Heated backlight switch.
15. Panel lights switch.
16. Lights switch.
17. Compressor overriding switch (air conditioning only).
18. Window lift (R.H. and L.H.).
19. Blower motor control switch.
20. Temperature and distribution control switch.
21. Spring.
22. Plate.
23. Temperature and distribution control knob.
24. Spring.
25. Plate.
26. Blower motor control knob.
27. Ignition/starter switch and steering lock.
28. Turn indicator warning light (Green).
29. Oil pressure warning light (Red).
30. Fuel flap warning light (Red).
31. Turn indicator warning light (Green).
32. Handbrake and fluid level warning light.
33. Windscreen wipers and washers switches.
34. Windscreen wipers and washers knob.
35. Cigar lighter.
36. Speaker balance control knob.
37. Speaker balance control switch.
38. Trafficator switch assembly.
39. Striker.
40. Spacers.

Fig. N.6 Instruments and Facia Lay-out

An electrically operated back light is standard equipment with a warning light underneath the switch.

The following systems are operated through relays which are situated in the fuse box:-
Starter solenoid, horns and horn change-over and the coolant fans behind the radiator.
A third fan in front of the radiator is fitted to cars with air conditioning. In some cases this is operated through a relay just in front of the regulator and in other cases directly, but the "cut in" switch is in front of the radiator. The air conditioning compressor is wired through a relay which is situated behind the switch panel on the facia. A further relay is incorporated in the charging system.

A day/night lighting relay is fitted in the left-hand rear corner of the boot.

N.28 ALTERNATOR

See relevant Chrysler Manual.

> **WARNING:**
>
> Where a transistorized alternator regulator is fitted the battery MUST NOT be disconnected whilst the engine is running.

N.29 BATTERY

Checking

The state of charge of the battery is indicated by hydrometer readings as follows:-

For climates below 27°C (80°F)

Cell fully charged	1.270 to 1.290
Cell about half charged	1.190 to 1.210
Cell completely discharged	1.110 to 1.130

For climates above 27°C (80°F)

Cell fully charged	1.210 to 1.230
Cell about half charged	1.130 to 1.150
Cell completely discharged	1.050 to 1.070

These figures are given assuming an electrolyte temperature of 16°C (60°F) If the temperature of the electrolyte exceeds this, 0.002 must be added to hydrometer readings for each 3°C (5°F) rise to give the true specific gravity. Similarly, 0.002 must be subtracted from hydrometer readings for every 3°C (5°F) below 16°C (60°F).

After examining the battery, check the vent plugs, making sure that the air passages are clear, and screw the plugs into position. Wipe the top of the battery to remove all dirt and moisture.

N.30 BRAKE WARNING SYSTEM

A red warning light on the facia indicates if the handbrake is on or the hydraulic systems have run low on fluid. A circuit check is incorporated in the warning light and is operated by pressing the area immediately below the red light.

To remove warning light bulb

1. Prise the warning lamp assembly out of facia.
2. Gently ease the sides of the body apart, by the rocker pivot and remove the rocker.
3. The bulb is now accessible.

N.31 BULBS

All 12 V	Watts	Lucas No.
Flasher Front/Rear Reverse	21	382
Side marker	4	
Side/flasher federal Stop/tail Repeater	6/21	380
Door warning Inspection No. Plate	6	989
Interior Bonnet Boot	6	254

All 12 V	Watts	Lucas No.
Warning lights & clock	2.4	281
Switch panel, Glove locker, Heater switch, All instruments	2.4	987
GB illumination	3	.04 Capless.
Test switch	15	280
Cigar lighter		643
Headlamps		QIV

N.32 COURTESY LIGHT

The courtesy light is operated by a switch in the door hinge pillars, which also operates a green trace light over the ignition switch. The lights are situated mid-way on each cant rail.

An overriding switch is contained on each lamp to operate the interior light.

N.33 ELECTRIC AERIAL

To Remove

1. Remove 7 bolts holding rear section of L.H. side front stone guard and withdraw stone guard.
2. Disconnect aerial leads.
3. Unscrew chrome aerial nut on top of wing and remove together with cup and gasket.
4. Remove 1 nut from steady brackets on aerial motor.
5. Withdraw assembly from under wing.

N.34 FUSES

The fuse box is situated on the R.H.S. of the engine bay and consists of 3 fuse blocks.

Fuse set A

1. 25 amp. fuse protects	Fuel and temp. gauges, horn relay, flasher and reverse lamps.
3. 50 amp. fuse protects	heated rear window.
5. 50 amp. fuse protects	headlamp flasher.

7. 50 amp. fuse protects radiator fans.

Fuse set B

1. 35 amp. fuse protects R.H. headlamp main beam
3. 35 amp. fuse protects L.H. headlamp main beam
5. 10 amp. fuse protects R.H. side lamp front & rear
7. 10 amp. fuse protects L.H. side lamp front & rear

Fuse set C

1. 35 amp. fuse protects R.H. headlamp dip beam
3. 35 amp. fuse protects L.H. headlamp dip beam
5. 35 amp. fuse protects Brake warning light, windscreen wiper.
7. 35 amp. fuse protects Horns.

Two spare fuses are mounted in each fuse set.

A line fuse inside the fuse box protects interior lights, clock and cigar lighter.

The window motors are individually fused, being covered by 2 in-line 35 amp. fuses situated underneath the gear shift panel.

Federal cars are covered by 4 in-line 35 amp. fuses. The windows will operate normally with the ignition on but can be lowered only with the ignition off, each circuit being covered by a separate fuse.

On R.H.D. cars, line fuses covering shaver socket (35 amp.), hazard warning light (25 amp.) and heater blower motor (35 amp.) are situated behind the facia above the glove locker.

On L.H.D. cars, the line fuses covering the heater motor (35 amp.) and shaver socket (35 amp.) are situated behind the facia above the glove locker and the hazard warning light (25 amp). fuse is behind the speedometer.

The radio is covered by a further line fuse, adjacent to the set.

N.35 HORNS

R.H.D. cars are fitted with electric horns as standard equipment and these are mounted, one on each side, behind the headlamps. Access is gained by removing the front mud shield from the respective front wing.

L.H.D. cars in addition to electric horns have air horns fitted

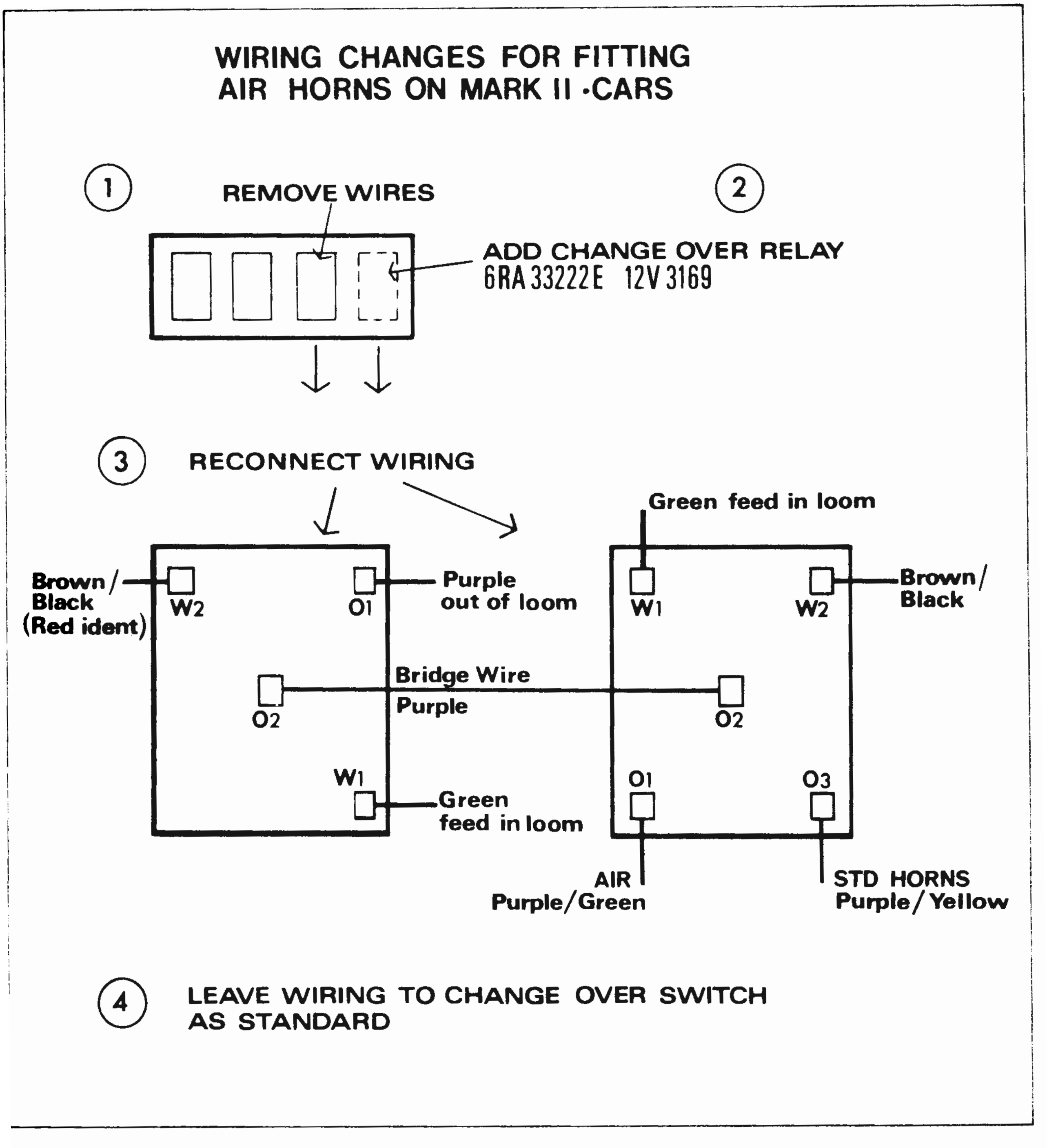


Fig. N.6 Wiring changes for fitting air-horns on Mk.11 cars as standard equipment. The compressor is mounted behind the headlamps on the R.H. front wing and the horns in a similar position on the L.H. wing. The compressor may be lubricated through a cutaway in the R.H. radiator panel. Access is otherwise gained by removing the mud shields on the respective wings.

Both sets of horns are operated through the horn push in the centre of the steering wheel, the selection being made by a change-over switch in the switch panel. The operation is through a relay with a change-over relay when air horns are fitted.

To fit air horns

Wiring changes and the extra relay for air horns are detailed in figure N.6. The relay is sited next to the horn relay under the fuse box.

N.36 INSTRUMENTS

The battery condition gauge, petrol gauge, oil pressure gauge, temp. gauge and clock are push-fitted in the facia.

To remove, apply a 'sucker' to the glass and pull the instrument out. The wires can then be disconnected.

The speedometer and revolution counter are retained by 2 thumb nuts and clips on each. To gain access to these nuts, the indicator switch panel must be released and the ignition switch panel removed. The speedometer trip cable must be released before the panel is removed.

N.37 LAMPS

Side lamps, rear lamps and flashers.

The lenses on side and flasher lights are secured by two Phillips headed screws. If these are removed the lens may be taken off and the bulb changed.

The stop, tail and flasher lights are approached from a panel on either side of the boot interior. The lens is released by the removal of three nuts.

The side repeater lamp bulb can be replaced by removing the single PR screws securing the lens.

The side rear lamp/reflector (fitted to cars to federal specification) lens is retained by the rubber surround. Prising the lens out gives access to the bulb.

Auxiliary Lights

One switch on the facia is provided for spot/fog lamps. This is already wired as far as the front lower intake grille, terminating at two snap connectors, one on the off side and one on the near side. The cable colour is Red/Yellow.

Number Plate Lights

The number plate lamps are mounted on the bumper directly beneath the rear number plate.

Access to the bulbs is gained by removing the rubber gaiter below the bumper blade and withdrawing the bulb holder assembly.

Warning Lights

The position of the seven warning lights is shown in figure N.5. Replacement of the bulbs is as follows:-

1. Main beam and low fuel: withdraw bulb holders from rear of appropriate instrument.
2. Flashers, oil pressure and fuel flap: withdraw unit bodily from panel and replace bulb.
3. Brake system. See N.30.

Headlamp Light Unit - To Remove and Refit

Light Unit - Remove

1. Remove two screws securing headlamp panel to radiator intake panel.
2. Free off three screws at bayonet fixings, turn inner rim anti-clockwise and withdraw rim.

3a. Release spring clip and pull out bulb.

3b. Cars to federal specification are fitted with sealed beam units which can be pulled off the spade connections.

Light Unit - Refit

1. Reverse removal procedure.

Headlamp - To Remove and Refit

Headlamp - Remove

1. Remove two screws securing headlamp panel to radiator intake panel.
2. Remove four screws securing headlamp assembly to radiator intake panel.
3. Disconnect snap connectors and withdraw unit complete with rubber gasket.

Headlamp - Refit

1. Reverse removal procedure.

Headlamp Beam Setting

Where possible, headlamps should be set by a professional, using specially developed equipment. Mechanical aimers for use on sealed beam unit, or Lucas "Beamsetter" equipment will enable the lights to be set quickly and accurately.

However, when such items are not available, the beams may be set as follows:-

1. Car must be in its loaded position (i.e. 1 or 2 passengers, tank half full).
2. Car should be on a flat level surface.
3. For the single filament units the centre of maximum light intensity on high beam should be 2in.below horizontal in 25ft.
4. The twin filament units should be aimed from the dip position with the top of the intensity block 2in. down from the horizontal centre line, and the right-hand side of the intensity block 2in. left of the vertical centre line.

   Adjustment is made by turning the screws on the light unit retaining plate, exposed by removing the panel. There is one screw for vertical adjustment, and one for horizontal, except on the Continental type unit, where there are two horizontal adjustments.

N.38 PETROL FILLER CAP

The petrol filler cap is electrically operated through a solenoid and can only be energised with the ignition in the OFF position. The system utilises the same relay as the A/C compressor. A yellow warning light is situated between the speedometer and tachometer and indicates the flap is open when the ignition is switched on.

Should the solenoid fail to release the flap a manual trip is incorporated in the lock mechanism. Access to this is through a cutaway in the outside hinge trim on the left-hand side of the boot. A trigger can be felt just inside this cutaway and pressure on the trigger in a rearwards direction will release the flap.

N.39 SPEEDOMETER

The speedometer is calibrated 0-160 m.p.h. and is fitted with a trip odometer and a blue main beam warning light. Drive is by cable, the length of the cable being 65in.

The take-off pinion has 29 teeth and the colour code is black.

To reset trip odometer, push and turn knurled knob situated below the speedometer and to the right of the steering column.

N.40 SWITCHES

Remove and Refit Window Winder Switches

1. Remove gear lever knob, 1 Alan screw.
2. Remove 2 screws at rear of gear selector panel and release panel.
3. Disconnect the wires on the back of the switch.
4. Depress the lugs on the ends of the switch and pull switch out forwards. Reverse procedure to refit.

Stop Lamp Switch

This switch is fitted above the brake pedal on a bracket under the pedal mounting box. The pedal lever rests against it when in its fully returned position and any forward movement of the pedal releases the switch thereby making electrical contact. The mounting hole in the bracket is elongated and this may be used for contact adjustment if necessary.

To Remove Switches from Main Block

1. Remove gear selector panel as above.
2. Remove 2 screws from top corners of switch panel, and pull out.
3. Remove wires from defective switch.
4. Depress lugs on the ends of the switch and pull switch out forwards. To refit - reverse procedure.

N.41 WINDSCREEN WIPER & WASHERS

The windscreen wiper has two speeds and is self-parking. The arms are 14 in. long, one straight and one cranked at 10°. The wiper blades are 14 in. long and the angle of sweep is 120°.

Replacing the Arm and Blade Assembly

The method of securing the arm and blade assembly to the wheel box spindle is as follows:-

The spindle is splined into the boss of the arm and held in position by a spring clip. This clip locates in an annular groove in the spindle. By lifting the spring the arm can be withdrawn.

By releasing a similar clip in the outer end of the arm the blade can be withdrawn.

Lubrication

Occasionally, smear lightly with grease both sides of the curved portion of the wiper-blade which fits into the arm.

Renewing the Drive

To remove the rack it will be necessary to remove the arms and blades, battery and motor. The rack which is attached to the motor, can then be withdrawn, thereby causing the wheel box pinions to rotate.

To remove wiper wheel boxes

1. Remove bonnet lock assembly by disconnecting cable and withdrawing 2 retainin bolts on each lock.
2. Remove blower motor.
3. Remove 6 screws holding plate above heater box to scuttle, pulling away insulation as necessary.
4. Remove water-chute/air ducting above blower motor, three screws and one nut i fibre glass assembly. 8 screws on steel assembly.
5. Remove scuttle grille 2 nuts underneath scuttle.
6. Remove 1 screw holding wiper in air intake and withdraw wiper. This is fitted on L.H. side of intake on R.H. drive cars and on R.H. side on L.H. drive cars.

To remove wiper motor

On L.H. drive cars

1. Remove brake MC/servo assembly.
2. Remove wiring terminal block.
3. Remove 2 bolts on retaining clamp.
4. Unscrew nut holding bundy tubing to wiper motor and draw out wiper motor complete with rack cable.

On R.H. drive cars

1. Remove battery.
2. Follow procedure for L.H.D. cars from 2 onwards.

N.27A BRIEF DESCRIPTION

The 12v, 66 AH battery has a negative earth, and is maintained by an alternator. The alternator is fundamentally an AC current generator, with six built-in silicon rectifiers that convert AC current into DC current. Output voltage is controlled by a regulator.

The ignition, starting, and charging systems are all of Chrysler origin, and full servicing particulars are given in the appropriate Chrysler manual.

Four headlamps are mounted in the radiator grille, these being of the quartz halogen type. Bulbs are fitted to all cars except those to federal specification, where the units are sealed beam. The outer pair of lamps operate as main and dipped beams, the inner pair main beam only. The lighting equipment includes side, tail, stop, flasher, reversing lights with side repeater lamps for the flasher, and on federal cars, side marker lamps.

A switch and wiring to the front bumper for auxiliary lamps is provided.

A pair of electric horns are operated by a horn push in the centre of the steering wheel, and via a relay. Air horns can be fitted in addition to the electric horns (standard on left-hand drive cars), and are operated via a change-over relay with a switch on the facia.

Interior equipment includes: courtesy light operated either by opening the doors or by an overriding switch, electric clock, razor/charging point, cigar lighter, and radio.

Variable speed windscreen wipers of the self-parking type incorporate electrically operated screen washers.

The instruments are electrically operated through a voltage stabilizer and include, a tachometer, and gauges for fuel, oil pressure, coolant temperature, and voltage condition of the battery. There are seven warning lights.

Electric window winders are fitted to both doors, and a red warning light appears in the rear door edge when the door is opened. Cars to federal specifications are fitted with a key removal warning buzzer in the left side door.

Boot and bonnet lights are fitted together with a flexible arm inspection lamp under the bonnet.

An electrically operated backlight is standard equipment.

The following systems are operated through relays which are situated in the fuse box:- starter solenoid, horns and horn change-over, and the radiator cooling fans. The air conditioning compressor is wired through a relay which is situated behind the switch panel on the facia. A further relay is incorporated in the charging system.

A day/night lighting relay is fitted in the left side rear corner of the boot.

N.27A Continued. 1974 series vehicles. SEAT BELT/IGNITION INTERLOCK SYSTEM

All cars to 1974 federal specifications are fitted with a seat belt/ignition interlock system, the details of which can be found in the 'Owners Handbook'. The system may be checked using Smiths Test Unit, part no. SRD 405.

Instructions for using Smiths' test unit SRD 405.

Using the tester in the vehicle

Connection details.
The logic unit is situated on the gearbox cover, and access to it is gained by removing the left-hand front console panel. Unplug the vehicle wiring harness from the logic unit. Connect the tester, using the appropriate plug and socket, to the logic unit and the harness. The two red 'Battery' warning lamps should now light, together with the two 'Belt' yellow lamps.

To test the harness and switches.

Action	Effect
Turn on ignition	Green 'Ignition' lamp should light
Turn key to start position	Yellow 'Start' lamp should light
Sit on driver's seat	Green 'Driver Seat' lamp lights
Sit on passenger seat	Green 'Passenger Seat' lamp lights
Fasten driver's seat belt	Yellow 'Driver Belt' lamp goes out
Fasten passenger seat belt	Yellow 'Passenger Belt' lamp goes out
Select gear	Blue 'Gear' lamp lights.

TO TEST LOGIC UNIT

The following actions refer to the positions of the switches on the test box NOT the actual switches in the car. A switch should be left on until instructed to turn off and vice versa.

The 'Test Function' heading gives the reason for carrying out a particular test.

Action	'Ign.' lamp	'Fasten Belts' lamp & buzzer	'Start' lamp	Test Function
'Ign.' on,press 'Start'	On	Off	On	Checks car starts when front seats are not occupied.
'Driver' seated	On	On	On	Checks restart circuit latches.
'Ign.' on	On	On	On)	Checks 'Ign.' off only,
'Ign.' off	Off	Off	Off)	does not reset latch.
'Driver' belted	On	On	On)	
'Passenger' seated	On	On	On)	Checks normal logic
'Passenger' belted	On	On	On)	sequence
'Passenger' belted off	On	On	On)	Resets logic and
'Passenger' seated off	On	Off,after delay (max. 7.7 secs)	On)	passenger seat delay.
'Driver' belted off	On	On	On)	Resets logic and driver's
'Driver' seated off	On	Off,after delay (max. 7.7 secs)	On)	seat delay.
'Ign.' off	Off	Off	Off)	
'Driver' seated on	Off	Off	Off)	Checks restart latch,
'Ign.' on	On	On	Off)	unlatches.
'In Gear' release 'Start'	On	On	Off)	Checks transmission
'Driver' seated off	On	Off,after delay (max. 7.7 secs)	Off)	switch input functions.
'Neutral'	On	Off	Off)	
Press 'Door SW'	On	Buzzer on only	Off)	Checks door switch
Release 'Door SW'	On	Off	Off)	operates buzzer.
'Passenger' belted on	On	Off	Off)	
'Passenger' seated on	On	On	Off)	Checks reverse logic
'Passenger' belted off	On	On	Off)	passenger side.
'Passenger' belted on	On	Off	Off)	
'Driver' belted on	On	Off	Off)	
'Driver' seated on	On	Off	Off)	Checks reverse logic
'Driver' belted off	On	On	Off)	on driver's side.
'Driver' belted on	On	Off	Off)	
'Driver' seated off	On	Off	Off)	
'Passenger' seated off	On	Off	Off)	
		Wait for 8 secs	)	Checks seat switches
'Driver' seated	On	Off	Off)	logic lockout feature.
'Passenger' seated	On	Off	Off)	

Using the tester out of the vehicle to test the logic unit.

Connection details.

Connect the separate supply lead to a 0-15v variable DC supply. The specified voltage is 11 volts, as this highlights any errors in the logic at low voltage. Connect the 12-way plug to the logic unit under test.

N.B. A switch should be left on until instructed to turn off and vice versa.

Action	'Ign' lamp	'Fasten Belts' lamp & buzzer	'Start' lamp	Test function
'Ign' on, press "Start'	On	Off	On	Checks car starts when front seats are not occupied.
'Driver' seated	On	On	On	Checks restart circuit latches.
'Ign.' on 'Ign.' off	On Off	On Off	On) Off)	Checks 'Ign.' off only, does not reset latch.
'Driver' belted 'Passenger' seated 'Passenger' belted	On On On	Off On Off	On) On) On)	Checks normal logic sequence
Supply to 5 volts Supply to 11 volts	On On	Off Off	On) On)	Checks logic memory, stays held during start
'Passenger', belted off 'Passenger' seated off	On On	On Off, after delay (max. 7.7 secs)	On) On)	Resets logic and passenger seat switch delay.
'Driver' belted off 'Driver' seated off	On On	On Off, after delay (max. 7.7 secs)	On) On)	Resets logic and driver's seat switch delay
'Ign.' off 'Driver' seated on 'Ign.' on	Off Off On	Off Off On	Off) Off) Off)	Checks restart latch, unlatches.
'In gear' release 'Start' 'Driver' seated off 'Neutral'	On On	On Off, after delay (max. 7.7 secs)	Off) Off)	Checks transmission switch input functions.
Press 'Door SW' Release 'Door SW'	On On	Buzzer on only Off	Off) Off)	Checks door switch operates buzzer.

'Passenger' belted on	On	Off	Off)	Checks reverse logic on passenger side.
'Passenger' seated on	On	On	Off)	
'Passenger' belted on	On	Off	Off)	
'Driver' belted on	On	Off	Off)	Checks reverse logic on driver's side
'Driver' seated on	On	Off	Off)	
'Driver' belted off	On	On	Off)	
'Driver' belted on	On	Off	Off)	
'Driver' seated off	On	Off	Off)	Checks seat switches logic lockout feature.
'Passenger' seated off	On	Off	Off)	
		Wait for 8 secs.	)	
'Driver' seated	On	Off	Off)	
'Passenger' seated	On	Off	Off)	

N.30A BRAKE WARNING SYSTEM

A red warning light on the facia indicates:-

(a) The handbrake is on.

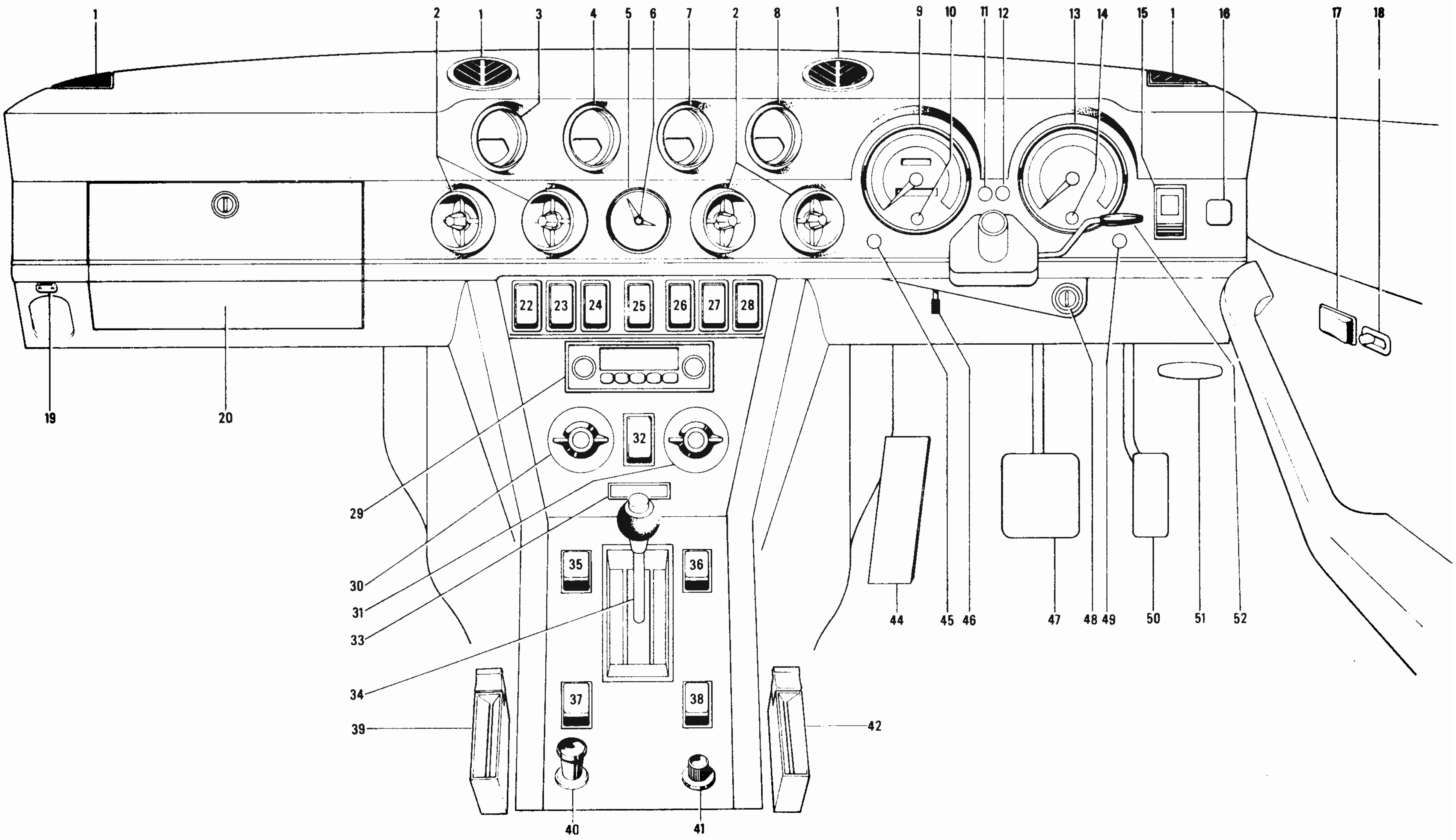
(b) The hydraulic systems have run low on fluid.

(c) The brake pads have worn to the point where renewal is necessary.

A circuit check is incorporated in the warning light, and is operated by pressing immediately below the red light.

N.31A BULBS

Headlamps 1A	Phillips	Q1V	112
2A	Phillips	Q1V	112
Sidelights	6W	MCC	989
Flasher	21W	SCC	382
Side Flasher	6W	MCC	989
Stop/Tail	6/21W	SBC	380
Number plate	6W	MCC	989
Reversing light	21W	SCC	382
Boot	6W	Festoon	254
Bonnet	6W	Festoon	254
Engine inspection	6W	MCC	989
Interior	6W	Festoon	254
Panel illumination	2.2W	MES	987
Warning light and clock	2W	Peanut	281
Instrument and gear quadrant	2.2W	MES	987
Door warning light	6W	MCC	989
Glove box interior	2.2W	MES	987
Steering lock illumination	2.2W	MES	987
Brake warning light and test switch	1.5W	LES	280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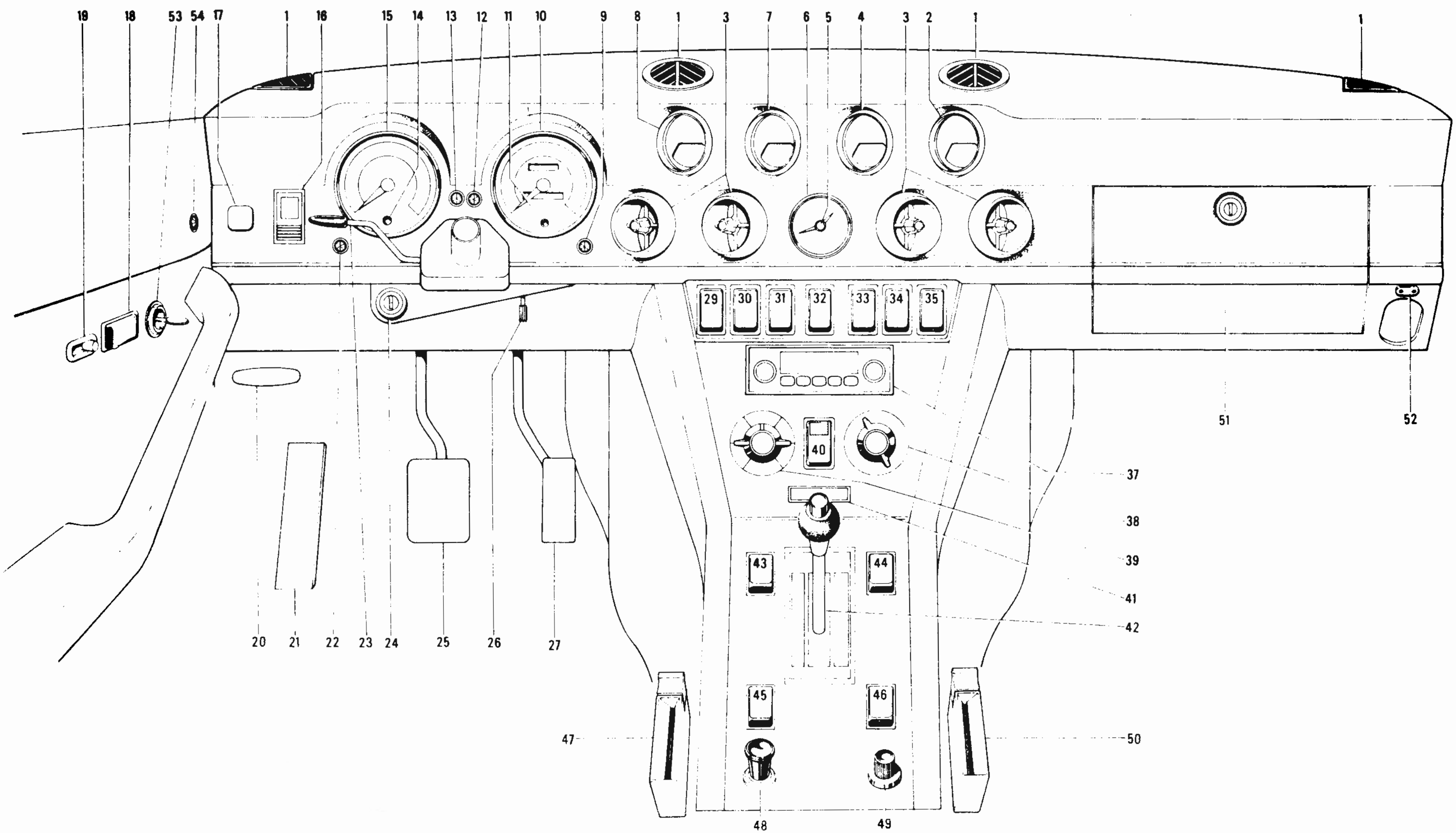
1. Demister ducts.
2. Face level directional vent.
3. Voltmeter.
4. Fuel gauge.
5. Electric clock.
6. Clock hand adjusting knob.
7. Oil pressure gauge.
8. Engine coolant temperature gauge.
9. Speedometer.
10. Main beam warning light (blue).
11. Oil pressure warning light (red).
12. Fuel filler flap warning light (amber).
13. Tachometer.
14. Low fuel warning light (amber).
15. Handbrake, brake pad wear, and fluid level warning light (red).
16. Windscreen wipers/washers.
17. Passenger door lock switch.
18. Door lock (manual).
19. Battery charging socket.
20. Glove box.
22. Fog lamp switch.
23. Fuel filler flap switch.
24. Horn selector switch.
25. Antenna switch.
26. Heated back light switch.
27. Panel light switch.
28. Headlamp switch.
29. Radio and tape player.
30. Temperature and distribution control.
31. Blower motor control.
32. Compressor overriding switch.
33. Seat belt warning panel.
34. Gear lever.
35. Window lift switch - L.H.
36. Window lift switch - R.H.
37. Side lights switch.
38. Hazard switch.
39. Seat belt clip - L.H.
40. Cigar lighter.
41. Radio speaker balance control.
42. Seat belt clip - R.H.
44. Dipswitch.
45. Turn indicator warning light (green)
46. Trip winder.
47. Brake pedal.
48. Ignition/starter switch and steering lock.
49. Turn indicator warning light (green)
50. Accelerator pedal.
51. Bonnet release.
52. Turn indicator and headlamp flasher.switch.

Fig. N.5A Controls and instruments (R.H.D - up to chassis no. 9184)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1. Demister ducts.
2. Voltmeter.
3. Face level directional vent.
4. Fuel gage.
5. Clock hand adjusting knob.
6. Electric clock.
7. Oil pressure gauge.
8. Engine coolant temperature gauge.
9. Turn indicator warning light (green)
10. Speedometer.
11. Main beam warning light (blue).
12. Fuel filler flap warning light (amber).
13. Oil pressure warning light (red).
14. Low fuel warning light (amber).
15. Tachometer.
16. Handbrake, brake pad wear, and fluid level warning light (red).
17. Windscreen wipers/washers.
18. Passenger door lock switch.
19. Door lock (manual).
20. Bonnet release.
21. Dipswitch.
22. Turn indicator warning light (green).
23. Turn indicator and headlamp flasher switch.
24. Ignition/starter switch and steering lock.
25. Brake pedal.
26. Trip winder
27. Accelerator pedal.
29. Side lights switch.
30. Headlamp switch.
31. Panel light switch.
32. Antenna switch.
33. Heated backlight switch.
34. Hazard switch.
35. Horn selector switch.
37. Radio and tape player.
38. Blower motor control.
39. Temperature and distribution control.
40. Compressor overriding switch.
41. Seat belt warning panel.
42. Gear lever.
43. Window lift switch - L.H.
44. Window lift switch - R.H.
45. Fog lamp switch.
46. Fuel filler flap switch.
47. Seat belt clip - L.H.
48. Cigar lighter.
49. Radio speaker balance control.
50. Seat belt clip - R.H.
51. Glove box.
52. Battery charging socket.
53. Wing mirror adjuster.
54. Light for windscreen wipers/washers switch.

Fig. N.5B Controls and instruments (L.H.D - up to chassis no. 9184)

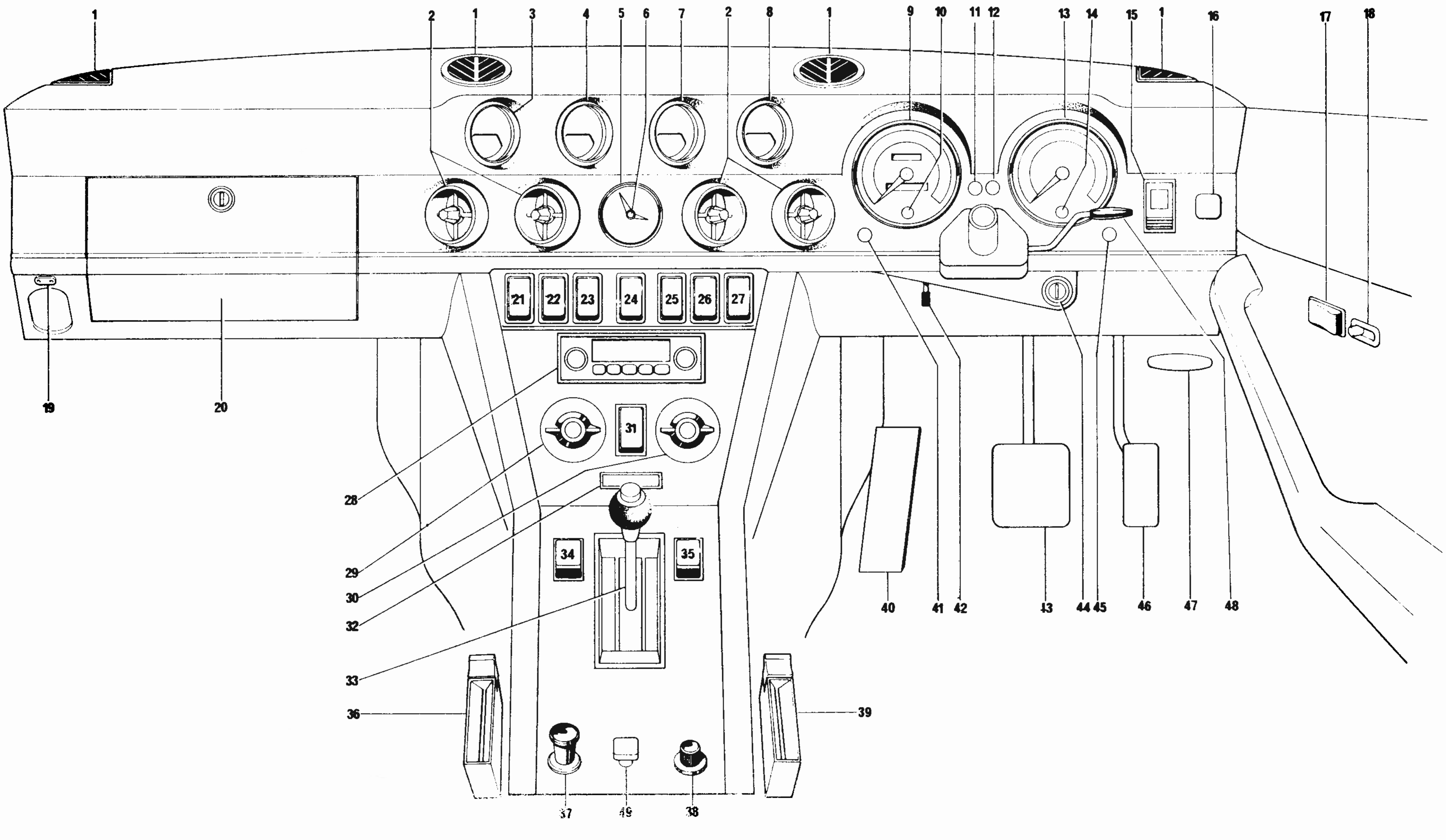
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Fig. N5C Controls and Instruments (R.H.D. - from chassis no. 9185)

1. Demister ducts
2. Face level directional vent.
3. Voltmeter
4. Fuel gauge
5. Electric clock
6. Hand adjusting knob
7. Oil pressure gauge
8. Engine coolant temperature gauge
9. Speedometer
10. Main beam warning light (blue)
11. Oil pressure warning light (red)
12. Fuel filler flap warning light (amber)
13. Tachometer
14. Low fuel warning light (amber)
15. Handbrake, brake pad wear, and fluid level warning light (red)
16. Windscreen wipers/washers
17. Passenger door lock switch
18. Door lock (manual)
19. Battery charging socket
20. Glove box
21. Fog lamp switch
22. Fuel filler flap switch
23. Horn selector switch
24. Hazard switch
25. Heated backlight switch
26. Parking lights switch
27. Lights switch
28. Radio and tape record player
29. Temperature and distribution control
30. Blower motor control
31. Compressor overriding switch
32. Safety belt panel
33. Gear selector
34. Window lift L/H
35. Window lift R/H
36. Seat belt clip L/H
37. Cigar lighter
38. Speaker balance control
39. Seat belt clip R/H
40. Dipswitch
41. Turn indicator warning light (green)
42. Trip winder
43. Brake pedal
44. Ignition/starter switch and steering lock
45. Turn indicator warning light (green)
46. Accelerator pedal
47. Bonnet release
48. Turn indicator and headlamp flasher
49. Panel lights dimmer

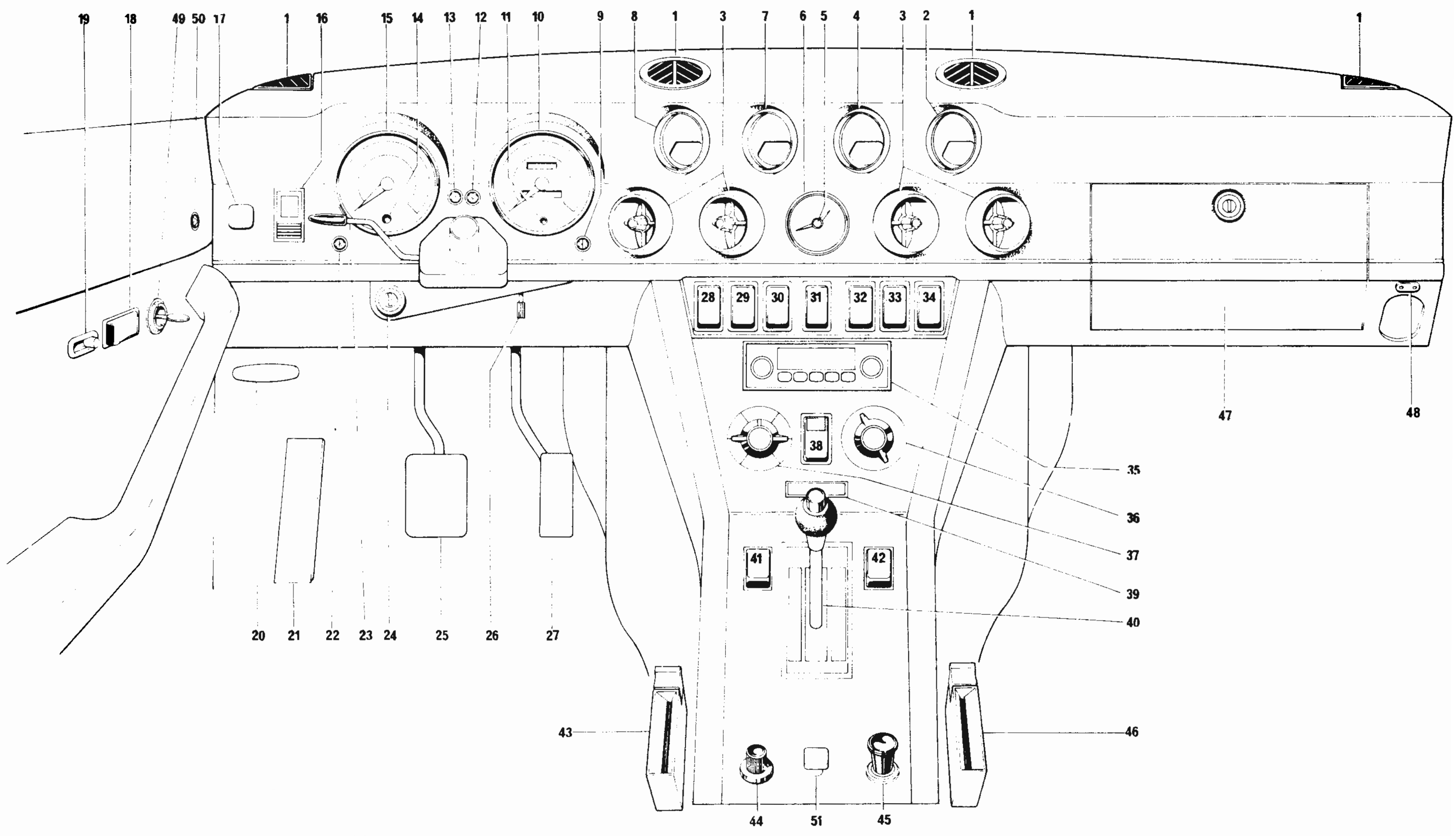
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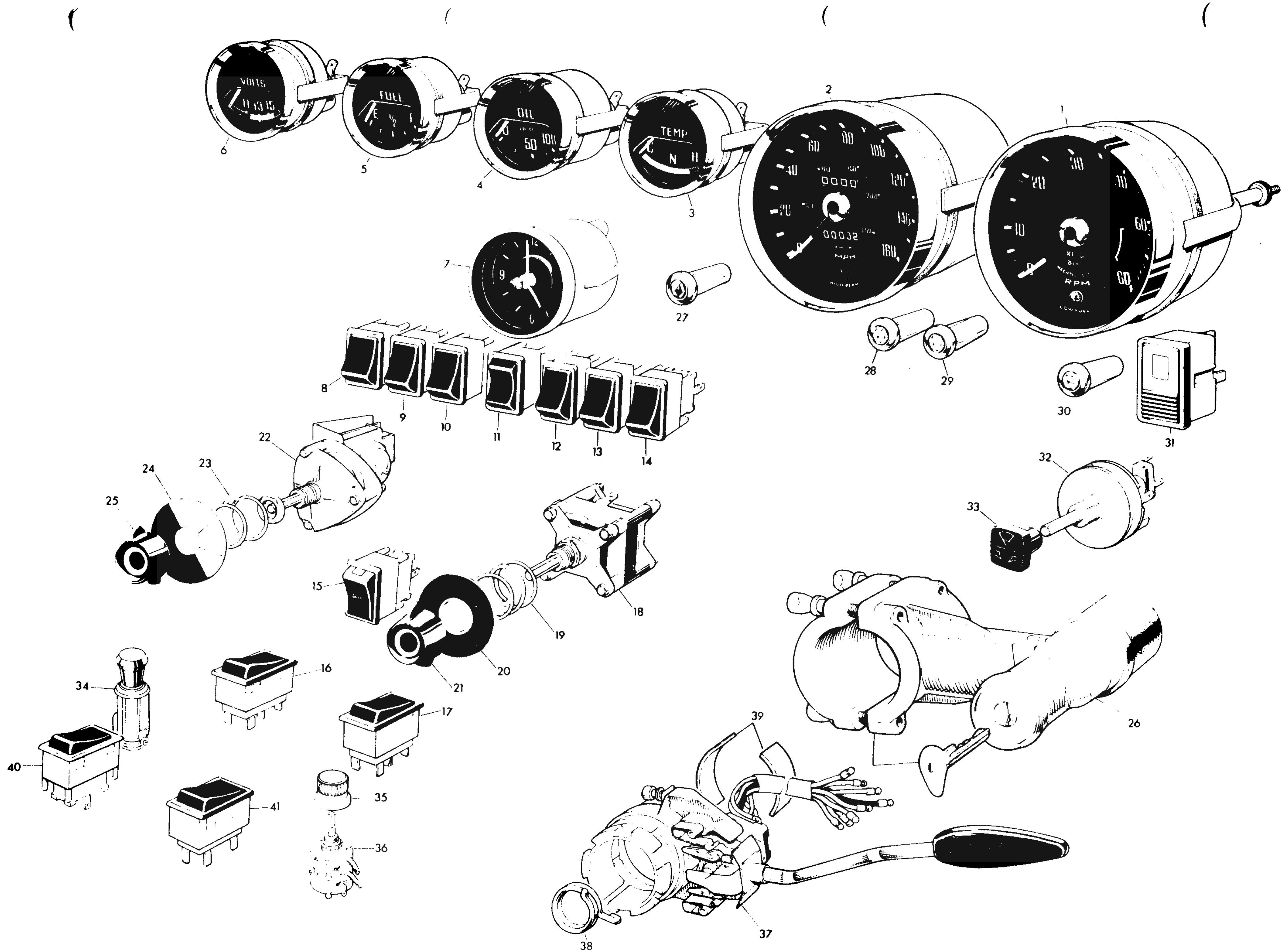
Fig. N5D. Controls and Instruments (L.H.D. - from chassis no. 9185)

1. Demister ducts
2. Voltmeter
3. Face level directional vent
4. Fuel gauge
5. Clock hand adjusting knob
6. Electric clock
7. Oil pressure gauge
8. Engine coolant temperature gauge
9. Turn indicator warning light
10. Speedometer
11. Main beam warning light (blue)
12. Fuel flap warning light (amber)
13. Oil pressure warning light (red)
14. Low fuel warning light (amber)
15. Tachometer
16. Handbrake, brake pad wear, and fluid level warning light (red)
17. Windscreen wipers/washers
18. Passenger door lock switch
19. Door lock (manual) L/H
20. Bonnet release
21. Dipswitch
22. Turn indicator warning light (green)
23. Turn indicator and headlamp flasher switch
24. Ignition/starter switch and steering lock
25. Brake pedal
26. Trip window
27. Accelerator pedal
28. Sidelights switch
29. Headlamp switch
30. Fuel filler flap switch
31. Foglamp switch
32. Heated backlight switch
33. Hazard switch
34. Horn selector switch
35. Radio and tape record player
36. Blower motor control
37. Temperature and distribution control
38. Compressor overriding switch
39. Seat belt warning panel
40. Gear selector
41. Window lift switch L/H
42. Window lift switch R/H
43. Seat belt clip L/H
44. Radio speaker balance control
45. Cigar lighter
46. Seat belt clip R/H
47. Glove box
48. Battery charging socket
49. Wing mirror adjuster
50. Light for windscreen wipers/washers switch
51. Panel lights dimmer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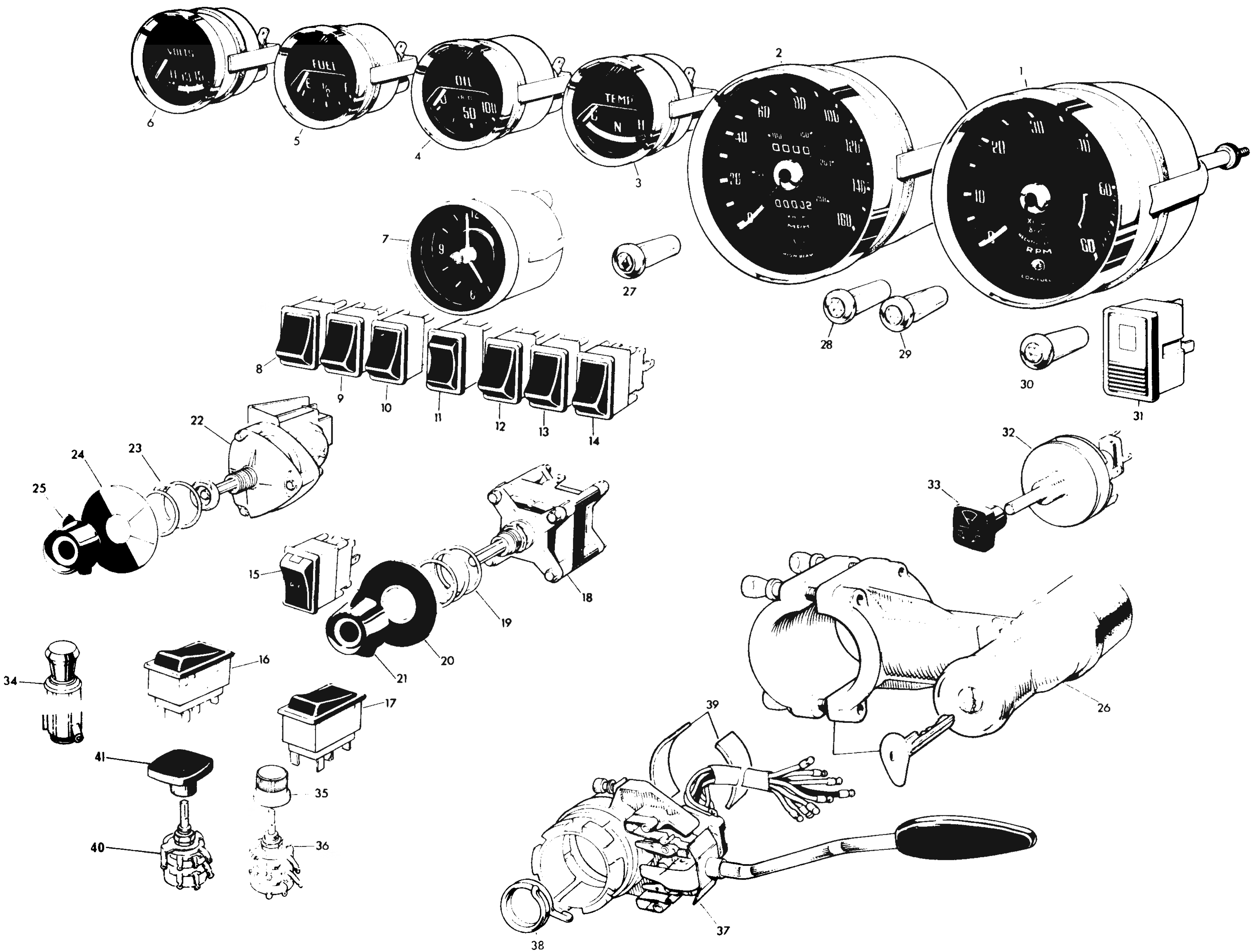
36
37
38
39
40
41
VOLTS
FUEL
OIL
TEMP
MPH
RPM

1. Tachometer.
2. Speedometer.
3. Engine coolant temperature gauge.
4. Oil pressure gauge.
5. Fuel gauge.
6. Voltmeter.
7. Electric clock.
8. Fog lamp switch.
9. Fuel filler flap switch.
10. Horn selector switch.
11. Hazard switch
12. Heated backlight switch.
13. Parking light switch
14. Headlamp switch.
15. Compressor overriding switch.
16. Window lift switch - L.H.
17. Window lift switch - R.H.
18. Blower motor control.
19. Spring.
20. Facia plate.
21. Knob.
22. Temperature and distributor control.
23. Spring.
24. Facia plate.
25. Knob.
26. Ignition/starter switch and steering lock.
27. Turn indicator warning light (green).
28. Oil pressure warning light (red).
29. Fuel filler flap warning light (amber).
30. Turn indicator warning light (green).
31. Handbrake, brake pad wear, and fluid level warning light (red).
32. Windscreen wipers/washers control.
33. Knob.
34. Cigar lighter.
35. Knob.
36. Radio speaker balance control.
37. Turn indicator and headlamp flasher switch.
38. Spring.
39. Spacers.
40. Panel lights dimmer switch
41. Knob

Fig. N.6A Instruments and facia lay-out - (up to chassis 9184)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VOLTS
FUEL
OIL
TEMP
RPM

1. Tachometer.
2. Speedometer.
3. Engine coolant temperature gauge.
4. Oil pressure gauge.
5. Fuel gauge.
6. Voltmeter.
7. Electric clock.
8. Fog lamp switch.
9. Fuel filler flap switch.
10. Horn selector switch.
11. Hazard switch
12. Heated backlight switch.
13. Parking light switch
14. Headlamp switch.
15. Compressor overriding switch.
16. Window lift switch - L.H.
17. Window lift switch - R.H.
18. Blower motor control.
19. Spring.
20. Facia plate.
21. Knob.
22. Temperature and distributor control.
23. Spring.
24. Facia plate.
25. Knob.
26. Ignition/starter switch and steering lock.
27. Turn indicator warning light (green).
28. Oil pressure warning light (red).
29. Fuel filler flap warning light (amber).
30. Turn indicator warning light (green).
31. Handbrake, brake pad wear, and fluid level warning light (red).
32. Windscreen wipers/washers control.
33. Knob.
34. Cigar lighter.
35. Knob.
36. Radio speaker balance control.
37. Turn indicator and headlamp flasher switch.
38. Spring.
39. Spacers.
40. Panel lights dimmer switch
41. Knob

Fig. N.6A Instruments and facia lay-out - (from chassis 9185)

To remove warning light bulb.

1. Prise the warning light assembly from the facia.
2. Holding the rocker pivot, gently ease the sides of the body apart, and remove the rocker.
3. The bulb is now accessible.

N.37A LAMPS

SIDE LIGHTS, REAR LIGHTS, FLASHERS

The lenses on side and flasher lights are secured by two screws. Access for changing a bulb is gained by removing the lens.

Access to stop, tail, and flasher bulbs is gained by removing a panel in the boot interior, and releasing the three nuts securing the lens.

Access to the side flasher bulb is gained by removing the single screw securing the lens.

The lens, for the side rear lamp/reflector (fitted on cars to Federal specification), is retained by the rubber surround. Access to the bulb is gained by prising out the lens.

AUXILIARY LIGHTS

One switch on the facia is provided for spot/fog lamps. This is already wired as far as the front lower intake grille, terminating at the two snap connectors, one on the off side, and one on the near side. The cable colour is Red/Yellow.

NUMBER PLATE LIGHTS

The number plate lights are mounted on the bumper directly beneath the rear number plate. Access to the bulbs is gained by removing the chrome surround retained by two screws.

On North American cars only, the number plate lights are mounted one each side of the number plate.

WARNING LIGHTS

The position of the seven warning lights is shown in Fig. N.5A
Replacement of the bulbs is as follows:-

1. Main beam, and low fuel; withdraw the bulb holders from the rear of the appropriate instrument.
2. Flasher, oil pressure, and fuel flap; withdraw the unit bodily from the panel, and replace the bulb.
3. Brake system. See N.30A.

HEADLAMP LIGHT UNIT - REMOVAL AND INSTALLATION

1. Remove the three screws securing the headlamp panel to the radiator intake panel.
2. Release the three screws at the bayonet fixings, turn the inner rim anti-clockwise, and withdraw the rim.
3. Release the spring clip, and withdraw the bulb.

   Note: Cars to Federal specification are fitted with sealed beam units, which can be withdrawn from the spade connections.
4. Reverse the removal procedure to install a light unit.

HEADLAMP - REMOVAL AND INSTALLATION

1. Remove the three screws securing the headlamp panel to the radiator intake panel.
2. Remove the four screws securing the headlamp assembly to the radiator intake panel.

3. Disconnect the snap connectors, and withdraw the unit complete with rubber gasket.
4. Reverse the removal procedure to install the headlamp.

HEADLIGHT BEAM SETTING

Where possible, headlights should be set by a professional using specially developed equipment. Mechanical aimers, for use on sealed beam units, or Lucas "Beamsetter" equipment enable the lights to be set quickly, and accurately.

When specialist equipment is not available, the beams may be set as follows:-

1. The car must be in its loaded position (i.e. 1 or 2 passengers, tank half full).
2. The car must be on a flat level surface.
3. For single filament units, the centre of maximum light intensity on high beam should be 2 in. (50.8 mm) down from the horizontal centre line, and the right side of the intensity block 2 in. (50.8 mm) left of the vertical centre line.

Adjustment is made by turning the screws on the light unit retaining plate, exposed by removing the panel. There is one screw for vertical adjustment, and one for horizontal, except on the Continental type which has two horizontal adjustments.

N.39A SPEEDOMETER

The speedometer is calibrated 0-160 miles/hr., and is fitted with a trip odometer and a blue main beam warning light. Drive is by cable, the length of which is 65 in. (1.65 mm).

To reset the trip odometer, push and turn the knurled knob located below the speedometer, and to the left (R.H.D.), right (L.H.D.) of the steering column.

The take-off pinion has 29 teeth, and the colour code is black.

N.40A SWITCHES

WINDOW WINDER SWITCHES - REMOVAL AND INSTALLATION

1. Remove the gear lever knob retained by one Allen screw.
2. Remove two screws at the rear of the gear selector panel, and release the panel.
3. Disconnect the wires on the back of the switch.
4. Depress the lugs on the ends of the switch, and pull out the switch.
5. Reverse the removal procedure to fit a switch.

STOP LAMP SWITCH

This switch is fitted above the brake pedal on a bracket under the pedal mounting box. The pedal lever rests against it when in its fully returned position, and any forward movement of the pedal releases the switch, thereby making electrical contact. The mounting hole in the bracket is elongated, and this may be used for contact adjustment if necessary.

MAIN BLOCK OF SWITCHES - REMOVAL AND INSTALLATION

1. Remove two screws from the top corners of the switch panel, and withdraw the panel.
2. Disconnect the wires from the defective switch.
3. Depress the lugs on the ends of the switch, and withdraw the switch.
4. Reverse the removal procedure to fit a switch.

N27B - BRIEF DESCRIPTION

The roof is power operated using electro-hydraulic equipment to raise and lower the roof.

The power source consists of an electric motor driving a hydraulic pump which feeds two hydraulic rams.

The pump motor is connected in series with the gearbox starter inhibit switch and thereafter individual operations are automatically controlled by a series of six micro-switches and electrical relays (6 or 7).

When the lower part of the facia switch is pressed the roof 'down' relay is energised which in turn feeds the hydraulic pump motor causing the hydraulic rams to lower the roof. When the roof reaches the end of its travel the roof/ quarter light changeover switch is operated which causes the pump motor to stop and the rear quarter light motors to be fed 'down'. Each quarter light is driven by an individual electric motor.

The operation of each quarter light is separated by relays. When each quarter light reaches the end of its downward travel a 'down' limit switch is operated and the feed is stopped. The down separator relay ensures that both quarter lights contact their limit switches before stopping.

If the roof cover is fitted at this stage, the roof inhibit relay is energised, thereby open circuiting the pump and quarter light motors.

When the upper part of the facia switch is pressed the quarter light motors are fed 'up' and the quarter lights raise until the 'up' limit switches are contacted. This operation is also separated by a relay as in the down operation, thereby ensuring that both quarter lights are fully raised before the roof 'up' relay is energised.

The roof raises until it reaches the windscreen rail at which point the roof 'up' limit switch is closed causing the roof inhibit relay to be energised thereby cutting off the feed to the roof motor.

Safety circuits include a thermal overload circuit breaker connected to the roof 'up' and 'down' relays. This can be manually reset.

The quarter light circuits are protected by an automatic reset thermal overload circuit breaker. Each of the three electric motors has a built in, automatic reset circuit breaker. None of the circuits are fused.

Three courtesy lights are fitted one at the rear of the centre console and two in the rear passenger compartment. A time delay switch fitted in the drivers door automatically keeps the three lights on for 15 to 30 seconds after the door is closed.

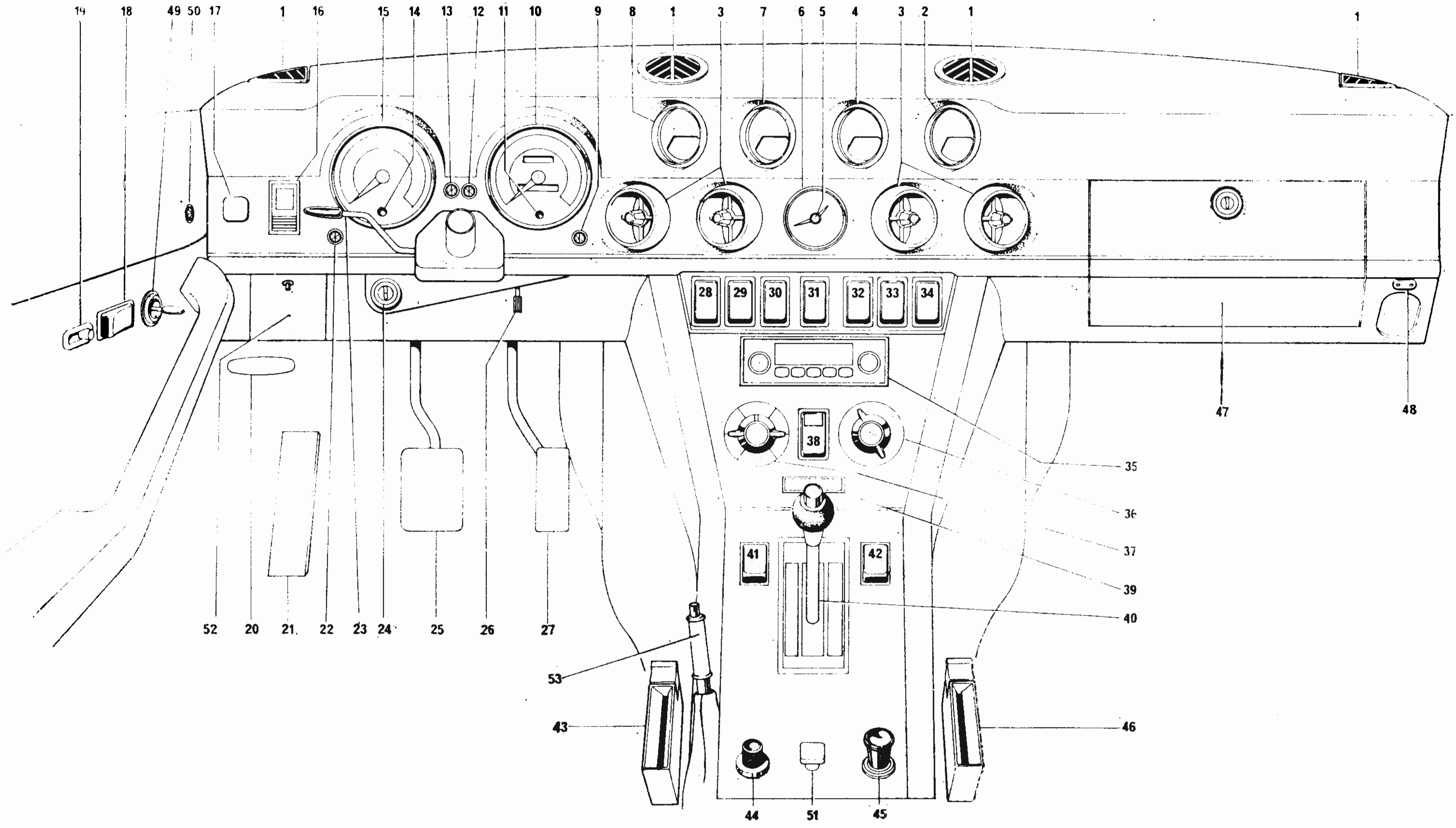


FIG. N7B CONTROLS AND INSTRUMENTS L.H.D.

INDEX

CONTROLS & INSTRUMENTS L.H.D.

1. Demister ducts
2. Voltmeter
3. Face level directional vent
4. Fuel gauge
5. Clock hand adjusting knob
6. Electric clock
7. Oil pressure gauge
8. Engine coolant temperature guage
9. Turn indicator warning light (green)
10. Speedometer
11. Main beam warning light (blue)
12. Fuel flap warning light (amber)
13. Oil pressure warning light (red)
14. Low fuel warning light (amber)
15. Tachometer
16. Handbrake, brake pad wear and fuel level warning light (red)
17. Windscreen wipers/washers
18. Passenger door lock switch
19. Door lock (manual) L/H
20. Bonnet release
21. Dipswitch
22. Turn indicator warning light (green)
23. Turn indicator and headlamp flasher switch
24. Ignition/starter switch and steering lock
25. Brake pedal
26. Trip winder
27. Accelerator pedal
28. Side lights switch
29. Headlamps switch
30. Fuel filler flap switch
31. Foglamp switch - (Aerial-North American only).
32. Roof switch - convertible
33. Hazard switch
34. Horn selector switch
35. Radio and tape record player
36. Temperature and distribution control
37. Blower motor control
38. Compressor overriding switch
39. Seat belt warning panel
40. Gear selector
41. Window lift switch L/H
42. Window lift switch R/H
43. Seat belt clip L/H
44. Radio speaker balance control
45. Cigar lighter
46. Seat belt clip R/H
47. Glove box
48. Battery charging socket
49. Wing mirror adjuster
50. Light for windscreen wipers/washers switch
51. Panel lights dimmer
52. Reset button
53. Handbrake

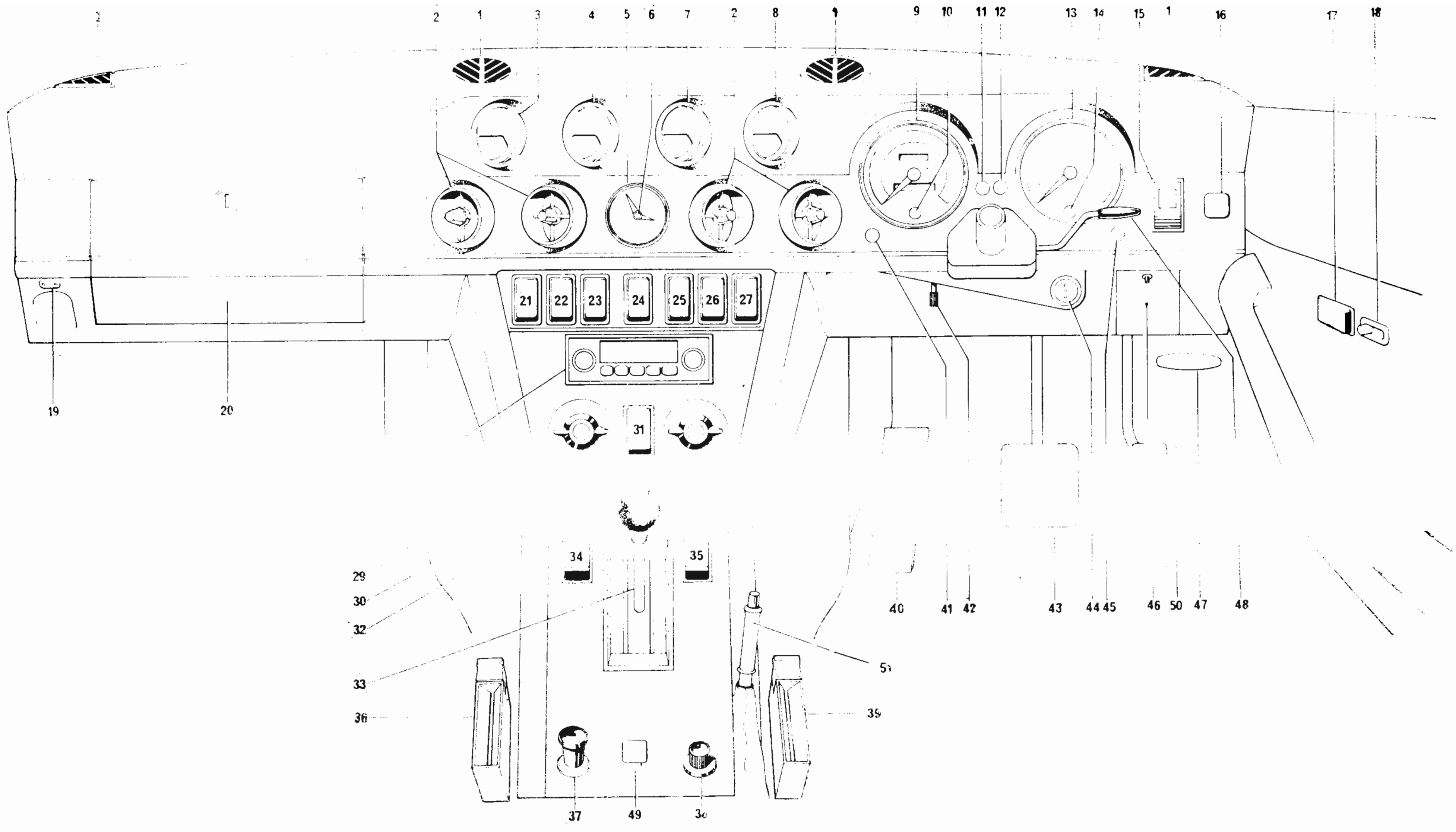


FIG. N8B CONTROLS & INSTRUMENTS R.H.D.

INDEX

CONTROLS & INSTRUMENTS R.H.D.

1. Demister ducts
2. Face level directional vent
3. Voltmeter
4. Fuel gauge
5. Electric clock
6. Hand adjusting knob
7. Oil pressure gauge
8. Engine coolant temperature gauge
9. Speedometer
10. Main beam warning light (blue)
11. Oil pressure warning light (red)
12. Fuel filler flap warning light (amber)
13. Tachometer
14. Low fuel warning light (amber)
15. Handbrake, brake pad wear and fuel level warning light (red)
16. Windscreen wipers/washers
17. Passenger door lock switch
18. Door lock (manual)
19. Battery charging socket
20. Glove box
21. Foglamp switch
22. Fuel filler flap switch
23. Horn selector switch
24. Hazard switch
25. Heated backlight switch (roof switch-convertible)
26. Parking lights switch
27. Lights switch
28. Radio and tape record player
29. Blower motor control
30. Temperature and distribution control
31. Compressor overriding switch
32. Safety belt panel
33. Gear selector
34. Window lift L/H
35. Window lift R/H
36. Seat belt clip L/H
37. Cigar lighter
38. Speaker balance control
39. Seat belt clip R/H
40. Dipswitch
41. Turn indicator warning light (green)
42. Trip winder
43. Brake pedal
44. Ignition/starter switch and steering lock
45. Turn indicator warning light (green)
46. Accelerator pedal
47. Bonnet release
48. Turn indicator and headlamp flasher
49. Panel lights dimmer
50. Reset button (convertible)
51. Handbrake

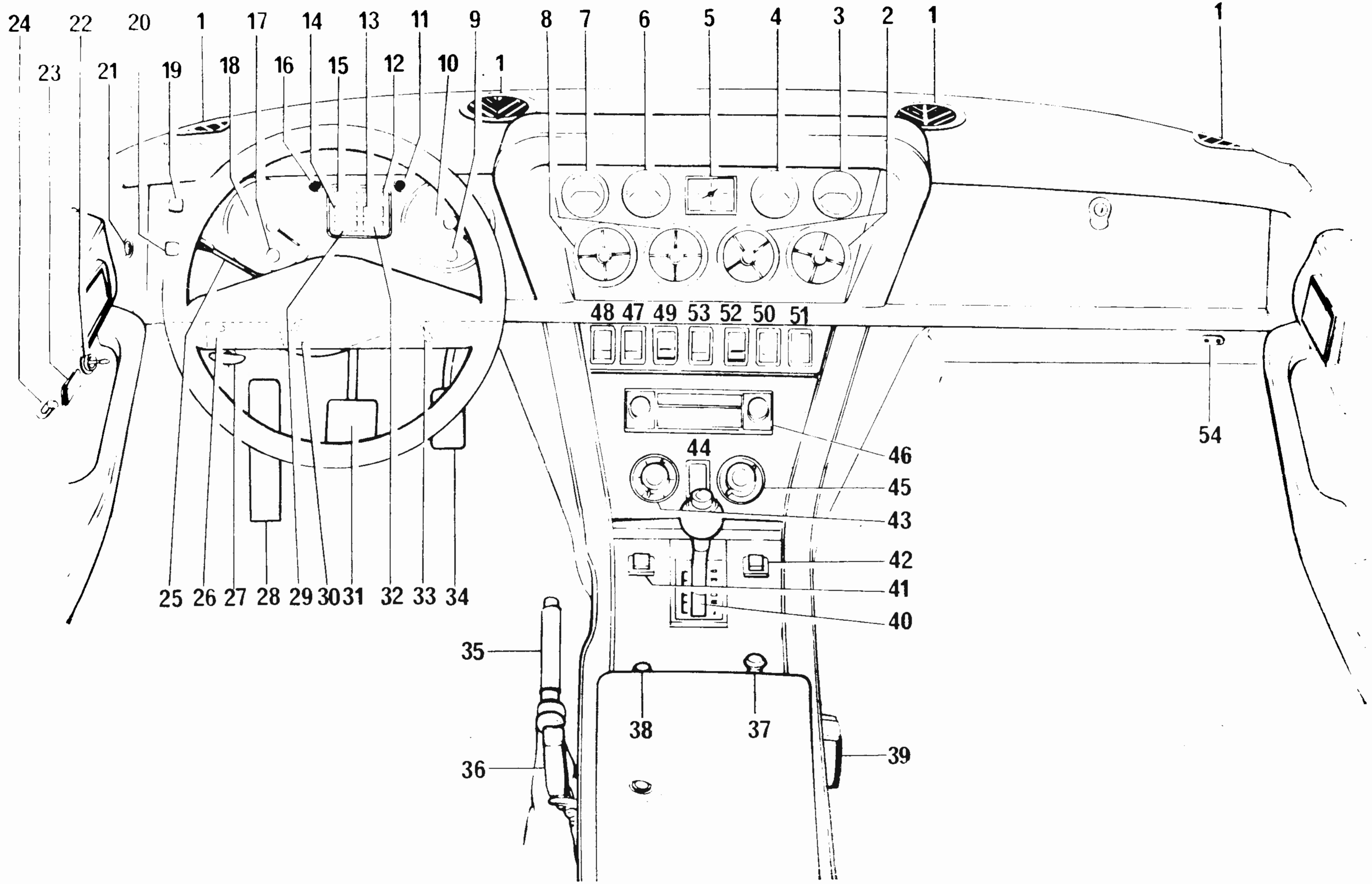


FIG. N9R LAYOUT OF CONTROLS L.H.D.

CONTROLS AND INSTRUMENTS (LEFT-HAND DRIVE)

1. Demister ducts
2. Face level directional vents
3. Temperature gauge
4. Oil pressure gauge
5. Electric clock
6. Fuel gauge
7. Voltmeter
8. Face level directional vents
9. Main beam warning light (blue)
10. Speedometer
11. Turn indicator warning light (green)
12. Brake/park warning light
13. Oil pressure warning light
14. Fuel filler cap warning light
15. Fasten seat belts warning lights
16. Turn indicator warning light (green)
17. Low fuel warning light
18. Tachometer
19. Panel lights dimmer
20. Windscreen wipe/wash
21. Light for windscreen wipe/wash switch
22. Wing mirror adjuster
23. Passenger door lock switch
24. Door lock (manual) L.H.
25. Turn indicator and headlamps switch
26. Reset button (convertible)
27. Bonnet release
28. Accelerator pedal
29. Heated backlight warning light
30. Ignition/starter switch and steering lock
31. Brake pedal
32. EGR warning light
    (Hazard warning light - German market only)
33. Trip winder
34. Dipswitch
35. Handbrake
36. Seat belt receiver L.H.
37. Radio speaker balance control
38. Cigar lighter
39. Seat belt receiver R.H.
40. Gear selector lever
41. Window lift switch L.H.
42. Window lift switch R.H.
43. Blower motor control
44. Compressor over-riding switch
45. Temperature and distribution control
46. Radio/tape player
47. Headlamps switch
48. Panel lights switch
49. Backlight switch (roof switch - convertible)
50. Hazard switch
51. Horn switch
52. Fuel filler flap switch
53. Fog lamp switch (aerial - North America)
54. Battery charging socket *Position may vary according to market

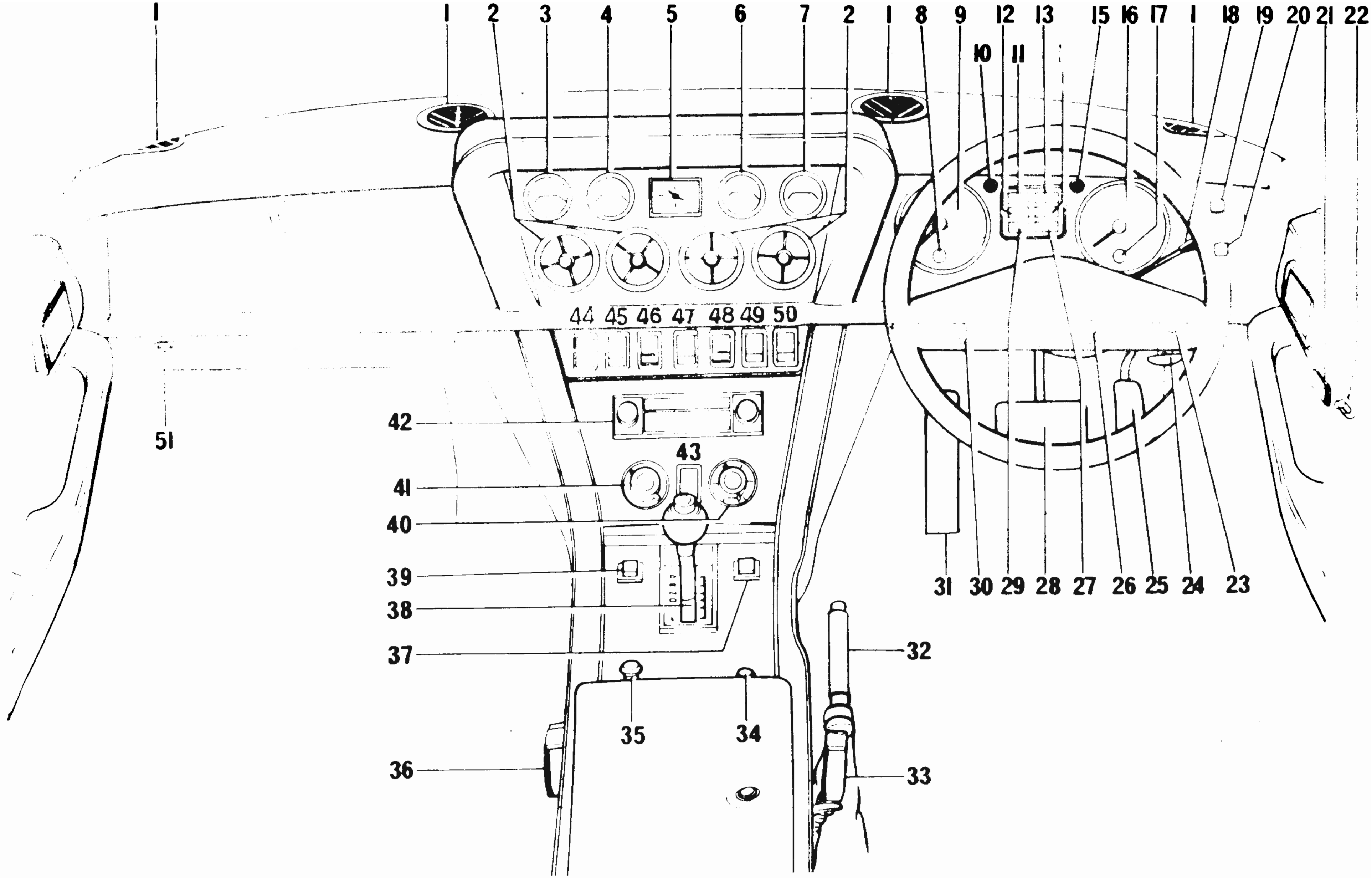


FIG. N10B LAYOUT OF CONTROLS R.H.D.

CONTROLS AND INSTRUMENTS (RIGHT - HAND DRIVE)

1. Demister ducts
2. Face level directional vents
3. Voltmeter
4. Fuel gauge
5. Electric clock
6. Oil pressure gauge
7. Temperature gauge
8. Main beam warning light
9. Speedometer
10. Turn indicator warning light
11. Brake/park warning light
12. Oil pressure warning light
13. Fasten seat belts warning light
14. Fuel filler flap warning light
15. Turn indicator warning light
16. Tachometer
17. Low fuel warning light
18. Turn indicator and headlamp flasher
19. Panel lights dimmer
20. Wipe/wash switch
21. Passenger door lock
22. Door lock manual R.H.
23. Reset button (Convertible)
24. Bonnet release
25. Accelerator pedal
26. Ignition/starter steering lock switch
27. Backlight warning light
28. Brake pedal
29. EGR warning light - North America
    (Hazard warning light - German market)
30. Trip winder
31. Dipswitch
32. Handbrake
33. Seat belt receiver R.H.
34. Radio speaker balance control
35. Cigar lighter
36. Seat belt receiver L.H.
37. Window lift switch R.H.
38. Gear selector lever
39. Window lift switch L.H.
40. Temperature and distribution control
41. Blower motor control
42. Radio/tape player
43. Compressor over-riding switch
44. Fog lamp switch
45. Fuel filler flap switch
46. Horn switch
47. Hazard switch
48. Backlight switch
49. Park lights switch
50. Lights switch
51. Battery charging socket
    *Position may vary according to market

N43B - LOCATION OF RELAYS & IDENTIFICATION

Vehicles use six or seven relays to operate the roof and quarter lights. The additional seventh relay is an inhibit relay employed when the roof cover is fitted. Under these conditions one inhibit relay disconnects the feed to the roof motor and the other relay disconnects the earth for the quarter lights.

When six relays are fitted one relay performs both operations.

The relays are attached to the L.H. hinge pillar in the luggage compartment, behind a casing. They may not be assembled in a uniform fashion, therefore, the only positive form of identification is by cable colours. These variations are as the following:-

Interior lights relay	P.PW.P.B.
Roof 'up' relay	WU.BW.NR.NG.or Y.
Roof 'down' relay	WP.BW.NR.NG. or Y. or R.
Roof 'inhibit' relay (six relays)	WS.YR.R.YP.
Roof 'inhibit' relay (seven relays)	WS.YP.NG.R. or Y.
Quarter light 'inhibit' relay (seven relays)	WS.YB.B.Y.or YG.
Quarter light separator relay 'up'	B.NY.NY. or WR. UY.
Quarter light separator relay 'down'	B.NY.NY.NY.or WR.
or	
Quarter light separator relay 'up'	B.R.R.R.or WR.UY.or R.
Quarter light separator relay 'down'	B.NY.NY.R.or WR.
or	
Quarter light separator relay 'up'	B.R.R.R.R.
Quarter light separator relay 'down'	B.NY.NY.R.
or	
Quarter light separator relay 'up'	B.WR.YB.R.
Quarter light separator relay 'down'	B.NW.YG.WR.

Colour code:	B. Black	Y. Yellow	P. Purple
	N.Brown	W. White	R. Red
	W.Blue	G.Green	S. Slate
	K. Pink		

Roof Cover Inhibit Relay

When the roof cover has been fitted correctly it will cause an inhibit relay to be energised and prevent the operation of the roof and quarter lights. The fastening base points are wired into a circuit which is completed when the roof cover has been fastened to the vehicle body. (The wiring is contained in the roof cover seam).

When the roof cover is fitted this completes a circuit from the ignition through the relay winding to earth. The power opens the relay contact points feeding the roof control circuit. If the roof main operating switch is pressed with the roof cover fitted, no current will flow to the roof motor or quarter light motors. See fig. N11B.

However, the quarter lights can be operated separately (Raise or Lower) by undoing specific fastenings on the roof cover and the roof zip fasteners to allow the quarter lights to pass through.

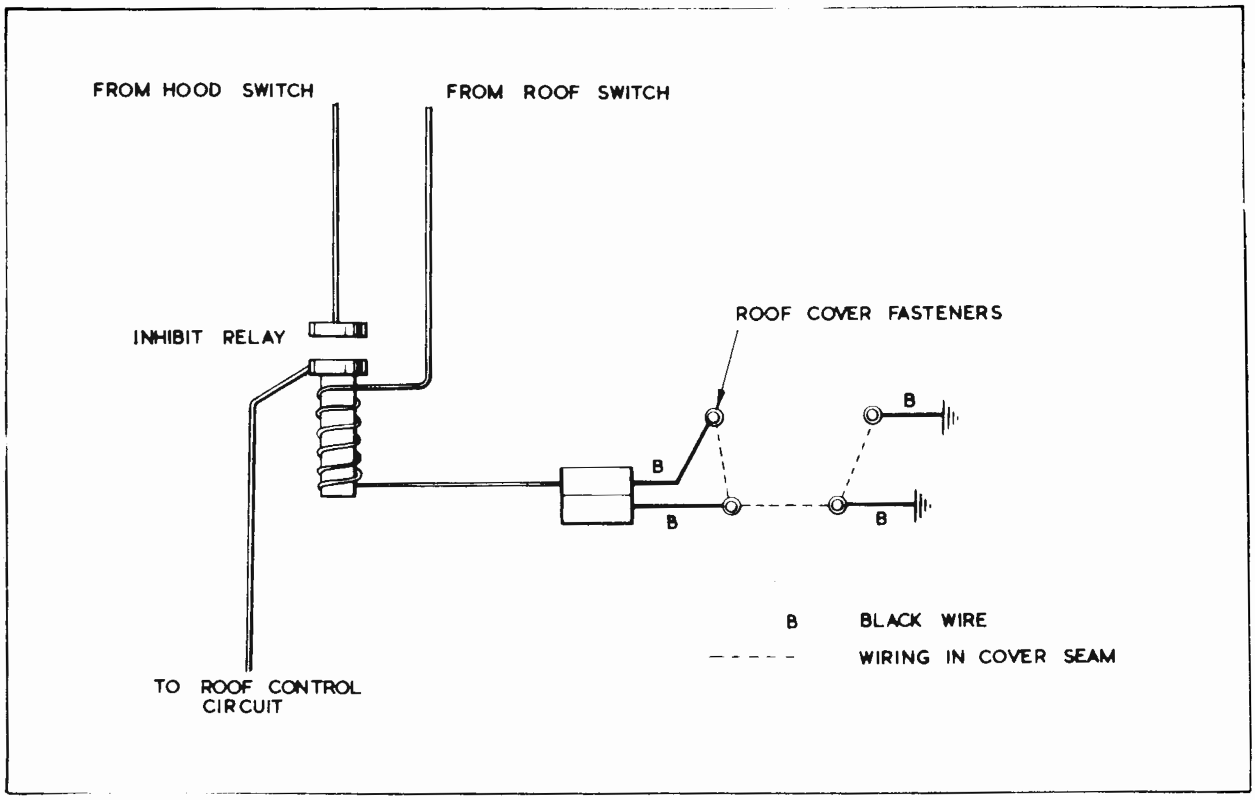


FIG. N11B. ROOF COVER INHIBIT RELAY

N44B - LOCATION & ADJUSTMENT OF MICRO SWITCHES (ROOF FULLY TRIMMED)

Six micro switches are used during the sequence of operation of the roof. Two are fitted to each quarter light assembly and two to the roof frame. To gain access to all the switches remove the rear quarter trim panels. See Section P25.

Carry out adjustments as follows:-

Before commencing checks on the roof operating sequence first connect a slave 12v battery to the system at the following connection points.

Disconnect the white/pink lead from the quarter light thermal cut out switch situated underneath the panel R.H. facia and tape back. Connect the thermal switch to the battery positive terminal. Disconnect the brown lead from the roof manual circuit breaker, tape back and connect the switch terminal to the battery positive. Connect the battery negative terminal to a suitable earthing point on the car. The system will now operate as normal using the facia rocker switch. See fig. N12B.

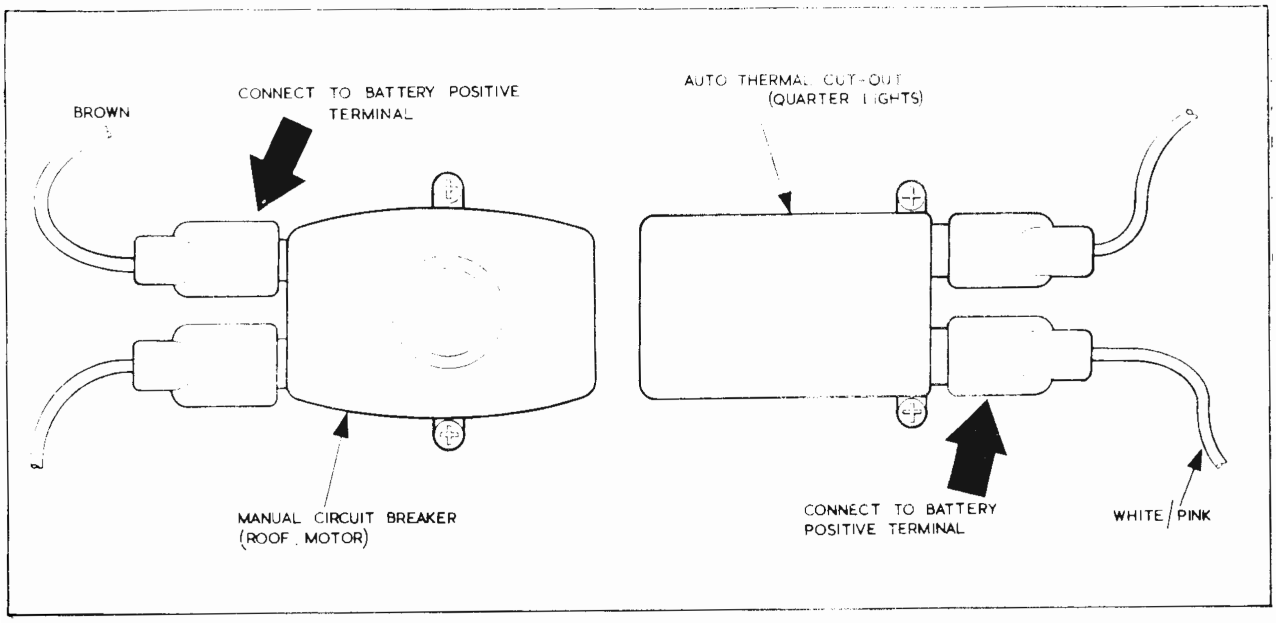


FIG. N12B. CONNECTION POINTS FOR SLAVE BATTERY

Roof Down Limit & Quarter Light Changeover Switch

This is located on the inside of the left mounting bracket on the roof frame. When the roof reaches its fully retracted position the switch is activated by an electrically mounted cam bolted to the roof frame. This causes the electro-hydraulic motor to switch off and at the same time switches on the quarter light motors.

Before proceeding with any adjustment first ensure that the quarter lights are fully raised.

To Adjust Micro Switch

1. With the roof slightly raised, loosen the electric cam locking nut and turn the cam away from the micro switch.

2. Push the roof down gently by hand (it is advisable to use a second operator during this operation) with a light steady pressure until the hood is just felt to bottom on the stowage deck. Before fully lowering the roof ensure that no 'foreign' articles are present in the stowage compartment otherwise correct closure will not be achieved and the roof may suffer damage and distortion.

3. Re-adjust the striker roller to just close the points on the micro switch. Re-check adjustment.

CAUTION: Do not at any time force the roof down. This will only strain the frame pivots and hinges causing permanent maladjustment.

Roof Fully Raised Stop Switch

The raised limit switch is mounted on the right main frame pivot bracket. The switch is operated when the leather trimmed hood rail contacts the limit switch striker roller.

To Check Adjustment

1. Raise the roof on power and observe the roof leading edge.

2. The roof should automatically stop with the leading edge vertically above the windscreen header rail so that the roof can be seated without strain onto the windscreen header rail spigot posts. Further travel will damage the rear quarter lights.

3. Release the header rail from the spigot posts by lifting gently upwards thereby allowing the leading edge to assume its natural position. This should be $\frac{1}{4}$ - $\frac{1}{2}$" (6 - 13mm) above the spigot post tips.

To Adjust The Roof Raised Limit Switch

1. Slacken the limit switch mounting nuts and move the switch in its slotted holder, so that the striker just operates the switch points with the roof in the raised position as described in "To Check Adjustment - 2" Set the switch in this position but do not overtighten the switch mounting nuts or the switch casing will be compressed causing malfunction.

2. Re-check switch operation.

Quarter Light Setting and Adjustment

Note: Before checking adjustment of rear quarter lights first check the front fixed quarter lights and door droplights for correct adjustment. See Section P15B.

To Adjust Rear Quarter Lights

The Quarter lights are adjusted correctly when there is a gap of $\frac{1}{4}$" (6mm) between the front edge of the quarter light frame and the rear edge of the door droplight frame when in the raised position. In the retracted position the quarter light must come to rest $\frac{1}{4}$in (6mm) from the wheel arch. (See fig. N13B).

To Adjust Quarter Light Upper Limit Switch

The switch is situated at the forward inside edge of each rear quarter light mounting. The switch can be moved by loosening the two retaining nuts. Adjust the position of the switch to comply with fig.N13B. Do not overtighten the nuts after adjustment as this will distort the switch case causing malfunction.

Note: Do not adjust by bending the striker arm.

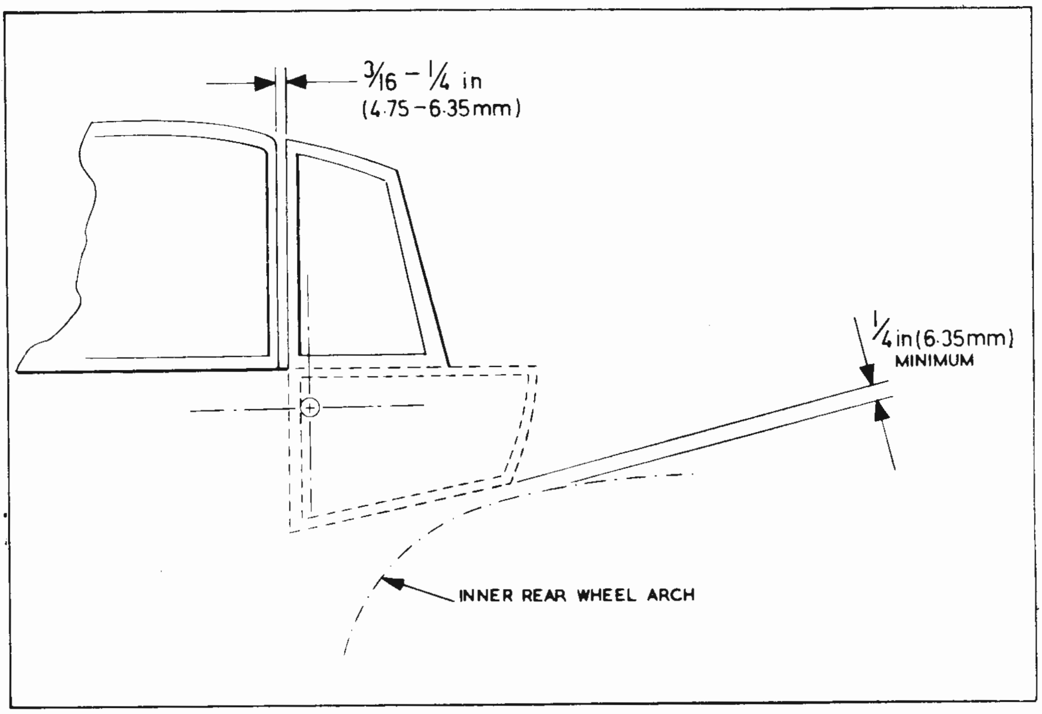


FIG. N13B. ADJUSTMENT OF REAR QUARTER LIGHTS

To Adjust Quarter Light Lower Limit Switch

The switch is situated at the rear inside edge of each rear quarter light mounting. Adjustment of the switch is as for the upper limit switch and the limit of travel as shown in fig. N13B. This setting is very important, otherwise the quarter lights may foul the rams or body resulting in extensive damage.

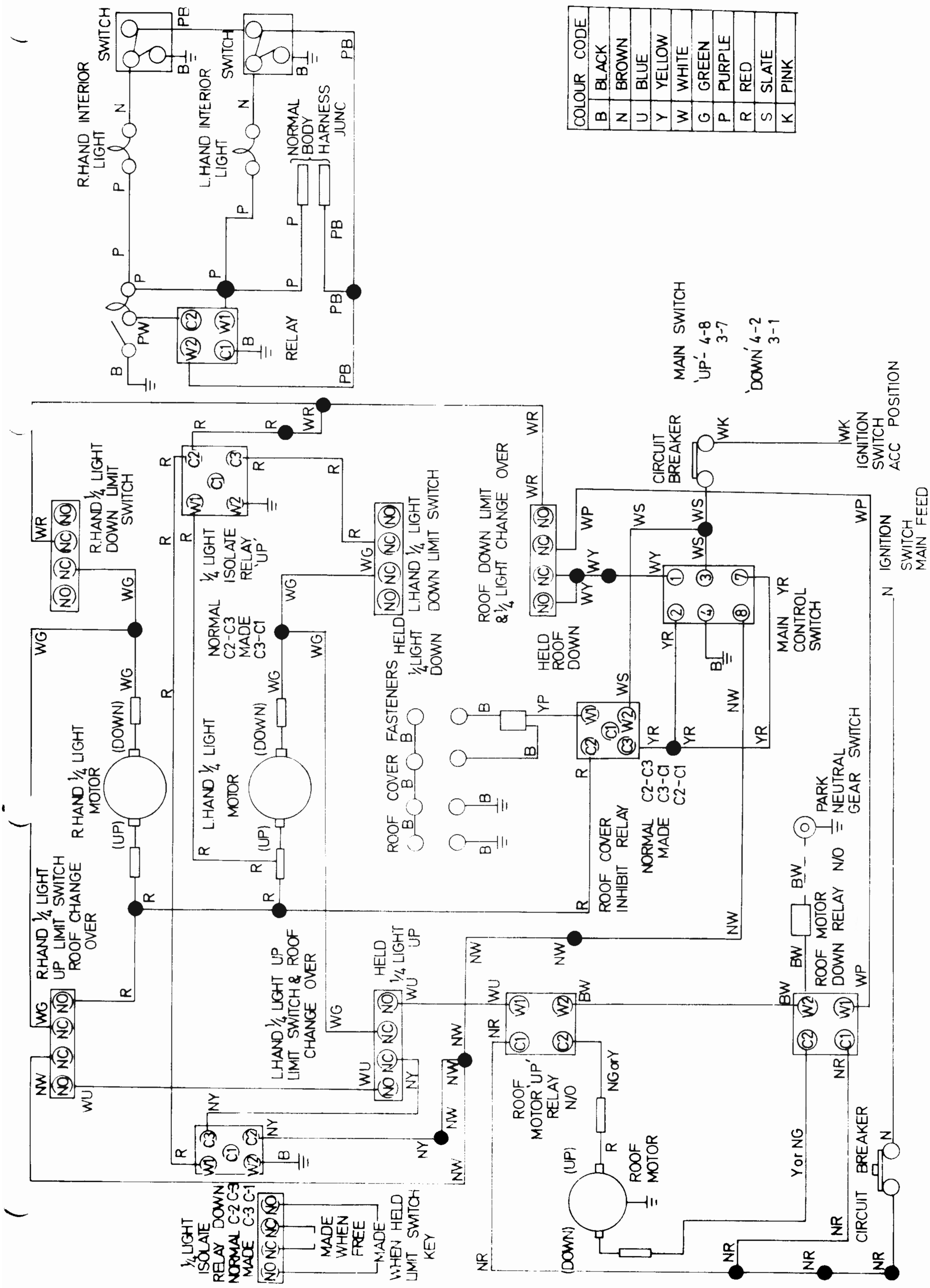


FIG. N14B ROOF ¼ LIGHT AND INTERIOR LIGHT CIRCUIT FROM CHASSIS No. 9670

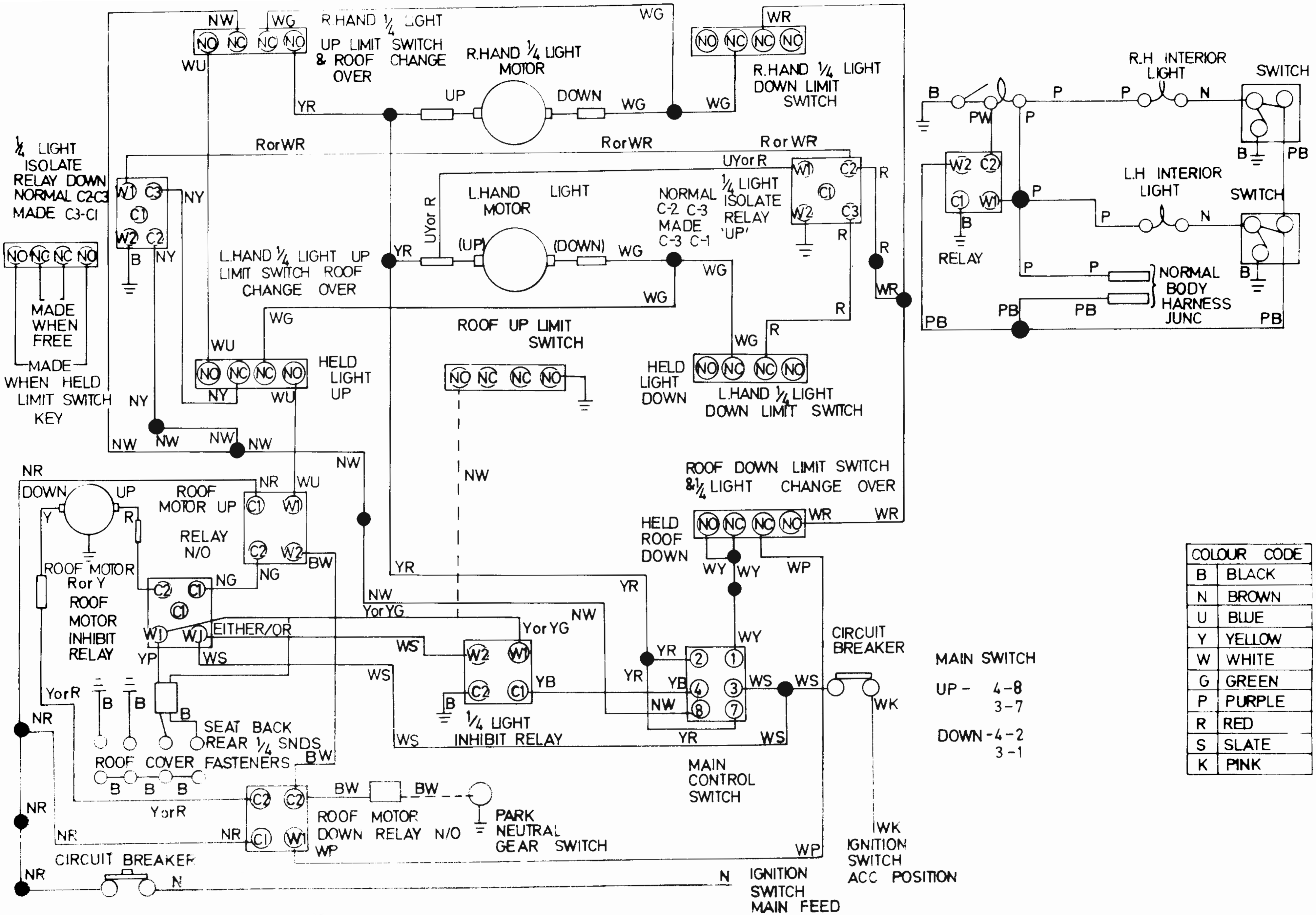
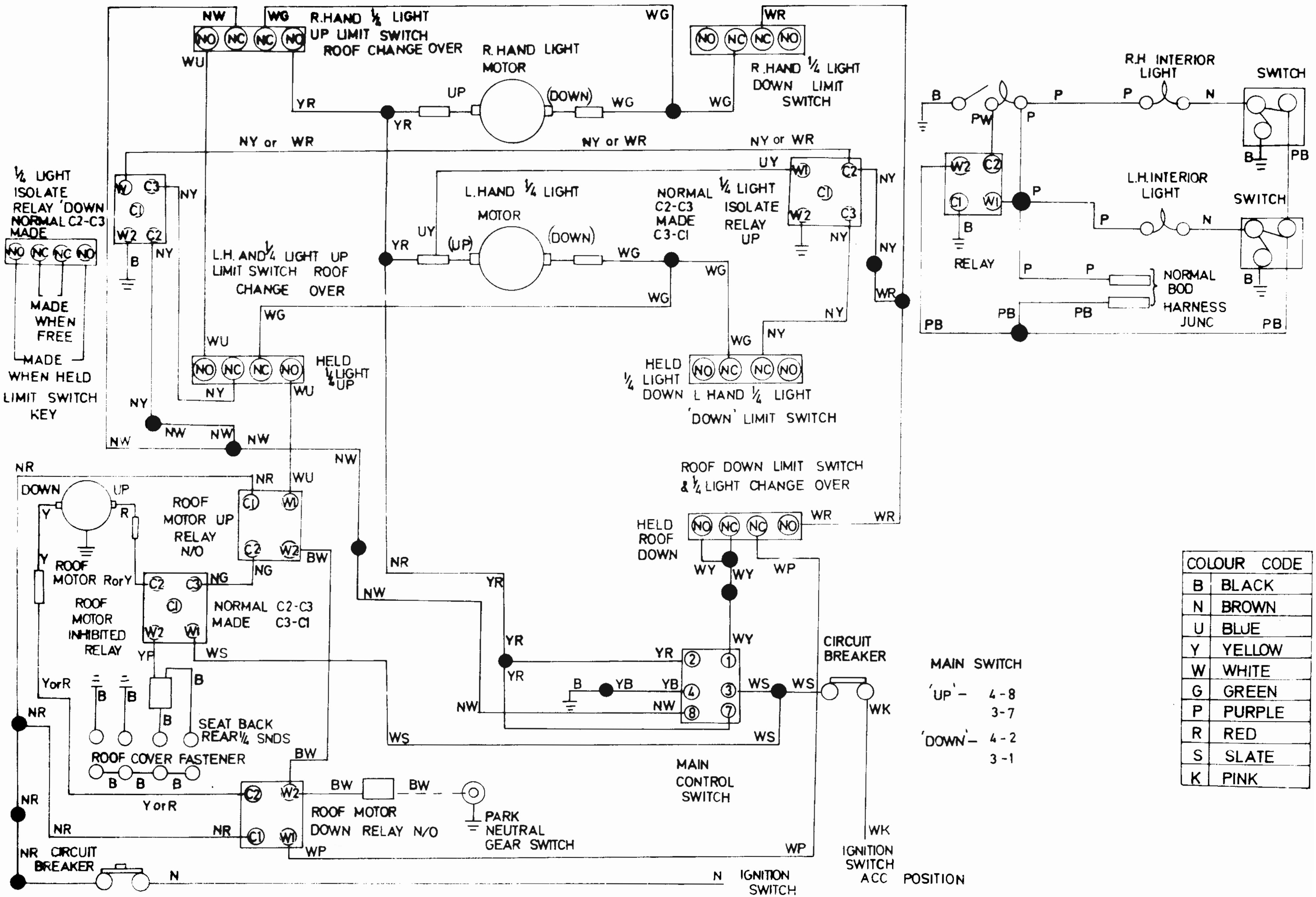


FIG. N15B ROOF, [illegible]HT AND INTERIOR LIGHT CIRCUIT FROM CHASSIS No. 9491 - 9659



COLOUR	CODE
B	BLACK
N	BROWN
U	BLUE
Y	YELLOW
W	WHITE
G	GREEN
P	PURPLE
R	RED
S	SLATE
K	PINK

MAIN SWITCH

'UP' –	4 - 8
	3 - 7
'DOWN' –	4 - 2
	3 - 1

FIG. N16B ROOF ¼ LIGHT AND INTERIOR LIGHT CIRCUIT UP TO CHASSIS No. 9490

WHEELS AND TYRES

INDEX

0.8 BRIEF DESCRIPTION

Exceptionally strong pressed steel road wheels are fitted of 15" dia. and 6" rim width. These are secured to the hubs with five studs and ball faced nuts.

In the interests of safety and comfort all wheel assemblies are balanced during car production. The balance should be checked from time to time.

0.9 WHEEL MAINTENANCE

1. The lateral variation measured on the vertical inside face of flanges must not exceed $\frac{1}{16}$th of an inch.
2. On a truly mounted and revolving wheel the difference between high and low points, measured at any location on either tyre bead seat, must not exceed $\frac{1}{16}$th of an inch.
3. There is no effective method of truing eccentric pressed steel wheels economically and they should be replaced.
4. Wheel nuts should be lightly oiled and free on their studs. When fitting a wheel all the nuts should be screwed up very lightly, making sure that their seatings register with the seatings in the wheel.
5. Final tightening should be done progressively and alternately by short turns of opposite nuts to ensure correct seating and to avoid distortion.
6. Wheels with damaged or elongated stud holes should be changed.
7. Rim seatings and flanges in contact with the tyre beads should be free from rust and dirt.

0.10 TYRES

The tyres fitted as standard equipment on R.H.D. cars are Dunlop SP Sport tubeless, the size being ER70VR15.

The tyres fitted as standard equipment on L.H.D. cars are Pirelli Cinturato HS tubed, the size being GR70VR15.

Tyre equipment should never be "mixed" as vastly different properties in tyres now available, could result in a dangerous combination, particularly on a high performance car.

Tyre pressures. COLD.

Normal load	Front	28 p.s.i.	1.97 Kg/sq.cm.
	Rear	32 p.s.i.	2.25 Kg/sq.cm.

Max load	Front	32 p.s.i.	2.25 Kg/sq.cm.
	Rear	36 p.s.i.	2.53 Kg/sq.cm.
Speeds over 110 m.p.h. (176 k.p.h.)			
	Front	36 p.s.i.	2.53 Kg/sq.cm.
	Rear	40 p.s.i.	2.81 Kg/sq.cm.

> NOTE:
>
> Only vulcanised repairs by reputable dealers can be considered satisfactory for high-performance vehicles.

0.11 REPAIR OF SMALL PENETRATIONS

Normally a tubeless tyre will not leak when the tread is penetrated by a nail or other small object, provided that it is left in the tyre. Examine the tyres from time to time and withdraw such objects at a time when loss of air will cause least inconvenience. If they are left in the tyre indefinitely, the original injuries may extend.

> NOTE:
>
> The use of plugs for the repair of penetrations in the tyre is NOT recommended.

A vulcanised patch repair is preferable but in the absence of vulcanising equipment a cold solutioned patch may be used. The Dunlop VP/8 "Vulcafix" patch is recommended.

During tyre removal and refitting it is most important to avoid damage to the rubber surfaces of the beads.

0.12 VULCANISED REPAIRS

1. With wire brush, thoroughly clean and roughen area inside the tyre around the hole, slightly larger than the patch, and remove dust. This cleaning operation is most important and should be carried out correctly.
2. If the hole has not previously been filled, use "Reddiplug" or uncured tread compound for small tread penetrations and uncured tread compound for all others. Trim flush on inside. If uncured tread compound is used, apply vulcanising solution to the hole and allow to dry before pressing the compound into the hole.
3. Apply two coats of vulcanising solution to the cleaned and roughened area and allow each coat to dry. Fit Dunlop PP/1 vulcanising patch or $\frac{1}{16}$th

inch uncured cushion compound.

4. Vulcanise.

0.13 COLD REPAIRS

1. Prepare as for vulcanised repairs, taking particular care over cleaning and roughening.
2. Apply patching solution.
3. After allowing the solutioned area to dry, remove the protective backing from a Dunlop VP/8 "Vulcafix" patch and apply. Press well down, particularly at the edges. Do not attempt to lift the patch after fixing.

0.14. TYRES - REMOVE AND REFIT

To Remove

As inextensible wires are incorporated in the beads of the outer cover, the beads must not be stretched over the wheel rim.

The correct method of tyre removal is as follows:

1. Remove the valve cap and core and deflate the tyre.
2. Press each bead in turn off its seating. Insert a lever at the valve position and, while pulling on this lever, press the bead into the well diametrically opposite the valve.
3. Insert a second lever close to the first and prise the bead over the wheel rim. Continue round the bead in small steps until it is completely off the rim.
4. Remove the inner tube and pull the second bead over the rim.

To Refit (Tubeless)

1. Rim preparation- remove mud and dirt from wheel, taking care not to damage the paint.
2. Hammer out any dents in the rim flange.
3. Clean the rim bead seats thoroughly. Use emery cloth, steel wool, a wire brush or file, depending on the amount of dirt, rust, rubber and surface irregularities to be removed. Smooth paint need not be removed.
4. File or buff away any high spots at the welded joint.
5. Wipe rim clean with a moist rag.
6. Valve fitting - the valve can be pulled into position or extracted with the aid of special tool (Part No.268723).
7. Extraction of the valve is brought about by continuing the downward pressure on the tool handle, thus drawing the broad rubber base through

the valve hole in rim.

8. Tyre fitting - the tyre beads and their rubber surfaces must not be damaged during fitting. Do not use a hammer or mallet.
9. Remove spacers from between the beads.
10. Wipe beads clean with a damp cloth.
11. Moisten tyre beads, rim surfaces and fitting levers with clean water.
12. Fit tyre in normal manner, using narrow levers in good condition and free from sharp edges. Take small bites in order to avoid strain or damage to the beads. Exercise particular care to ensure that the rubber bead toes are not torn when lifted over the rim flanges.
13. The second bead should be fitted so that the part nearest the valve goes over the rim last.
14. Inflation - remove the inner core from valve.
15. Holding the tyre and wheel upright, bounce the tread of tyre on the ground at several points around its circumference. This will help to snap the beads on to the tapered rim seats and provide a partial seal.
16. Connect air line with valve core still removed and inflate with the wheel and tyre upright. If the first rush of air does not seal the beads, continue to bounce the tyre with the air line attached until the beads are fully home against the rim flanges.
17. Remove air line and fit valve core, then inflate to 50 p.s.i. (3.5 kg/sq.cm.).
18. If air continues to escape under the beads after bouncing and the tyre cannot be inflated, use one of the following methods to seat beads:

Method 1

A tyre tourniquet (Part No.268722) can be used to assist the sealing of tyre against rim seats.

19. With the tool in open position, buckle the strap centrally around the tread of the deflated tyre and wheel assembly. Pull strap through buckle as tightly as possible.
20. Thread the loose end of strap through gap between rivet and roller on link mechanism and compress tread by pulling handle through 180°.

21. With valve core removed, attach the air line and inflate until the beads are sealed against the flanges. If they fail to seal at the first attempt, move the handle back and re-tighten the strap. When the beads are home, disconnect the air supply and fit the valve core, then remove the tourniquet before final inflation.

22. To remove the tourniquet, move the handle back and press the thumb on the end of buckle - pushing the slider bar on the buckle inwards and upwards.

23. Inflate to 50 p.s.i. (3.5 kg/sq.cm.) and test.
 a. An efficient hand or foot pump will inflate a tubeless tyre when a tourniquet is available;
 b. A tourniquet may be improvised from a length of rope and a twisting bar.

Method 2

This method is usually effective if bouncing fails and a tourniquet is not available.

24. With tyre on rim wipe beads and rim seat dry.

25. Lean tyre and wheel against a wall at an angle greater than 45°.

26. Press wheel centre so that nearest bead obtains a hold on the rim seat.

27. Turn tyre and wheel around and place the other side against wall, leaning at a greater angle. Ensure that the first bead is not dislodged.

28. With the valve core removed, attach an air line. Inflate tyre and press gently against wheel centre whilst inflating to seal the second bead. Alternating rather than continuous hand pressure may be found helpful. Continue to inflate until beads are properly seated.

29. Remove air line and fit valve core, then inflate to 50 p.s.i. (3.5 kg/sq.cm.) and test.

30. Testing for leaks: A few minutes after inflating, immerse the tyre and wheel in a water tank and check for air leaks.

31. Place assembly in tank with valve uppermost. Submerge valve and check.

32. Release and allow the assembly to float, with channel between the rim

flange and tyre filled with water. Check carefully for air bubbles above the rim flange.

33. Turn wheel assembly over and submerge wheel rivets if they are not already under water. Check for leaks at rivets.

34. Submerge the assembly to fill between flange and tyre, then allow to float. Check for air bubbles at rim flange.

35. To seal leaks - leak at top of rim flange:
Mark on tyre and rim the position of leak and deflate tyre. The leak may be caused by dirt, rust, a high weld or chipped paint. By holding the bead away from rim seat, the cause of the leak can often be located and cleared without removing the tyre.

36. Leak at wheel rivets: Mark position of leak on rim then deflate and remove tyre. Peen the head of the defectively sealed rivet with a ball peen hammer whilst it is supported by another hammer or suitable tool.

37. Leak at valve base: The valve should be replaced if after ensuring that it is properly seated, the leak continues.

0.10A TYRES

The tyres fitted as standard equipment are either Dunlop SP tubed type - the size being ER70 VR15, or Pirelli Red Spot tubed, size GR70 VR15.

Tyre equipment should never be 'mixed' as vastly different properties in tyres now available, could result in a dangerous combination, particularly on a high performance car.

Tyre pressures. COLD.

Market	Tyre size designation	Vehicle capacity weight	Maximum load rating		Recommended Tyre inflation pressure: With 2 persons	With max. load	At high speed (over 110 mph (177 kph))
North America	GR70 VR15	4,800lb (2,177kg)	-	Front	28 psi (1.97kg/sq.cm)	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)
				Rear	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)	40 psi (2.81kg/sq.cm)
	ER70 VR15	4,800lb (2,177kg)	-	Front	28 psi (1.97kg/sq.cm)	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)
				Rear	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)	36 psi (2.53kg/sq.cm)
Europe & Japan	GR70 VR15	-	1,830lb (831kg)	Front	24 psi (1.68kg/sq.cm)	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)
				Rear	28 psi (1.97kg/sq.cm)	36 psi (2.53kg/sq.cm)	40 psi (2.81kg/sq.cm)
	ER70 VR15	-	1,490lb (677kg)	Front	24 psi (1.68kg/sq.cm)	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)
				Rear	28 psi (1.97kg/sq.cm)	36 psi (2.53kg/sq.cm)	40 psi (2.81kg/sq.cm)
Australia	GR70 VR15	-	1,830lb (831kg)	Front	28 psi (1.97kg/sq.cm)	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)
				Rear	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)	40 psi (2.81kg/sq.cm)
	ER70 VR15	-	1,490lb (677kg)	Front	28 psi (1.97kg/sq.cm)	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)
				Rear	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)	36 psi (2.53kg/sq.cm)
U.K.	GR70 VR15	-	1,830lb (831kg)	Front	28 psi (1.97kg/sq.cm)	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)
				Rear	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)	40 psi (2.81kg/sq.cm)
	ER70 VR15	-	1,490lb (677kg)	Front	28 psi (1.97kg/sq.cm)	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)
				Rear	32 psi (2.25kg/sq.cm)	36 psi (2.53kg/sq.cm)	40 psi (2.81kg/sq.cm)

Note: Only vulcanised repairs by reputable dealers can be considered satisfactory for high-performance vehicles.

SECTION P

WORKSHOP MANUAL

INTERCEPTOR &FF

BODY

INDEX

P.13 BRIEF DESCRIPTION

The steel body and ladder-type tubular chassis frame are welded together to form an extremely rigid unit.

The bonnet top is hinged at the front and supported on two telescopic struts when in the open position. A safety prop is provided to supplement the telescopic struts.

The boot lid is hinged to the roof rear rail and the lifting mechanism is spring-assisted.

Two doors are fitted, hinged at their forward edges and embodying electric window lift mechanism.

Body Interior

Upholstery is in hide on both the Interceptor and the FF. Individual, fully-adjustable bucket seats are fitted in front. Fore/aft movement is $5\frac{1}{4}$ in. The seat backs can be adjusted to any angle within their range of movement. Combined door pulls and arm rests are mounted in the door.

The individual rear seats have a folding centre arm-rest. Heavy pile carpets with felt underlays are fitted.

A laminated glass windscreen and electrically heated back light are standard equipment.

Seat belts are fitted as standard for both front seat occupants and anchorages are provided for rear passenger belts. All seat belt anchorages comply with Specification BS.AU.48-1965.

P.14 CARE OF BODYWORK

The careful maintenance of the bodywork, both internally and externally, is of primary importance if the car is to retain its appearance and comfort. The paintwork, upholstery, carpets, door locks and hinges will each benefit from the periodical attentions briefly indicated in the following paragraphs and these attentions should, therefore, be undertaken as regularly as possible

Care of the Bodywork

The cellulose finish of the bodywork should receive regular care and attention if it is to retain its original lustre. If neglected, the finish of the car will have a tendency to become dull, the dullness taking a form of 'bloom' on the surface of the paintwork.

Frequent washing with clean, cold, running water will greatly assist in the retention of the original lustre. Always ensure that the sponge and leather used are free from grit and oil.

Should the cellulose become dull, an application - sparingly used - of one of the liquid polishes of reputable manufacture will restore the finish to its original shade. An occasional application of good class wax polish after the car has been thoroughly washed will give added protection.

Chromium

Plated parts should be finished with a damp leather. If the chromium is very dirty it should be washed in warm soapy water but on no account should metal polish be used.

Door Locks and Hinges

Occasionally apply a few drops of oil on the moving parts of all door locks and hinges. A light touch of grease should be smeared on the lock striker plates or pegs to ensure free movement and to reduce wear of the locks.

Upholstery

The upholstery has, in general, an impermeable surface and it can be kept clean and fresh looking by an occasional wiping down with a damp cloth and saddle soap. Finish off, when completely dry, with a good furniture cream.

Seat Slides

Occasionally check the securing screws for tightness and apply a little grease to the runners on the floor beneath the seats. Carefully remove the surplus grease to avoid damage to the carpets.

Carpets

All carpets should be kept free from dust and grit by use of a vacuum cleaner or vigorous brushing with a stiff brush. Periodically the carpets and felts should be removed and thoroughly beaten, after which the body floor should be inspected.

Windows

Windows and the mirrors should be cleaned with a damp leather.

P.15 DOORS AND DOOR GLASSES

Doors - Remove and Refit

1. Remove door casing (see below).
2. Remove pin from door check.
3. Disengage four snap connectors, one earth wire, 2 speaker wires and on Federal cars only, 2 brown warning buzzer leads, and withdraw harness through grommet in door frame.
4. Remove circlips from hinge pins and remove pins.
5. Remove door.
6. To refit reverse removal procedure.

Door Hinges

Both doors have two hinges each, all of identical pattern. One half of each hinge is welded to its respective door pillar, the working half of each being secured to the door by four screws and subsequently welded.

When fitting hinge pins, the lower hinge pin should be inserted from above and the upper pin inserted from below.

Circlips are fitted on the top hinges only.

Should excessive wear develop in the hinge pins, the hinges should be reamed out and oversize pins fitted.

Door Casing - Removal

1. Remove locking button - this unscrews in both and burst-proof locks.
2. Remove remote control handle - 1 screw.
3. Remove 17 screws and withdraw chrome finisher.
4. Lift casing and withdraw.

Door Locks (Burst Proof) (Removal)

1. Remove the door casing.
2. Remove circlip and pull off remote control bar.
3. Remove self locking nut on lock bar and pull bar out of lock.
4. Remove 4 lock retaining screws from edge of door and withdraw lock and backing plate from inside door.

Reverse the procedure for replacement.

Door and Lock Adjustments

Latch adjustment is made by releasing the 2 retaining screws on the B post and repositioning the hook.

Handle/Lock adjustment is made on the screw and nut between the two.

Remote Control Handle/lock adjustment is made on the threaded rod at the handle end.

To Remove Door Drop Glass

1. Remove door casing.
2. Remove 2 bolts retaining rear vertical frame.
3. Remove 2 bolts holding glass to lift mechanism.
4. Tip glass forward at front and ease out.

To refit - reverse the procedure.

To Remove Door Frame

1. Remove door casing.
2. Remove 5 bolts holding frame to door or brackets.
3. Pull frame out thro' top of door ensuring that the tag on the rear of the frame is eased out of the door first.

To refit - reverse the procedure, making sure that the packing pieces where fitted are replaced.

Removing Drip Rails and Window Mouldings

These are secured to the body frame by chrome screws. The moulding can then be removed after removing the screws.

P.16 WINDSCREEN

Removing and Replacing Windscreen

To remove the screen the top and bottom centre cover plates on the moulding must be pushed to one side so that the moulding can be withdrawn in two parts from the rubber section.

On cars to federal specification, the top mould cover plate is bolted in. To gain access to the nuts the interior mirror and top windscreen trim pad will have to be removed.

Following this, it will be possible to remove the screen complete with its rubber surround from the body flange.

To replace screen the one piece rubber section should be fitted to the outside edge of the glass and the chrome moulding inserted. Next, two 15 feet lengths of 1/8th inch diameter cord are required. These should be treated with beeswax. One length should be laid round the body flange root periphery and 'dum-dum' applied at intervals to hold it in position. The other length should be similarly fixed in the body flange slot in the rubber section as shown in the illustration. The screen, complete with rubber surround and cord, should then be placed into the screen frame in the body. The surround mouldings can now be fitted into the slots in the rubber section and the cover plates moved sideways to join their ends. Next, ease out the inner and outer rubber flange lips by withdrawing the cords.

On federal cars, the procedure for refitting the top mould cover plate is the reverse of removal.

It should be noted that the windscreen on cars to the federal specification are 'stuck' in, the adhesive used being BOSTIK GLAZING COMPOUND B.10.

P.17 BACKLIGHT

Removing and Replacing Backlight Glass

First, remove the glass heater cable connectors and the four moulding cover plates by removing six domed nuts. Then remove the top moulding which is held in position by four domed nuts. The remaining three mouldings are held in position by plates with domed nuts.

The filler strip in the rubber surround should now be extracted and the leads to the heater element disconnected. The glass complete with rubber surround can then be withdrawn from the frame.

When removing the rubber surround from the glass, care should be taken not to damage the holes in the rubber provided for the leads to the glass heater element.

Backlight replacement is achieved by simply reversing the dismantling procedure.

Removing Rear Light Assembly

1. Remove top moulding
2. Remove two domed nuts from each support bracket and disconnect supports.
3. Disconnect lead to glass heater element.
4. Remove six setscrews from each hinge.

The rear light assembly can now be lifted away from the car.

P.18 REAR QUARTER LIGHT

Removing Rear Quarterlight

Remove shut pillar moulding by withdrawing chrome screws. Two studs are fitted on the front edge of the light frame and these enter two oversize holes in the shut pillar, thereby forming a hinge.

By removing the two stud nuts and the mushroom-headed catch screw, which requires a special key, the quarterlight assembly can be removed. Four grub screws at the top and bottom forward ends of the frame lock the glass in position. By removing these the glass can be withdrawn from the frame.

To remove Rear Extractor Vent Grille

1. Prise out Jensen emblem retained by 2 plastic cups and pins.
2. Pull off black channel section.
3. Remove 4 retaining screws and withdraw grille.

To refit - reverse procedure.

To remove body side sills

Remove 2 screws from front and rear, 6 from underneath and pull off sill.

P.19 SEATS

Front Seats

The fore and aft adjustment range of the front seats is: to adjust the seat position, the adjuster knob should be pulled out and released when the required position has been attained. Rake adjustment to the seat back is effected by rotating the knurled knob on the outside of either seat hinge. The seat back can be tilted for access to the rear compartment by lifting the lever on either side of the hinge, and tilting the back forwards.

Front Seat Removal

To remove a front seat it is only necessary to withdraw the four screws which secure the seat slide mechanism to the floor. The seat can then be lifted out complete with the sliding mechanism.

Rear Seat Removal

The rear seats cushion has no fixing and can be lifted away without preparation. The seat back assembly is secured to the frame unit by four wing nuts. Two of these wing nuts are accessible from inside the boot and one from inside each rear wheel arch. After removing the four wing nuts the complete back squab assembly, including the hinged centre arm rest, can be lifted away.

Removal of Deck Behind Rear Seats

Remove five P.K. screws from flange at rear of panel and two wing nuts from underneath panel. Free off back squab by loosing off back squab wing nuts. The deck panel can then be withdrawn.

P.20 BUMPERS

Front Bumpers

The bumper assembly is made up of three sections with detachable over-riders and brackets. It is attached to the body at four points.

To remove Front Bumper

It will be necessary to first remove both outer headlamps (See 37)

Next remove the two screws entering from below the two tubular front brackets. The two end fixing screws can now be removed and note should be taken of the position of the various washers and spacers when carrying out this operation. The bumper assembly can now be withdrawn by sliding it forward and out of its front tubular supports,

To reassemble, reverse the above operation.

Rear Bumper

The rear bumper is one piece and is fitted with two over-riders and two number plate illumination lamps.

To remove the rear bumper assembly, disconnect the snap connectors for the number plate lamps, remove the two screws entering from below the tubular brackets, the two forward fixing bolts. The bumper assembly can now be withdrawn by sliding it backwards out of its tubular supports.

To re-assemble, reverse the operation.

P.21 AIR INTAKE AND OUTLET GRILLES

There are four grilles of aluminium slats fitted to the Interceptor body, and six on the FF body, the latter having an extra outlet on each front quarter panel.

1. Radiator intake grille.
2. Air outlet grille at front quarter panel R.H.
3. Air outlet grille at front quarter panel L.H.
4. Air intake grille on scuttle top.

Removing and Replacing Grilles

The radiator grille is fitted with four studs which secure it to four body brackets with nuts. After removing the four nuts the grille can be withdrawn forward.

The outlet grilles are secured at the bottom by two P.K. screws, accessible from outside the body, and two nuts at the top accessible from inside.

Scuttle Top Grille

The scuttle top grill is retained by two grille mounted studs. To remove the grille it will first be necessary to remove the ducting adjacent to it to gain access to the nuts.

P.22 BONNET TOP

Removing the Bonnet Top

1. Disconnect telescopic and safety struts from bonnet top.
2. Remove two hinge nuts from below surround flange panel and lift away.

P.23 REMOVING AND REPLACING TRANSMISSION COVER, CONSOLE AND FACIA

1. Remove gear lever knob by releasing Alan screw.
2. Remove 2 screws at rear of gear selector panel and lift out panel after disconnecting switches and bulbs.
3. Remove rear vent panel retained by 6 screws and disconnect the tubes held in by 2 screws.
4. Remove one screw in each corner of the console switch panel, disconnect 3 wiring blocks, remove vacuum pipes from heater switches taking care to label them before removal, and then withdraw the panel.
5. Remove both console forward side panels by removing 2 bolts top and bottom on each side.
6. Release rubber stop, remove 2 bolts on hinge attachment and withdraw cubby box assembly.
7. Remove companion box and side panel assembly by removing 3 screws on each side and one each side into the facia panel.
8. Remove steering wheel (see F.31).
9. Remove switch panel retained by 2 screws.
10. Remove lower ignition switch cover panel held in by one screw in each corner; release knurled nut on trip cable and withdraw.
11. Remove screen pillar finishers each held in by 2 screws.
12. Remove the 2 panels on the extremities of the facia.
    NS. Remove 3 screws and disconnect plug wiring
    OS. Remove 5 screws.
13. After removing 2 x $\frac{1}{4}$" bolts into the bulkhead on each side and 2 x 2BA nuts just to the outside of the 2 demister vents and approximately on the same line, the heater ducting tubes, speedometer cable, loom plates and grommets and disconnect wiring blocks under bonnet, the facia can be withdrawn.

P.24 HEADLINING

Headlining - Removing and Replacing

1. Remove rear view mirror and disconnect wiring.
2. Remove sun visors.
3. Remove screen top header rail.
4. Remove rear quarter casing, rubber sealing section and rear crash rail.
5. Remove interior lights, grab handles and cant rail splines.
6. The headlining which is bonded to the inside of the roof panel can now be pulled away.

Headlining - Refit

Reverse removal procedure, using new headlining.

P.13A BRIEF DESCRIPTION

The steel body, and ladder-type tubular chassis frame are welded together to form an extremely rigid unit.

The bonnet top is hinged at the front and supported on two telescopic struts when in the open position. A safety prop is provided to supplement the telescopic struts.

The boot lid is hinged to the roof rear rail, and the lifting mechanism is spring assisted.

Two doors are fitted, hinged at their forward edges, and embodying electric window lift mechanism.

BODY INTERIOR

Upholstery is in either hide or hide and sheepskin. Individual, fully adjustable bucket seats are fitted in front. Fore and aft movement is 5¼ in. (133 mm). The seat backs can be adjusted to any angle within their range of movement. Combined door pulls and arm rests are mounted in the door.

The individual rear seats have a fixed centre arm rest. Heavy pile carpets with felt underlays are fitted.

A laminated glass windscreen, and electrically heated backlight are standard equipment.

Seat belts are fitted as standard for both front seat occupants, and anchorages are provided for rear passenger belts. All seat belt anchorages comply with Specification BS. AU48 - 1965.

P.14A UPHOLSTERY

The hide upholstery has, in general, an impermeable surface and it can be kept clean and fresh looking by an occasional wiping down with a damp cloth and saddle soap. Finish off, when completely dry, with a good furniture cream.

The sheepskin seat covers (standard or North American cars, optional elsewhere) should be occasionally treated with a foam carpet cleaner in the following manner:- the foam should be brushed in well and left to dry, then vacuumed, vigorously brushed with a stiff brush and finally vacuumed again.

P.15A DOORS AND DOOR GLASSES

DOOR CASING - REMOVAL AND INSTALLATION

1. Remove locking button by unscrewing.
2. Remove one screw to withdraw the remote control handle.
3. Remove screws to withdraw the chrome finishers.
4. Lift the casing, and withdraw sufficiently to disconnect the lock switch connector.
5. For installation, reverse the procedure for removal.

DOORS - REMOVAL AND INSTALLATION

1. Remove the door casing as described above.
2. Remove the pin from the door check.
3. Disengage four snap connectors, earth wire, two speaker wires, and on Federal cars, two brown warning buzzer leads. Withdraw the harness through the grommet in the door frame.
4. Remove the hinge pins; the top hinge pin is held by a circlip.
5. Remove the door.
6. To install, reverse the procedure for removal.

DOOR HINGES

Both doors have two hinges of identical pattern. One half of the hinge is welded to the respective door pillar, with the rotating half secured to the door by four screws, and subsequently welded.

When fitting hinge pins, the lower pin should be inserted from the top, and the upper pin from the bottom. The top hinge only is fitted with a circlip.

Should excessive wear develop in the hinge pins, the hinges should be reamed out, and oversize pins fitted.

DOOR LOCKS (BURST PROOF) - REMOVAL AND INSTALLATION

1. Remove the door casing as described above.
2. Remove the circlip, and pull off the remote control bar.
3. Remove the self locking nut on the lock bar, then pull the bar out of the lock.
4. Remove the lock retaining screws from the edge of the door, and withdraw the lock, and backing plate, from inside the door.
5. For installation, reverse the removal procedure.

DOOR AND LOCK ADJUSTMENTS

Latch adjustment is made by releasing the two retaining screws on the 'B' post, and repositioning the hook.

Handle/lock adjustment is made on the screw and nut between the two. Remote control handle/lock adjustment is made on the threaded rod at the handle end.

DOOR DROP GLASS - REMOVAL AND INSTALLATION

1. Remove the door casing as described above.
2. Remove the two retaining bolts for the rear vertical frame.
3. Remove the two bolts holding the glass to the lift mechanism.
4. Tip the glass forward at the front, and withdraw outwards.
5. Assemble the glass using the removal procedure in reverse.

DOOR FRAME - REMOVAL AND INSTALLATION

1. Remove the door casing as previously described.
2. Remove the five bolts holding the frame to the door.
3. Pull out the frame through the top of the door, ensuring that first the tag on the rear of the frame is eased out of the door.
4. Reverse the removal procedure to install the door frame, ensuring that, where fitted, the packing pieces are replaced.

DOOR LOCK SWITCH SOLENOIDS - REMOVAL AND INSTALLATION

1. Remove the door casing as previously described.
2. Disconnect the electrical leads.
3. Disconnect the door lock actuating rod from the solenoids.
4. Remove the securing screws, and withdraw the solenoids assembly.
5. Reverse the removal procedure to install the door lock switch solenoids.

DRIP RAILS AND WINDOW MOULDINGS - REMOVAL AND INSTALLATION

The rails and mouldings are secured to the body frame by screws. Access to the screws is gained by having the door open, and the quarter light opened wide.

P.16A WINDSCREEN - REMOVAL AND INSTALLATION

To remove the windscreen, the top and bottom centre cover plates on the moulding must be pushed to one side, so that the moulding can be withdrawn in two parts from the rubber section.

On cars to federal specification, the top mould cover plate is secured with nuts and bolts. For access to the nuts, the interior mirror, and the windscreen top trim pad must be removed.

The windscreen can now be removed, (glass outwards) complete with the rubber surround, from the body flange.

To install the windscreen, the one piece rubber section should be fitted to the outside edge of the glass, and the chrome moulding inserted. Then, lay a 15 ft. (4.57 m) length of $\frac{1}{8}$ in. (3.18 mm) diameter cord, treated with beeswax, round the body flange root periphery, and apply 'dum-dum' at intervals to hold the windscreen in position. Fix a similar length of cord, treated with beeswax, in the rubber section of the body flange slot. Place the windscreen, complete with rubber surround, mouldings, and cord, into the body windscreen frame. Move the cover plates sideways to join the ends of the mouldings. Ease in the rubber flange lip by withdrawing the cords.

On cars to federal specification, the procedure for installing the top mould cover plate is the reverse of that for removal.

Note: Cars to federal specification have windscreens "stuck" in, using BOSTIK GLAZING COMPOUND B.10 as the adhesive.

P.17A BACKLIGHT

BACKLIGHT GLASS REMOVAL AND INSTALLATION

1. Remove the glass heater cable connectors, and the four moulding cover plates secured by six domed nuts.
2. Remove the mouldings which are held in position by domed nuts.
3. Extract the filler strip in the rubber surround, and disconnect the leads to the heater element.

4. Withdraw the glass, complete with the rubber surround, from the frame.

   Note: When removing the rubber surround from the glass, care should be taken to avoid damaging the holes in the rubber through which the leads to the glass heater element are routed.

5 Installation of the backlight is achieved by reversing the removal procedure.

BOOT LID - REMOVAL AND INSTALLATION

1. Remove the top moulding.
2. Remove two domed nuts from each support bracket, and disconnect the supports.
3. Disconnect the leads to the glass heater element.
4. Remove six setscrews from each hinge, and withdraw the boot lid.
5. Reverse the removal procedure, for installation of the boot lid.

P.18A REAR QUARTER LIGHT - REMOVAL AND INSTALLATION

Remove the shut pillar moulding by withdrawing the chrome screws. Two studs are fitted on the front edge of the quarterlight frame, and these enter two oversize holes in the shut pillar, thereby forming a hinge. By removing the two stud nuts, and the mushroom-headed catch screw, which requires a special key, the quarterlight assembly can be removed.

The removal procedure in reverse should be used to install the quarterlight assembly.

REAR EXTRACTOR VENT GRILLE - REMOVAL AND INSTALLATION

1. Prise out the Jensen emblem retained by two plastic cups and pins.
2. Pull off the black channel section.
3. Remove the four retaining screws, and withdraw the grille.
4. Install the vent grille using the removal procedure in reverse.

BODY SIDE SILLS

Each sill is retained by two screws at the front and rear, and six screws beneath the sill.

P.19A SEATS

FRONT SEATS

The fore and aft adjustment of front seats is provided by an adjuster bar located beneath, and at the front of, each seat. Pull up the bar, and slide the seat into the required position, then release the bar.

Rake adjustment of the seat back is effected by rotating the knurled knob on the inboard hinge of the seat.

For access to the rear compartment of the car, tilt the seat squab forwards by lifting either of the levers on the squab hinge.

FRONT SEAT - REMOVAL AND INSTALLATION

The front seat is removed, and installed, complete with the sliding mechanism. The mechanism is secured to the floor by a screw at the front, and rear, of each sliding rail.

REAR SEAT - REMOVAL AND INSTALLATION

The cushions for the rear seats are not fixed, and can be lifted straight out. Each seat squab is secured to the frame unit by a wing nut at the top, and a screw at the bottom. Access to the wing nut is gained from inside the boot, and for the screw from inside the car.
The centre arm rest is retained by six screws.

DECK BEHIND REAR SEATS - REMOVAL AND INSTALLATION

1. Remove the rear seat squabs.
2. Where rear seat belts have been fitted, remove the belt guide plate secured to the deck panel by two screws.

3. Remove five screws from the flange at the rear of the deck panel.
4. Remove the two wing nuts underneath the deck panel, which can then be withdrawn.
5. Reverse the removal procedure to install the deck panel.

P.20A BUMPERS

FRONT BUMPER

The single section bumper assembly, with detachable overriders and brackets, is attached to the body at four points.

REMOVAL AND INSTALLATION

1. Remove both outer headlamps, described in section N.37A, for access to the two end fixing bolts.
2. Remove the end fixing bolts, noting the position of the various washers and spacers.
3. Remove the securing bolts, two each side, from the tubular front brackets, and withdraw the bumper by sliding the assembly forward out of the tubular support brackets.

   Note: Access to the securing nuts for the overriders is obtained by removing the bumper mounting brackets.
4. To install the bumper assembly, reverse the removal procedure described above.

REAR BUMPER

The one piece rear bumper assembly is fitted with overriders and brackets, and, except for North American cars, a number plate illumination light assembly. The rear bumper is attached to the body at four points.

REMOVAL AND INSTALLATION

1. Disconnect the snap connectors for the number plate light.
2. Remove the end fixing bolts, access to the bolt heads being from within the wheel arch.

3. Remove the securing bolts from the tubular rear brackets, and withdraw the bumper by sliding the assembly rearwards out of the tubular support brackets.

   Note: Access to the securing nuts for the overriders is gained by removing the bumper mounting brackets.

4. To install the bumper assembly, the removal procedure should be reversed.

P.21A AIR INTAKE AND OUTLET GRILLES

There are four grilles of aluminium slats fitted; radiator intake, air outlet at the front right, and left, quarter panels, and air intake on the scuttle top.

The radiator grille is secured with four self-tapping screws. The outlet grilles in the front quarter panels are each secured by two P.K. screws at the bottom, and two nuts at the top. Access to the screws is from outside the body, and once removed, the grille can be eased out sufficiently to gain access to the nuts located inside.

The scuttle top grille is retained by two bolts, the securing nuts for which necessitate the removal of ducting adjacent to the grille. To remove the ducting, the blower unit, battery, and, in some instances the cam cover, will require to be withdrawn first.

P.22A BONNET - REMOVAL AND INSTALLATION

1. Disconnect the safety, and telescopic struts from the bonnet.
2. Remove the nuts, located beneath the surround flange panel, that secure the two bonnet hinges, then withdraw the bonnet.
3. To install the bonnet, reverse the removal procedure.

P.23A TRANSMISSION COVER, CONSOLE, AND FACIA - REMOVAL AND INSTALLATION

1. Remove the gear lever knob by releasing the securing Allen screw.
2. Remove the two screws at the rear of the gear selector panel, and located in the companion box. Disconnect the switches and bulbs to withdraw the selector panel.

3. Remove the screw in each top corner of the rocker switch panel, and withdraw the panel sufficient to give access to the two forward retaining screws for the console panel; remove the screws.
4. Remove the two screws at the rear of the console panel, and withdraw the panel having disconnected the switches, and vacuum pipes from the heater switches.
5. Remove the front seats, as previously described (P.19A), for easy access to the tunnel side panel retaining screws.
6. Remove the six retaining screws for each carpeted side panel, and withdraw the panels.
7. Remove the screws retaining the hinges, for the companion box lid, to the tunnel side panel.
8. Remove the companion box by taking out the three screws each side of the box, the four screws retaining the bottom liner of the box, and the two screws retaining the bottom of the box to the tunnel.
9. Remove the two screws each side at the rear of the tunnel side panels, and the screw attaching each panel to the facia panel; withdraw the panels.
10. Remove the steering wheel as previously described (Section F.33A).
11. Remove the three securing screws for the steering column lock cowl, release the knurled nut on the odometer trip cable, and withdraw the cowls for the steering column, and lock.
12. Remove the facia panel trims by taking out the ten securing screws.
13. Lower the glove box by releasing the stop, and remove the hinge attachment screws; withdraw the glove box.
14. Remove the two screws which retain each windscreen pillar finisher, and disconnect the wiring for the charging plug on the passenger side; withdraw the pillar finishers.
15. Remove the four bolts into the bulkhead, the two nuts adjacent to the inner demister vents, the heater ducting tubes, speedometer cable, harness plate and grommets, and disconnect the wiring blocks under the bonnet; withdraw the facia panel.
16. The procedure for installation is the reverse of that for removal described above.

P15B - DOORS & DOOR GLASSES

Door Casing - Remove & Refit

1. Remove the locking lever button by unscrewing.

2. Remove the single screws from the centre of the remote control interior door handle and withdraw complete with two bezels and one spring.

3. Where a remote control exterior mirror is fitted, unscrew the bezel and press the control through the door casing.

4. Remove the self tapping screws which retain the bright finishers to the edges of the casing and withdraw the finishers.

5. On the drivers door, withdraw the casing sufficiently to disconnect the solenoid locking switch connector and to withdraw the bulb and holder from the wiper switch location lamp.

6. Refit the casing in the reverse order.

Door Quarter Light - Removal & Installation

1. Remove the door casing - See previous paragraphs.

2. Remove one bolt, nut and washers from the bottom of the droplight front guide channel.

3. Remove the two bolts and packing washers from the lower edge of the quarter light. Note the number of square packers used.

4. Withdraw the quarter light assembly vertically. Install the quarter light in the reverse order (leave the mountings loose) and in addition -

   (a) Check the condition of the quarter light frame to windscreen frame sealing rubber and renew if necessary.

   (b) Lubricate the droplight guide channel with a light silicon grease.

   (c) Refer to "Alignment of Door Quarter Light" for correct refitting dimensions.

Door Droplight Glass - Removal & Refit

The door droplight and quarter light are removed together as an assembly.

1. Remove the door casing - see previous instructions.

2. Remove one bolt, nut and washer from the bottom of the droplight front guide channel.

3. Remove the two bolts with packers from the lower edge of the quarter light. Note the number of packers used

4. Remove the nut and washer from the upper end and the nut and bolt from the lower end of the rear guide channel. Note the number of packing washers used at the upper mounting.

5. Remove the two nuts which retain the glass in the lift mechanism and withdraw the mounting plate and rubber packers.

6. Withdraw the droplight and quarter light assembly vertically.

   Install the assembly in the reverse order, leaving the mountings loose, and in addition:-

   (a) Check the condition of the nylon bearings on the front and rear of the droplight. If the bearings appear to be worn then they should be renewed.

   (b) Lubricate the front and rear guide channels with a light silicon grease.

   (c) If new packing rubbers are used at the droplight glass lower edge, the inner rubber must be trimmed away at the mid-point where the guide peg on the mounting plate protrudes through towards the glass.

   (d) Refer to "Alignment of Door Quarter Light" and "Alignment of Door Droplight".

Alignment of Door Quarter Light

1. The quarter light should be assembled with the original number of square .125 in. (3.2mm) thick packers between the quarter light lower edge and the mounting points on the door. If the quantity is unknown or a new door is being fitted, use three packers at the front and none at the rear. The packers should be adjusted until the upper edge of the quarter light runs parallel with the centre line of the car when viewed from above.

2. Set the quarter light so that when measured vertically at the front edge between the door bright mouldings and the top outer edge of the quarter Light the height is 16.125in (410mm). See fig. P1B.

3. Position the quarter light to obtain a constant 0.25in (6.5mm) gap between the windscreen frame bright finisher and the forward edge of the quarter light frame.

4. Position the lower end of the droplight guide channel so that it is approximately .0625 in. (1.5 mm) clear of the spring on the droplight lift gear. Finally tighten in this position.

5. Finally tighten the quarter light lower edge mounting bolts and re-check the position.

Alignment of Door Droplight

1. Position the rear edge of the droplight so that the upper edge runs parallel to the centre line of the car when viewed from above. This position is maintained by packers fitted on the stud between the top of the droplight rear guide channel

and its fixing point on the door inner skin. Packers can be made from $\frac{1}{4}$in (6.5 mm) (internal diameter) plain washers, slotted, to enable them to be assembled over the stud without dismantling. Lowering the droplight will provide access to this fixing.

When the alignment is correct operate the droplight several times so that the channel finds its correct position and then tighten the lower fixing. Slotted holes provide adjustment at the lower end.

2. After setting the droplight alignment the droplight lift mechanism centre guide rail may require some adjustment to avoid binding on the guide pegs. The upper end of the rail can be packed with $\frac{1}{4}$in (internal diameter) slotted plain washers between the rail and the door inner skin, the lower end is adjusted on its fixing bolt with a locking nut.

3. Measure the height of the droplight at its rear edge, from the top of the door bright moulding to the top rear corner of the droplight using a flexible rule around the curve of the glass. This height should be 15.25in (39mm). Adjustment is provided by a cam attached to the droplight lift gear. This acts as a stop on the lift motor mounting bracket.

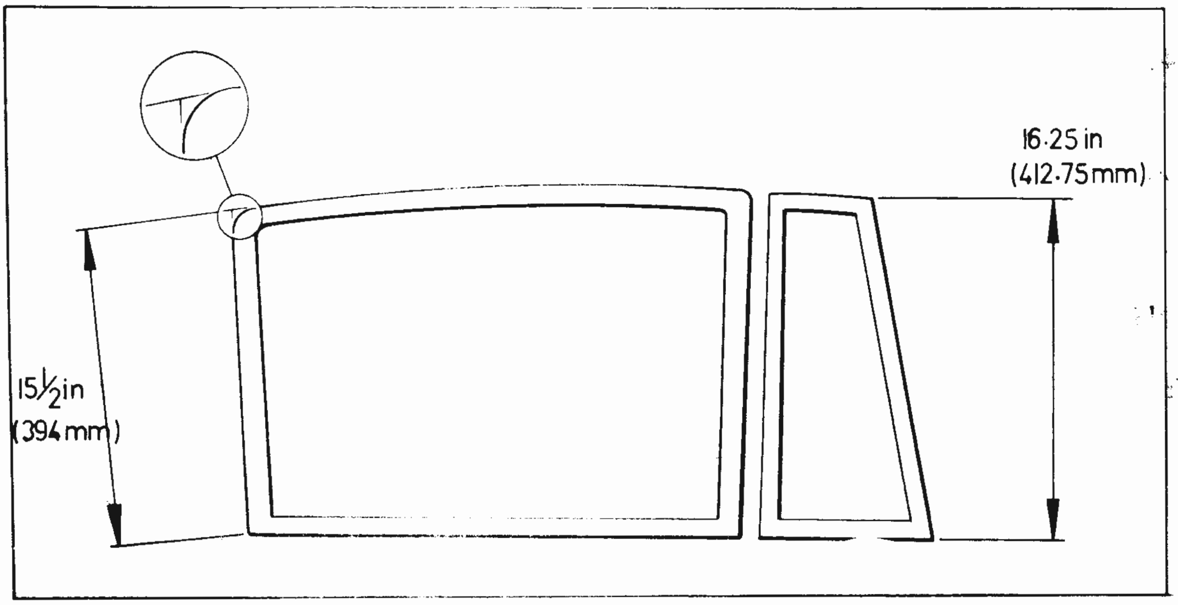


Fig. P18. Setting dimension for door drop glass and quarter lights.

P18B - REAR QUARTER LIGHTS - REMOVE & REFIT

To Remove Rear Quarter Light Assembly

1. Lower the roof only, leaving the quarter lights in the raised position.

2. Remove the rear quarter light casing. See Section P25B.

3. Disconnect the motor feed connections and the micro switch connections noting the colour coding to the terminals (some early vehicles may have non-standard colour coding).

4. Remove the three countersunk mounting screws from the top of the "B" post whilst supporting the quarter light assembly. Caged nuts are used for the three mounting screws.

   Collect the aluminium spacers from the mounting and note the thickness used. The same thickness will be used as a basic for the alignment procedure when refitting the assembly.

   If the assembly is to be dismantled further, refer to the exploded view, illustration fig. P2B.

To Refit Quarter Light Assembly.

1. Using a proprietry body sealer (such as 'Dum Dum') assemble the spacers removed during dismantling to the inside of the 'B' post.

2. Offer up the quarter light assembly and refit the mounting plate and the three countersunk mounting screws. If difficulty is encountered positioning the the assembly over the rear guide bracket, slacken off the two dome nuts on the trim panel.

3. Reconnect the micro switch and the motor wiring. Test the motor for operation.

4. Carry out the alignment procedure as detailed in 'Alignment of Rear Quarter Light Assembly'.

5. Reset the micro switches as described in Section N43.

6. Refit the quarter light trim.

Alignment of Rear Quarter Light Assembly

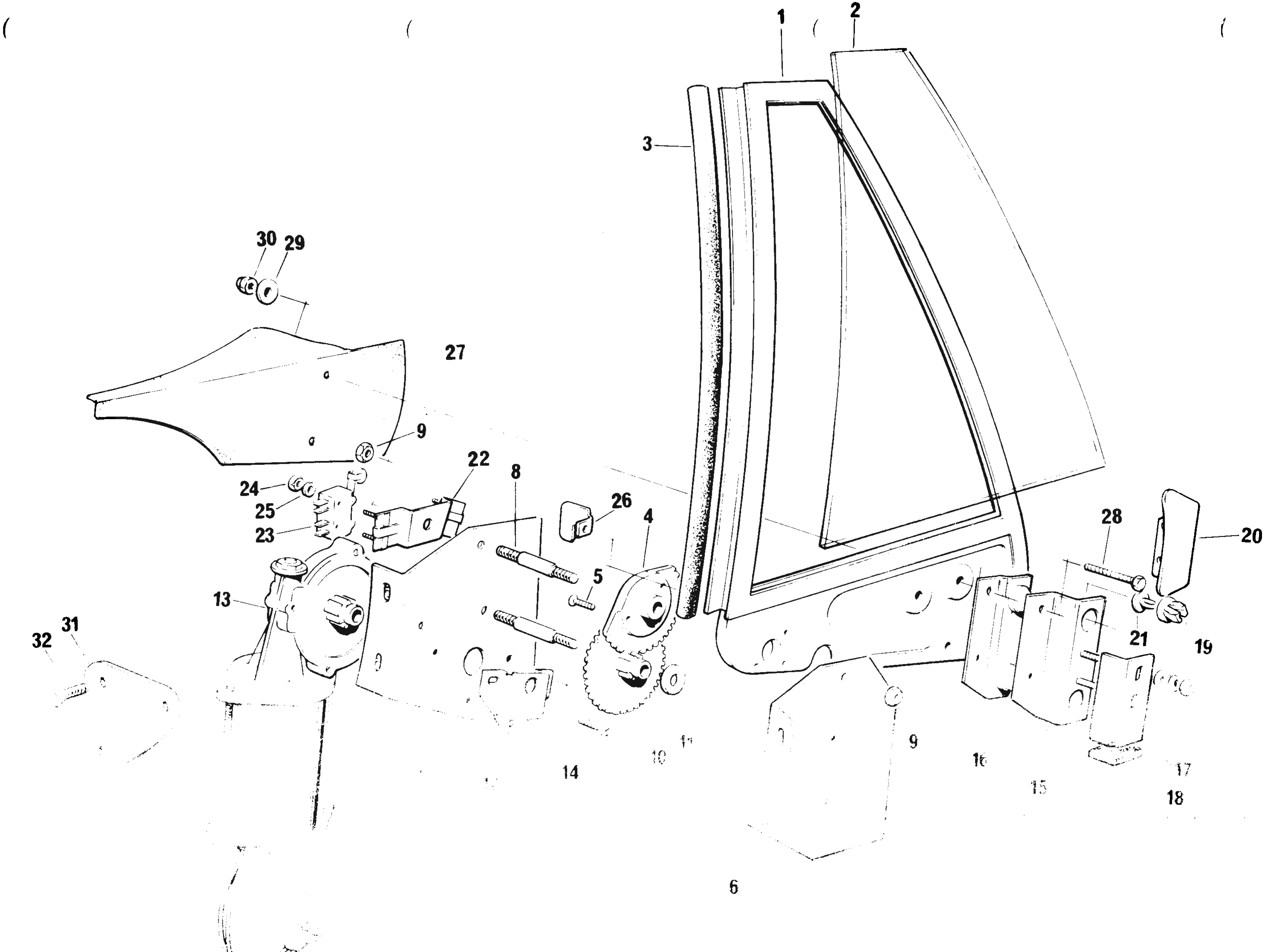
1. With both the drop light and rear quarter light fully raised, measure the gap between the kower front edge of the quarter light and the rear edge of the droplight. This gap should be $\frac{3}{16}$-$\frac{1}{4}$ in (5 - 6mm). See fig. N11B and adjustment is addected by altering the spacers at the mounting bracket. Spacers are available in $\frac{1}{16}$- $\frac{1}{8}$ in thickness (2mm and 3mm).

   The gap at the top of the quarter light should be set in conjuction with the adjustment of the raised limit switch. See Section N43B.

   Assemble the correct spacers as described in "To Refit Quarter Light Assembly".

2. When viewed from above, the outer edge of the quarter light should be $\frac{1}{8}$ (3mm) outside the door droplight outer edge. The measurement is at the top only. The lower outer edges should be in the same plane. See fig. P3B for details.
   Adjustment is made by moving the quarter light assembly about its three mounting screws.

3. The lower edge of the quarter light should run parallel to the centre line of the car when viewed from above. Adjustment may be made by cutting spacers for individual screws at the quarter light mounting.



P2B. EXPLODED VIEW OF REAR QUARTERLIGHT

1. Quarterlight - Rear Assy. RH.
1. Quarterlight - Rear Assy. LH.
2. Glass - rear quarterlight RH.
2. Glass - rear quarterlight LH.
3. Seal - front edge quarterlight
4. Gear - fixed - quarterlight frame
5. Screw - gear to base rail
6. Brkt - outer - quarterlight hinge RH
6. Brkt - outer - quarterlight hinge LH
7. Brkt - inner - quarterlight hinge RH
7. Brkt - inner - quarterlight hinge LH
8. Spacing stud - quarterlight hinge bracket
9. Locknut - spacing stud
10. Idle gear - quarterlight Assy
11. Washer - nylon - idle gear
12. Bearing brkt - quarterlight motor
13. Motor - quarterlight RH
13. Motor - quarterlight LH
14. Bolt - special - motor to brkt.
15. Guide rail - outer - quarterlight RH
15. Guide rail - outer - quarterlight LH
16. Guide rail - inner - quarterlight RH
16. Guide rail - inner - quarterlight LH
17. Stop brkt - quarterlight RH
17. Stop brkt - quarterlight
18. Pad rubber - stop brkt.
19. Nylon stud - guide
20. Guide plate - rear - quarterlight RH
20. Guide plate - rear - quarterlight LH
21. Nylon stud - guide plate
22. Brkt - support - micro switch RH
22. Brkt - support - micro switch LH
23. Micro switch
24. Locknut - switch to brkt.
25. Washer - plain
26. Stop RH - switch
26. Stop LH - switch
27. Trim panel - quarterlight base RH
27. Trim panel - quarterlight base LH
28. Screw - panel to base
29. Washer - plain
30. Domed cap nut
31. Spreader plate - shut face RH
31. Spreader plate - shut face LH
32. Screw - hinge Brkt - Quarterlight

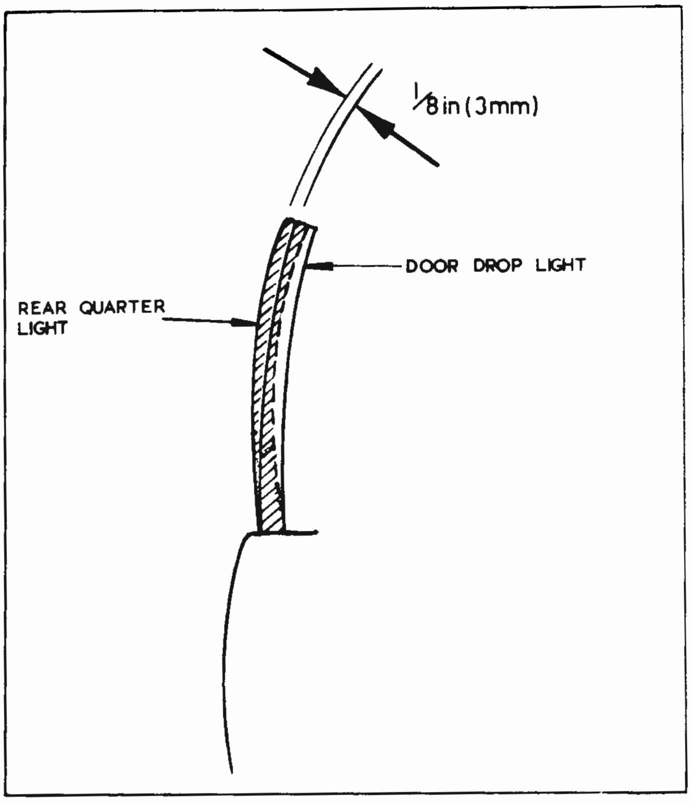


Fig. P3B. View along axis of door droplight and rear quarter light.

P19 - REAR SEATS

To Remove Rear Seats

1. Lift out the seat cushions.

2. Remove the screw and washer from the base of the squab.

3. Remove the inspection panels from the boot front casing and unscrew the wing nuts that retain the back of the seat.

4. Lift out the squabs.

5. Remove the four self tapping screws that secure the seat back.

6. If rear seat belts are fitted, remove the bezels and remove the bolt from the seat belt anchorage.

7. Lift out the seat back.

To Replace Rear Seats

Replace using the removal procedure in reverse.

P25B - QUARTER TRIM PANEL

Remove and Refit

1. Remove the door aperture seal from the 'B' post and sill.

2. Pull away the edge of the trim panel from the 'B' post.

3. Remove the screws which secure the front of the panel to the 'B' post.

4. Pull away the rear deck carpet slightly to reveal the rear retaining screw and remove.

5. Withdraw the casing.

   Note Early vehicles have a one piece casing and later vehicles have a two piece type. On later vehicles the top section only may be removed if desired (for access to the micro switches etc).

6. Repeat the above operations for the other side.

P26B - OPERATING THE ROOF

The roof can only be raised or lowered when:-

(a) The gear selector is in position 'P' or 'N'

(b) The ignition key is in position I or II. If the engine is cold it is advisable to operate the roof with the engine running. This is because the thermal cold start choke may be partly opened while the roof operates, with the subsequent difficulty trying to start the engine from cold. If the engine is hot, the roof may be operated with the engine stopped if desired.

To Lower the Roof

1. Clean the backlight. Refer to Section P26B 'Care and Cleaning'.

2. Unzip the backlight. Ensure that the roof stowage compartment is free of articles and then lay the backlight in the bottom of the compartment and fold back once.

3. Lower the two sun visors to gain access to the two over-centre catches and then release.

4. [illegible] the roof free of the header rail. Depress the lower part of the fascia 'roof' switch and hold in this position until the roof is completely stowed.

5. As soon as the stowage of the roof is complete the rear quarter lights will lower. But if desired to leave the quarter lights raised, then the fascia switch should be released at this point.

6. Fit the roof cover. Ensure that all the fasteners are secured [illegible] close the zip fasteners on each side.

7. If the roof cover is not fitted, ensure that the two straps are engaged at the hinge of each frame to avoid roof lift during high speed driving (later vehicles only).

Note:- If the quarter lights are raised then the zip fasteners on each side must be left open. If the roof is down but the cover not fitted then the quarter lights will operate independently of the roof. Fitment of the cover automatically cancels operation of the roof and quarter lights.

Raising the Roof

1. Open roof zip fasteners. Release all cover fasteners.

2. Lower the sun visors and depress the upper part of the facia 'roof' switch until the roof is fully raised.

3. Ensure that the dowels are correctly aligned with their sockets and pull the header down firmly using the handrail situated at the centre.

4. Engage the two over-centre catches.

5. Close zip fasteners retaining the backlight.

6. Stow roof cover on the shelf behind the rear seats.

Roof Safety Circuits - Operation

If the roof electrical circuit is overloaded for any reason (i.e. attempting to lower the roof before disengaging the catches) a cut-out switch will operate, breaking the circuit. If this occurs, then before the hydraulic motor will operate, the circuit breaker reset button must be pressed. The button is situated behind the facia closing panel. This panel is located on the right side on R.H.D. vehicles and on the left side on L.H.D. vehicles.

Should an electrical fault develop which causes the motor to keep cutting out, then by similtaneous use of both the operating switch and the reset button, the roof may be raised in an emergency.

Sequence of Operation - Roof

The following chart should be used as a general guide when fault finding. The actions and operations are shown in the correct sequence.

See Section N42B, 43B & P26B for location and identification of systems.

	Action	Operation
1.	Select 'P' or 'N' transmission. Ignition or Accessory 'on'. Depress lower part of 'roof' facia switch.	Park & neutral gear switch is operated. Pump motor in 'closed' circuit. Live circuit to roof 'up' relay. (a) Roof 'down' relay energised. (b) Pump motor operates. Feeds hydraulic rams. (c) Roof/quarter light changeover switch operates. (d) Pump motor stops. (e) Quarter light motor operate. (f) Quarter light 'down' limit switches are operated. Note: both switches must operate for correct sequence (g) Quarter light stops.
2	Release roof facia switch	Roof switch returns to central position
3	Fit roof cover (all fasteners must be used).	Roof inhibit relay energised. Open circuits pump motor and quarter light motors.
4.	Remove roof cover.	Roof inhibit circuit de-energised.
5	Upper part of facia roof switch depressed.	(a) Quarter lights 'up' relay energised. (b) Quarter light 'up' limit switches operated Note: Both switches must operate for correct sequence (c) Roof 'up' limit switch operated. (d) Roof inhibit relay energised. (e) Roof motor stops.
6	Release facia switch	Roof switch returns to central position

P27[illegible] CARE & CLEANING OF ROOF MATERIALS

Routine Cleaning - Backlight

1. DO NOT rub with a dry cloth or sponge.
2. Wash with a soap and water solution.
3. Rinse off with clean water and finally dry with a soft [illegible]

General 'Bloom' or Dulling

An overall film, either inside or outside, can be removed with -

(a) A wax polish with a fine cutting compound content
or
(b) A fine cutting compound and paint cleaner (e.g. 'T' cut).

Always wash the surface first.

If the 'bloom' is too heavy for a wax polish, commence with a fine cutting compound and finish with a wax polish to produce a shine. Polish one area at a time using a circular motion and gradually move across the entire area.

Note: It is advisable to mask off the edge of the roof fabric to avoid a build up of polish and a subsequent white line around the edge of the backlight.

Small Scratches or Scuffing

Generally small marks can be removed with a fine cutting compound and paint cleaner (e.g. 'T' cut). Wash the surface first and polish the damaged area only using a circular motion. Restore a shine to the surface with a wax polish with a fine cutting compound content.

Severe Scratches

Use a similar procedure as with 'Small Scratches or Scuffing' but commence with a coarser grade cutting compound and work down to a wax polish.

Foreign Matter on the Surface

The presence of 'foreign' matter on the backlight, such as adhesive, paint or sealer etc., will almost certainly cause the P.V.C. to be etch marked. Remove the offending substance with a solvent related to the contamination (i.e. thinners for paint etc).

Do not allow a solvent to remain in contact with the P.V.C. for longer than is necessary and allow contact only to the affected areas.

Any resulting marking should be polished out as for 'Small Scratches and Scuffing'.

Headlining - Cleaning (West of England Cloth)

When the interior of the vehicle is cleaned, the entire headlining should be brushed with a stiff bristled brush (not wire).

General Dirt and Dust Marking (not oil based)

If the procedure for 'Routine Cleaning' is not sufficient to remove the marks, wipe the dirty area with a well wrung out sponge that has been soaked in clean warm water. Avoid wetting a localised area as water-marking will occur.

DO NOT use soap or other cleaning agents.

Grease or Oil Stains

Use Trichlorethylene on a clean soft cloth. Use a dabbing action to avoid spreading the stain. When the area is clean and dry brush the complete headlining with a soft bristled brush (not wire).

Stubborn Grease or Oil Stain

If the procedure as in 'Grease or Oil Stains' is not sucessful, Carbon Tetracloride may be used in a similar manner. Use sparingly and avoid soaking areas of the headlining.

Exterior Fabric - General care

Wash the P.V.C. with a soap and water solution, rinse off with clean water and dry with a sponge or soft cloth.

Excessive Marking

Marks which cannot be removed with soap solution or neat soap should be removed with a solvent. Do not allow any solvent to remain in contact with the surface for longer than is necessary and do not allow any solvents to contact the stitched seams.

When originally fitted the roof seams are treated with a stitch sealant.

P28 - ROOF EXTERIOR FABRIC

It is possible to remove the exterior fabric leaving the backlight and headlining in positiin if required.

If the backlight also requires replacing, refer to Section P29B.

To Remove Roof Exterior Fabric

1. Remove the bright trim strip from the lower edge of the rear of the roof fabric. This is retained by self tapping screws which also retain fasteners for the cover.

2. Remove the covered trim strip from the rear bow above the backlight.

3. Extract all the tacks which secure the roof fabric to the tacking strip along the deck panel.

4. Tear off the rear quarter light sealing rubbers from the [illegible]

5. Remove the three cantrail cover casings from each side.

6. Tear off the seal from the header panel to windscreen frame.

7. [illegible] header rail catches.

8. Remove the header rail handle.

9. Tear the header panel lining away until the aluminium retainer strips and self tapping screws are exposed on the rear edge. Remove the retainer

The headerlining is not part of the main headlining and may therefore be scrapped.

10. Tear the outer fabric away from the header panel taking care not to damage the foam padding.

11. Tear the outer fabric away from the frame behind the rear quarter lights. Tear off at the rear bow taking extreme care not to damage the inner lining. The inner lining should be repaired if necessary.

12. Slacken the roof tension screws at each rear quarter, and pull the wire through the roof fabric.

13. Remove and discard the fabric. It cannot be re-used.

To Replace Exterior Fabric

1. Attach, using tape, a strip of laminated wood (3 ply), 4 - 6in (100 - 150mm) deep across the top of the windscreen. This will allow the roof fabric to be stretched and tacked during fitting procedure. It will also prevent any adhesive from contaminating the windscreen.

2. Fit new tension wires. Thread through the front of the header panel and out of each side.

3. Refit header rail catches.

4. Preparation: Offer the fabric onto the frame, ensuring that the seams are central and parallel. Tack the front edge on to the plywood strip. Temporarily tack the rear end of the fabric onto the rear tacking strip. Ensure the fabric is smooth and taught.

   Make a chalk line along the side of the fabric adjacent to the lower edge of the cantrails, along the front edge of the header panel, rear upright and along the body line behind the rear quarter lights. See fig. P4B.

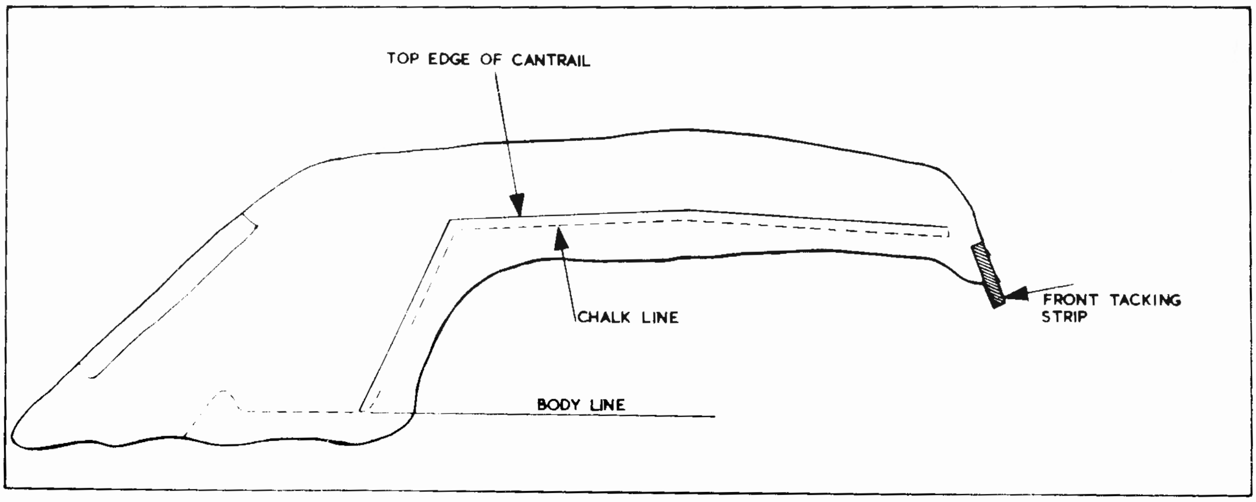


Fig. P4B - Marking roof outer fabric

Chalk mark the backligh aperture. Make the marking at the edge of the 'Vybak' clear plastic. When all the marking out is complete, remove the outer fabric from the car for cutting and sewing.

Cutting and Sewing

5. The chalk line made for the backlight aperture corresponds to the actual 'Vybak' edge and not to the zip. Cut the fabric 1in (25mm) inboard of the chalk line.

6. Cut out the aperture and welt along the edges.

7. Trim off at chalk line down to the rear quarter (see original roof for guide). Repeat the 'Welting' along the top of the droplight and down behind the quarter light using 3" (75mm) edging strip. Trim off edging strip only to top and bottom of rear quarter light (see original roof). Sew in pirelli stiffener at lower quarter. See fig. P5B.

8. From the chalk line at the front edge of the header panel sew in the header securing strip. The strip is the same width as the header panel.

9. Sew in the fabric channel for the tension wire starting ⅜-¼in (9.5-6.4 mm) back from the locating hole in the header panel and finishing at the top of the rear quarter light. (See original roof).

   Note: The welting tension wire channel, header securer and pirelli stiffener should be stitched in one operation. (See original roof).

Refitting Outer Fabric After Sewing

1. Lay the prepared fabric onto the roof. Fold back of fabric over towards the front to reveal the rear bow. Apply adhesive with a brush to the area along the rear bow (immediately below the trimmed rear bow screwed strip. Apply adhesive to the underside of the outer fabric. With the roof raised about 10in (250mm) apply adhesive to the cantrail behind the rear quarter light.

2. At the header panel place two small rubber wedges, about ¼in (6mm) thick between the header and the windscreen rail. This will allow for the thickness of the header sealing rubber to be fitted later, lower roof and close the header catches.

3. Place a strip of polythene sheet over the adhesive applied to the rear bow and lay the outer fabric over the backlight. (The polythene will prevent the outer fabric from sticking to the rear bow at this stage).

4. Temporarily tack the front of the fabric to the plywood former on the windscreen.

5. Keeping the fabric taught tack at the rear tacking strip at the bottom inside corners of the backlight, stretch the fabric taught at each side of the rear bow and tack at the rear tacking strip immediately behind the pirelli stiffener. (use existing tacking holes where possible).

6. Apply adhesive to each side flap for the rear cantrail.

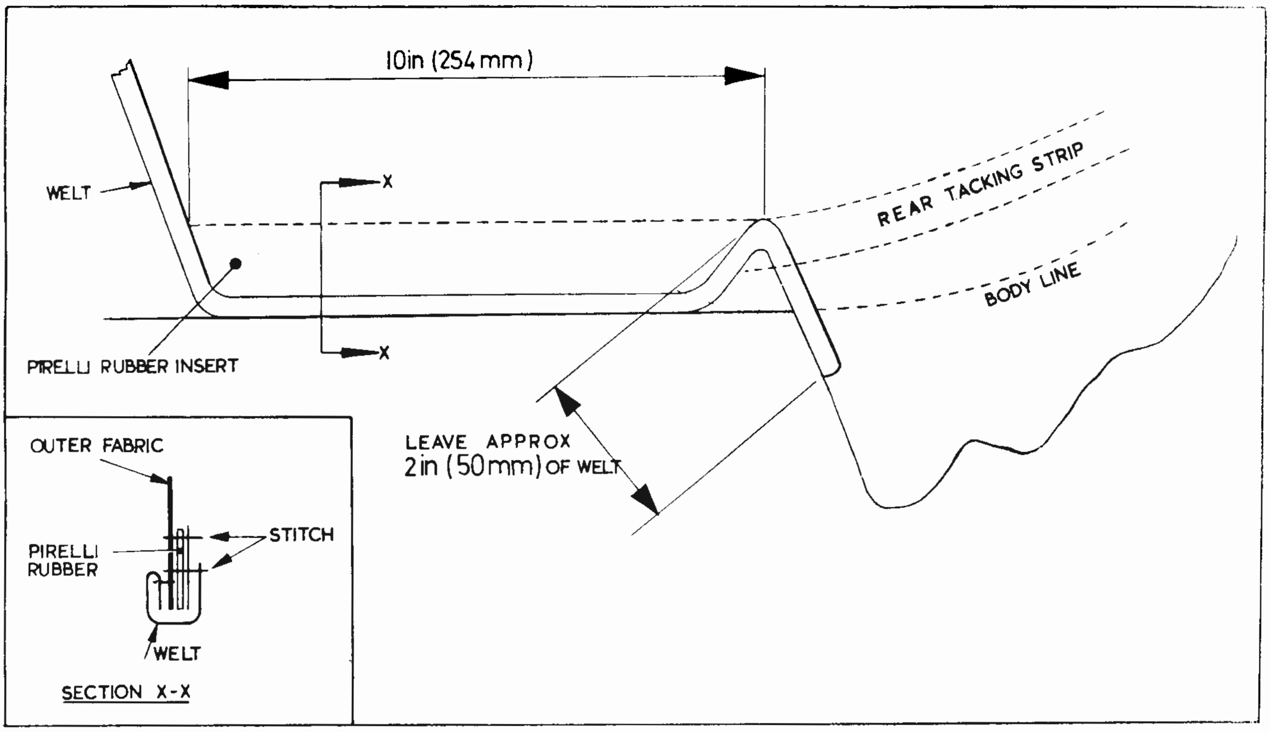


Fig. P5B Rear quarter detail - outer fabric.

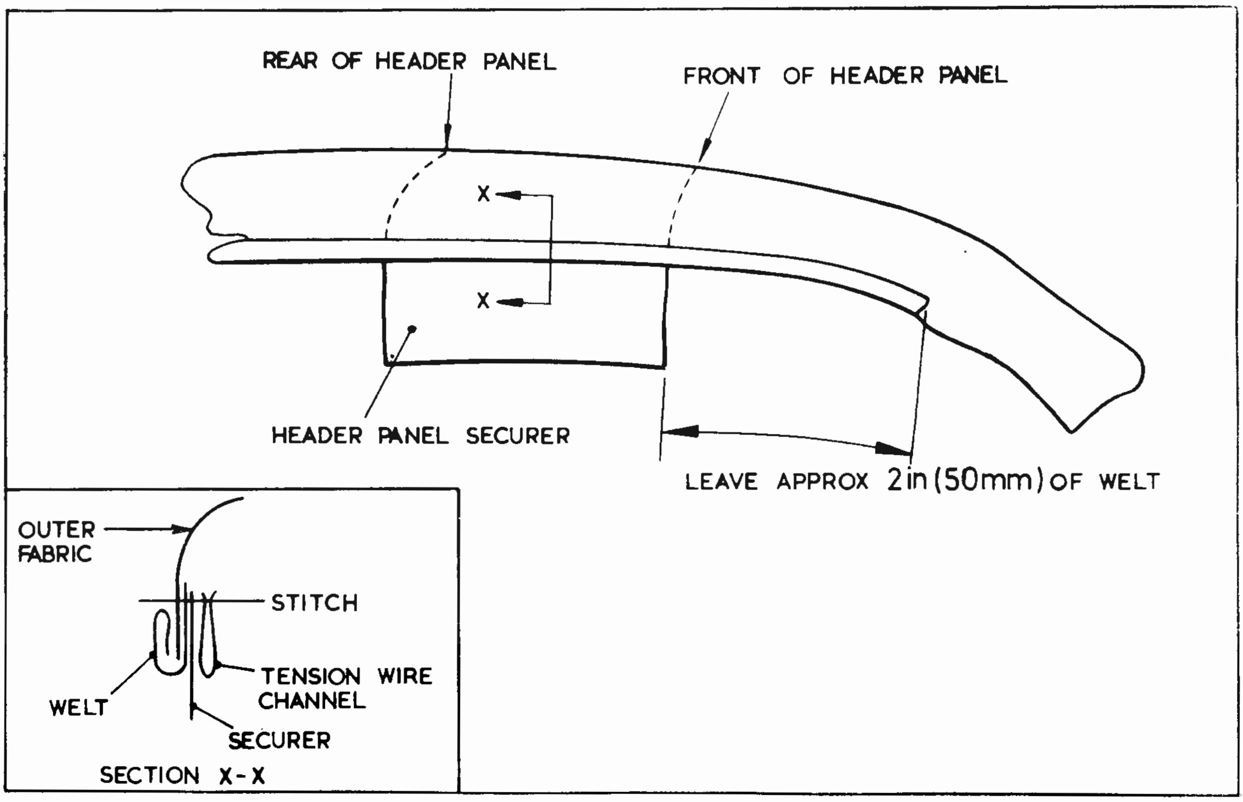


Fig. P6B Outer fabric - front.

7. Thread the roof tension wires through the hole in the rear cantrail.

8. Stick the side flap to the rear cantrail, push into position with a smooth flat edge. Trim off the width of the cantrail.

9. Remove the temporary tacks at the bottom rear quarter, pull the outer fabric taught and finish tack at the lower tacking strip.

10. Trim outer fabric up to the rear tacking strip, leave approximately 2in (50mm) of welting and tack. See fig P7B.

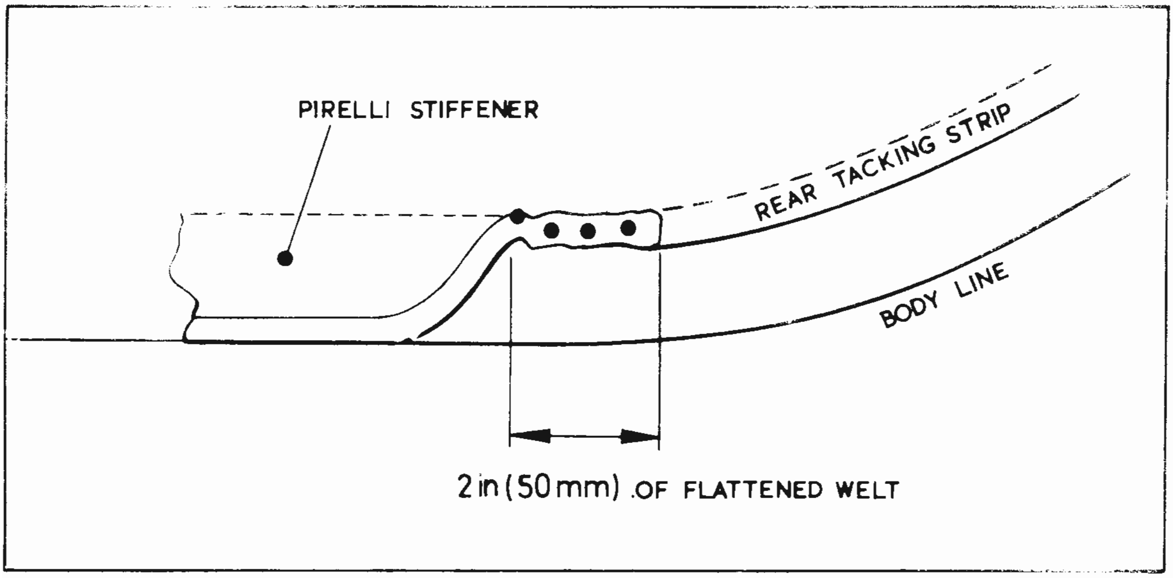


Fig. P7B. Rear Quarter - Outer Fabric L.H. Side.

11. Remove the polythene sheet from the rear bow. Ensure a good fit is obtained along the rear bow. The adhesive applied earlier will hold the fabric in position on the rear bow. Replace the trimmed finisher over the rear bow. Redrill the bow for the attachment screws. Use $\frac{7}{64}$ in dia. drill (2.78 mm) and $1\frac{1}{4}$ x No.6 self tapping screws. Work from the centre of the bow outwards.

12. Ensure that the front fabric is taught and re-tack at the windscreen if necessary.

13. Mark a line along the roof fabric at the front edge of the header panel. Trim fabric at the corner of the header panel leaving about 2in (50mm) of welting.

14. Apply adhesive to [illegible] flap and cantrail and to [illegible].

15. [illegible] fabric from the windscreen and apply adhesive to the fabric in readiness for [illegible] underneath the header panel. Do not apply adhesive [illegible] of the header panel.

16. [illegible] 8in (203mm) above the top of the windscreen frame, and apply adhesive underneath the header rail.

17. Apply a [illegible] to the outer corners of the header [illegible] along the top).

18. Pull the outer fabric over and stick to each outer corner of the header pane Welt should finish at the bottom edge of the header panel.

19. Trim side securer in readiness for sticking to the cantrail.

20. Stick the outer fabric under the header using the line to position accurately on the header panel.

21. Lower the roof onto the top of the windscreen frame and check the fit of the outer fabric. If necessary detach the fabric from the header and reposition the roo

22. When satisfied with the fit, tuck in each side securer with a flat wedge, with the roof in the raised position.

23. Stick down each welt at the corners of the header panel.

24. Cut off surplus fabric from the header.

25. Raise the roof about 2 - 3 in (50 - 75mm) above the top of the windscreen frame. Pull the tension wires through until taught and tighten the wire retaining screws. Lower roof.

26. Stick on the cantrail seals.

27. Fit the rear tacking strip bright finisher complete with the hood cover fasteners.

28. Refit new header panel lining. The rear edge is attached by a solt aluminium retaining strip. Ensure that the screws used are of countersunk variety otherwise the heads will show through the lining. Remove the header catches, dowel receivers and grab handles.

29. Fit the lining to the header panel with the lining folded over and around the retaining strip. (See original).

30. Trim the lining to fit with the outside edges folded over inwards and stick with adhesive. When fitted the lining should meet the inside of the cantrail and also cover the forward end of the cantrail. (See original for pattern).

31. Trim excess from the front of the header and cut holes for the header catches, dowel receivers and grab handle.

32. Refit header catches, dowel receivers and grab handle.

33. Refit cantrail cover casings.

P29B - BACKLIGHT

To Remove Backlight

1. Remove the bright trim strip from the lower edge of the rear of the roof fabric. This is retained by self tapping screws which also retain the fasteners for the roof cover.

2. Remove the covered trim strip from the rear bow above the backlight.

3. Extract all the tacks which secure the roof fabric to the tacking strip along the deck panel and fold the fabric forward away from the backlight. Lay the fabric on the centre of the roof.

4. Laying exposed along the rear bow are the foam strips and the edge of the roof padding material (calico). These strips are retained by adhesive to the fabric beneath and should be gently pulled away to reveal the tacks which secure the backlight fabric to the bar.

5. From inside the car, unzip the backlight and then remove the trimmed finisher from the lower edge of the backlight headlining. This is manufactured in two halves and is secured with self tapping screws.

6. The lower edge of the backlight headlining (beneath the finisher) is secured by adhesive and tacks. Withdraw the tacks and pull the material away from the body. Any damage sustained by the backlight headlining will not affect replacement as a new headlining will be supplied as a part of the backlight assembly.

7. Remove the tacks from the outer edge of the rear bow to release the top edge of the backlight fabric and similarly along the tacking strip on the deck panel to release the lower edge.

8. Between the backlight fabric and backlight headlining are two rubberised strips of webbing. Lift the lower edge of the fabric and remove the tacks from the lower end of each strip of webbing.

9. Fold back the top edge of the backlight fabric to expose the webbing strip tacked to the bow and the upper edge of the backlight headlining tacked and glued to the bow.

   Note: Do not damage the main headlining.

10. Withdraw the backlight assembly.

<u>Refitting the Backlight Assembly</u>

The backlight is supplied as an assembly which is comprised of:-

(a) The backlight surround fabric

(b) The Vybak clear plastic window

(c) The rear headlining.

1. Lay the backlight assembly over the rear bow ensuring that the 'Vybak' window is centralised. Tack once at the centre of the bow and once after stretching at each side of the backlight (temporarily). See fig. P8B.

2. Fold the outside edges of the backlight fabric inwards, pull the headlining taught along the rear bow and tack at 3in (76mm) intervals as far as the wooden insert in the bow allows. (Later cars have a wooden insert extension at the ends of the rear bow). See fig. P8B. Remove the temporary tacks from the outer edge of the backlight fabric and tack the centre of the headlining to the rear bow.

Remove the temporary tacks from the centre of the rear bow and apply a rubber solution to the underneath of the rear headlining forward of the rear bow. Fold the headlining onto the front edge of the bow and trim off the excess. Replace temporary tacks in the backlight fabric.

Fig. P8B.

3. Pull the lower edge of the backlight fabric downwards until taught. Check that the headlining is hanging loose inside the car and not tacked with the lower backlight fabric. Tack the centre of the backlight fabric to the lower tacking strip. Stretch the assembly sidewards and tack once below each corner of the 'Vybak". See fig. P9B.

4. Fold each side of the backlight fabric to the centre once more and lay both the rubberised strips of webbing over the rear bow and lower tacking strips. Pull taught and tack. (See fig P10B).

5. Apply rubber solution to the outer lower edge of the rear bow and the corresponding area on the inside of the rear headlining. Attach the headlining at each side of the lower bow, ensuring that the tension wire is located outside the headlining. See fig. P11B. Fold the corner of the headlining back at an angle of 45° and trim off leaving an overlap of approximately 1in (25 mm) and retain with adhesive

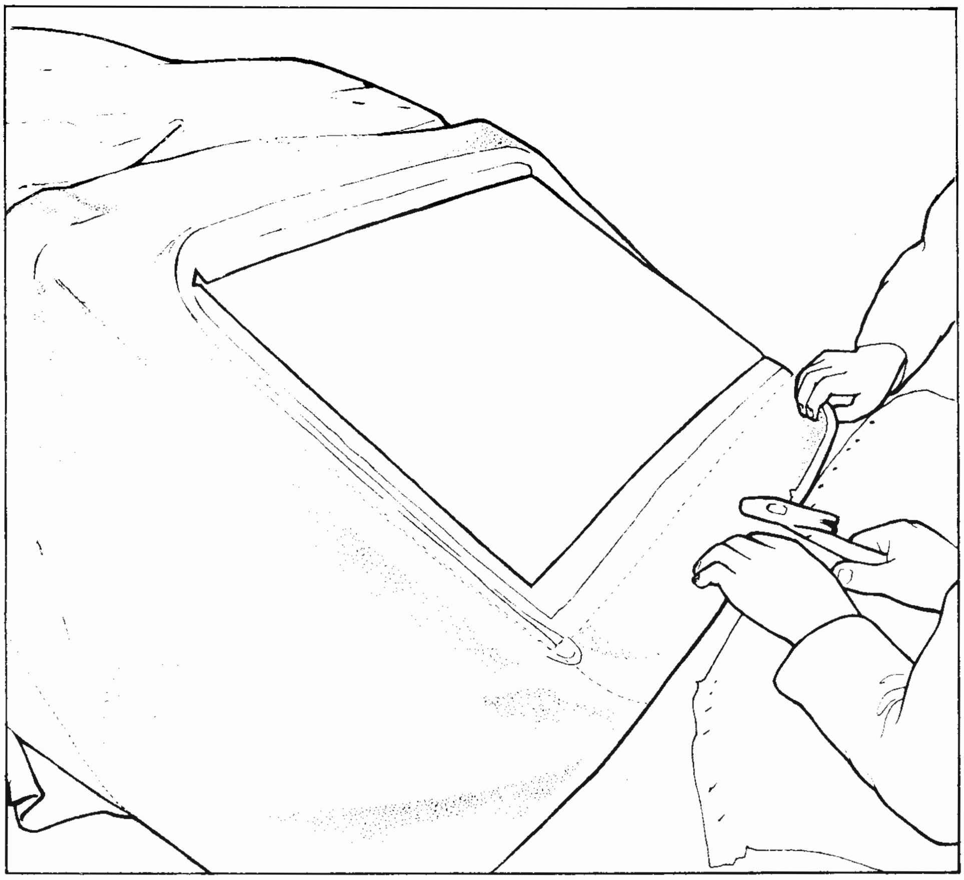


Fig. P9B

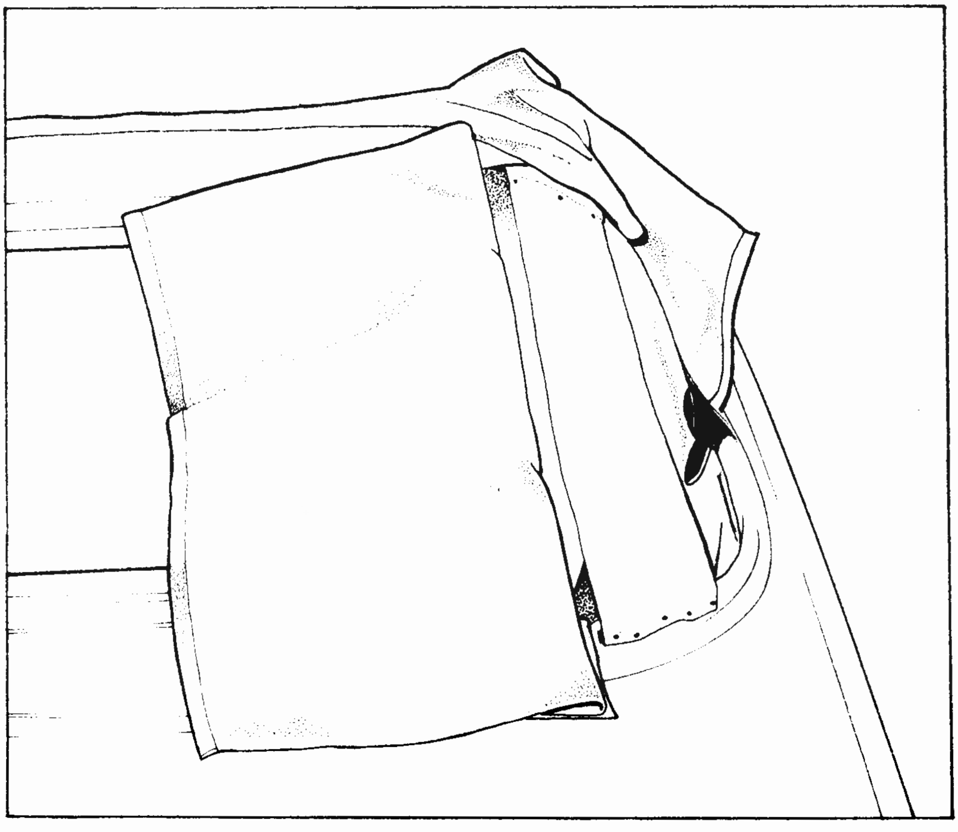


Fig. P10B

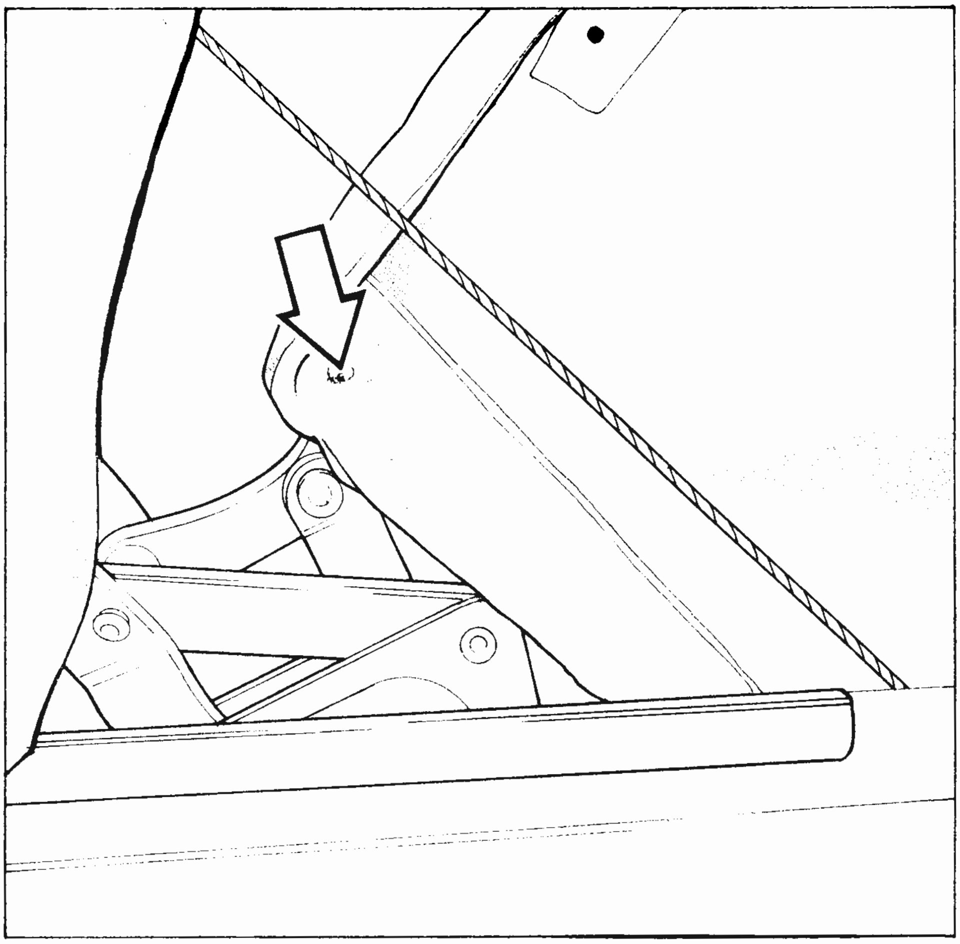


Fig. P11B

6. Lay the backlight fabric over outside edges of rear bow (remove temporary tacks) and tack at 2in (50mm) intervals as far as the wooden insert in the bow will allow. Apply adhesive to the forward edge of the rear bow and underside of fabric and stick down. Trim any surplus material away.

7. Finish tacking the lower edge of the backlight fabric to the rear tacking strip. Ensure that the fabric is kept taught.

8. Trim off the lower edge of the fabric to follow the line of the deck panel.

9. Stretch the calico/foam padding backwards onto the rear bow and stick with adhesive to the backlight fabric.

10. Blend out the corners on the rear bow with tapered edge foam strips. Glue a length of wide foam along each corner and blend out the lower edge of the bow with a length of narrow foam on each side. See fig. P12B.

11. Apply adhesive to the lower edge of rear headlining at the point where it attaches to the body above the rear parcel shelf. Then tack using three or four tacks per side, the headlining to its batten and then trim off the excess and replace the rear retaining fillets.

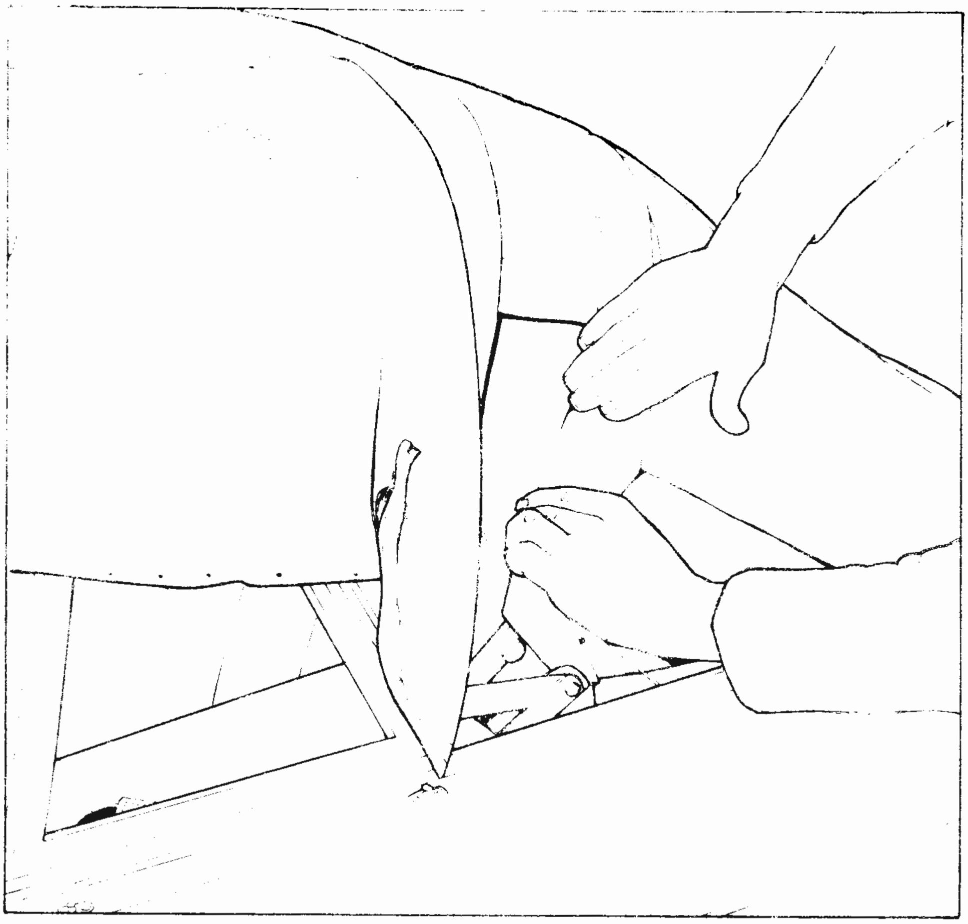


Fig. P12B

12. Release the header rail catches and fold the outer roof fabric rearwards over the backlight fabric. It is essential that the screw holes in the outer fabric are again used on the original screw holes in the rear bow. When all these holes have been located and aligned, attach the trim strip with self tapping screws.

13. Temporarily tack the lower edge of the outer fabric to the lower tacking strip and secure the header rail catches. Inspect the outer fabric around the backlight for correct tension or signs of wrinkling. When the appearance is acceptable finally tack the fabric. If adjustment is required, release the header rail catches adjust and re-tack.

    When the fabric is completely tacked, apply a suitable sealer (e.g. Dum Dum) to the inside of the rear bright trim strip and replace using self tapping screws. (including roof cover fasteners).

14. Remove any excess sealant and remove the protective polythene panels from the backlight.

P30B - ROOF FRAME

Remove and Refit

1. [illegible]ve the roof outer fabric as described in Section P28B, the backlight as [illegible]tion P29B and the headlining as in Section P31B.

2. [illegible] the rear quarter ca[illegible] in Section P25B.

3. Remove from each side the two thin headed bolts from the front of the main frame mounting bracket which attaches to the rear quarter light guide bracket. (The quarter lights must be lowered to gain access). Slacken the two domed nuts on each quarter light and withdraw the brackets.

4. Remove the micro switch from the left side mounting bracket. If the frame is not to be refitted, remove the switch adjustment roller cam from the frame.

5. Disconnect the hydraulic rams as described in Section P31B.

6. The frame is attached by four bolts at each wheelarch. The bolts screw into caged nuts on the frame. Access to the bolts is gained from underneath the wheel-arch. Remove the bolts and stiffener plate from each side. Withdraw the frame and collect the aluminium packers from under the mounting brackets.

   Note thickness of the packing taken from each side. This thickness will be used as a basis for adjustment when fitting a new frame.

<u>Roof Frame - Replace</u>

Before fitting frame ensure that the droplights and front fixed quarterlights are correctly aligned. See Section P15B.

1. Taking the same amount of packers that were removed from the main mounting panels, replace the same quantity, attaching them with sealer to retain their position.

2. Offer up the frame and attach with four mounting bolts, spring and plain washers at each side. Check the frame pivot pins and apply'loctite'(green) to eliminate any possibilty of the pins loosening.

3. Manually raise the roof and drop the header rail onto the locating dowels on the windscreen frame.

4. Check the gap between the edge of the rear quarter light and the lower end of the roof frame. This gap should be $\frac{1}{4}$in (6mm). Adjust this gap by moving the frame on its main mounting points forwards or backwards.

5. Check the gap between the top of the rear edge of the rear quarter light and the roof frame. This gap should be $\frac{1}{4}$in(6mm). Adjust by slackening the two countersunk screws on the underside of each cantrail and pushing the rear telescopic end of the frame towards the header rail. When the gap is a constant $\frac{1}{4}$in (6mm), re-tighten the countersunk locking screws.

6. Check the gap between the cantrail and droplight and quarter light top edges. This gap should be $\frac{1}{4}$in (6mm). If the spacing is too high or too low or unequal, adjust as required by the addition or removal of spacers under the hood main frame pivot brackets.

7. Re-check the clearance of the rear edge of the quarter lights.

8. Check the clearance at the inside rear edge of each quarter light. This should be approximately $\frac{1}{8}$ in (3mm). The frame can be adjusted by moving it sideways on its main mountings.

9. Examine both cantrails for 'sag' at the centre joints. The two halves of the rails should be a slightly curved continuous line. Adjustment is carried out at the serrated adjuster plate. This plate carries the secondary frame pivot and the 'trimmed' car hood rail. Usually, very small adjustments are all that is necessary on the serrated plate. Re-check $\frac{1}{4}$in (6mm) parallel gap between fram cantrails and door droplight top edges.

10. Re-check all adjustments. Check that the frame is horizontal across the width of the car when in the lowered position. Slight corrections to the level can be made at the serrated adjuster plate.

11. Refit the hydraulic rams. See Section P32B.

12. Fit the quarter light guide brackets to the front of the main frame pivot mounting. Ensure that thin headed nuts are used to avoid any foul with the quarter lights. Tighten the chrome domed nuts which retain the trim panels to the quarter light. These nuts also retain the guide channel for the guide bracket. Ensure that the quarter lights run smoothly.

13. Fit and adjust the roof micro switch ($\frac{1}{4}$light changeover) after the roof fabric is fitted. See Section N44B.

P31B - HEADLINING

To remove the headlining with outer fabric and backlight removed.

1. Tear foam padding complete with calico away from the bows and header panel.

   Note: The materials cannot be re-used.

2. Withdraw the roof tension wires through the header panel.

3. Remove the tacks from the webbing where the straps are attached to the bows and tear the webbing away from the header.

4. Tear the headlining away from the underside of the header panel and from each bow.

5. If the frame is to be re-used, ensure that no tacks are left in the tacking strips and that any excessive adhesive is removed.

   Any frame adjustments should be made whilst the fabrics are removed. See Section P30B.

Refit Headlining (with outer fabrics removed) - Preparation.

Remove the two rear trimmed tension arms. Re-trim in hide and fit new hide sleeves over the anchorage points. Use adhesive to retain the sleeve and cut out the screw holes. Fit new tension wires. Refit header catches.

To fit Headlining and Inner Lining

1. Remove the staples from the seams on the new headlining (these are used as a guide for machining only).

2. Take up the first seam and wrap it around the forward bow. Staple from above (this is only a temporary operation to hold the lining in position).

3. Repeat operation 2 at the second bow.

4. Ensure the headlining drops down inside the cantrails.

5. Fold back at the forward bow and temporarily tack at each end. Fold forward at the second bow and temporary tack.

6. Apply adhesive to the back inside edge of the header panel, at the centre, each end, the forward inside edge of each cantrail, the top of each cantrail immediately behind each quarter light and on the corresponding parts of the headlining.

7. Tension out the lining to the rear, wrap it around the rear bow and temporarily tack (one in the centre and at each end).

8. When the adhesive is touch dry, stick the lining into position at the centre, front and ends of the header panel and the front and back of the cantrails.

9. When the positioning is correct, affix the remainder of the header panel.

10. At the forward bow remove the staples at the centre (leave the tacks in each end). Apply adhesive to the front of the bow and into the channel. Affix the lining to the bow and tuck into the channel, keeping the tension correct. Trim off at the channel. Remove the temporary tacks and repeat from the end to the centre. Repeat on the back of the bow. Wrap the lining over the bow and affix. Finally, tack at each end. (4 per side).

11. Move to the second bow and remove the staples from one end and at the centre. Fold the rear section over the bow to tension the lining and then repeat as in operation 10.

12. Apply adhesive to the front and side of the cantrail rear upright and the corresponding area on the lining. When the adhesive has dried and maintaining the correct tension in the headlining, affix down and around the rear cantrail at both sides.

13. Tension the lining to the rear bow and finally tack. Work from the centre and tack at $1\frac{1}{2}$ - 2in (38 - 50mm) intervals along to the ends of the bow. Apply adhesive to the front edge of the rear bow and the corresponding area on the headlining, affix into position and trim off the excess. Also affix the extreme edges of the lining around the outer metal sections of the bow.

14. Trim the edge of the lining at the frame pivots, and fold the edges under to give a horizontal line immediately above the inside front pivot bottom mounting bracket and a smooth curve from the rear bow.

15. Trim the lining from the header catches.

16. Fit backlight. See Section P17B.

17. Attach the 'Pirelli' webbing straps before the outer edges of the backlight are nailed. Start tacks at the inside of the rear bow, stretch over to the plywood tacking strip on the windscreen and tack. Tack to rear tacking strip (5 tacks). Tack with three nails at each of the bows. Mark at the front and back of the header panels, remove from the plywood tacking strip and attach the 'Pirelli' webs to the header panel using adhesive.

    Note that the webs are angled, the apex of the angles are tacked to the rear bow.

18. Fit the calico inner lining with the wooden edging trim. Lay the assembly on the top of the frame, with the stitched edges parallel with the roof. Ensure that there is an equal overhang at the edges, front and back of the roof.

19. Apply adhesive to the header panel up to 1in (25mm) from the rear edge and attach the calico to the header panel. Stretch the calico over to the rear bow and tack with two nails in the centre, four at the outside and then at 3in (75mm) intervals.

20. Tack at the outer ends of the centre bows at one side then tension and tack at the opposite side.

21. Attach a foam strip 6" wide x ⅛in thick (150mm x 3mm) to the header panel between the 'Pirelli' webs to fill the space between the webs.

22. Trim the top of the 'Pirelli' web between the edge of the foam strip and the start of the lining with a small piece of lining material. Trim off the calico and lining flush with the front edge of the header panel.

23. Lay the ¼in (6mm) thick foam sheet over the calico. Apply adhesive to the underside of the foam at the rear bow and to the rear bow. Apply adhesive to the header panel and the corresponding area on the foam. Attach the foam just beyond the rear bow then trim off to the centre line of the bow.

24. At the front edge trim along the front of the header panel along each side, and then for the length ¼in (6mm) above the top of the cantrail. Affix the foam to the edge of the lining and then trim off the lining around the header panel and 2½in (63mm) below the foam.

25. Apply adhesive to the outside of the foam, up to ½in (12mm) from the edge, fold back the lining material and staple.

26. Glue a strip of calico 3in (75mm) wide over the rear bow to cover the edge of the foam. Trim off excess calico layers flush with the back of the bow.

27. Glue a filler strip of foam ⅛ thick [illegible] x 50mm) below the edge of the calico/lining material on the lower edge of the rear bow, following with a strip of chamfered foam ⅛ thick x 2[illegible] (3mm x 62mm) around the corner of the rear bow.

28. At the header panel apply adhesive [illegible] and attach a strip of calico 6in (150mm) wide. Trim off the material at the sides and radius the centre to match the header panel. Pierce the [illegible] of the inner lining to allow the roof outer fabric tension wires to pass through.

29. Apply adhesive to the underside of the header panel calico and side reinforcing and the corresponding area under the header, fold under and trim off at $\frac{3}{4}$in (20mm) under the header panel and in the seal housing in each cantrail.

To Remove the Headlining (without removing the outer fabrics)

1. Remove the header seal.

2. Tear off the header panel lining

3. Using a knife cut along the back edge of the rear bow and tear away from the bow.

4. Cut at the back and front of the remaining two bows, tear off at the rails behind the rear quarter lights and then tear off at the bows.

5. Finally, tear off at the header panel.

To Replace the Headlining

1. Attach plywood formers to the two front roof bows. Use self tapping screws and fit to the back of the bows.

2. Cut the front loop off the headlining at the two front roof bows.

3. Glue and tack the lining to the plywood formers with the lining correctly tensioned between the bows. The seams should be $\frac{1}{4}$in (6mm) below the bottom edge of each bow. (Use any excess material to tuck in over the top of each bow).

4. Obtain the correct tension at the cantrail areas then glue onto the rear of the header panel and the front inside edge of the cantrails. If any difficulty is experienced at the forward ends of the cantrails it is permissible to use one self tapping screw and cup washer at each side.

5. Pull the lining back over the rear bow, then glue in position.

6. Apply adhesive to the roof rail behind the rear quarter lights and stick down the lining. Trim off any excess at the front edge.

7. Fold the rear lower edge (using adhesive) and tack the edge behind the rear bow (using adhesive).

8. Offer up the rear bow trimmed finishers to the rear edge of the bow. Hold in position and drill suitable holes for self tapping screws. Use five screws each side.

9. Replace the header panel linings and fittings. See Section P28B.

10. Replace header seal.

The hydraulic system comprises of a reversible electro hydraulic motor pump with an integral fluid reservoir supplying power to two double acting rams.

The hydraulic pump is mounted on the same drive shaft as the electric motor and delivers pressure to either of its two outlet/inlet ports. The delivery/return circuit for hydraulic flow is connected to both ends of the hydraulic rams. Therefore the rams will extend or retract and move the frame up or down.

The hydraulic ram cylinders are anchored at the ram end and are able to swing on pivots at that anchorage. This allows the cylinders rams to provide direct thrust to the hood frame at the same time allowing their position for the changing angular thrust required as the roof frame is moving.

The hydraulic pump is self-priming and the system is self bleeding.

The electro hydraulic power unit is only serviced as an assembly and individual components will not be supplied.

To Remove Rams

1. Lower the roof

2. Remove rear quarter trim panels. See Section P25B.

3. Remove the three bolts from the front of the inner panel and bend the panel towards the interior slightly, to gain access to the cylinders.

4. Remove the retaining clip or split pin from the pivot at the ram end and withdraw the pin.

5. Remove the two nuts that retain the inner half of the hinge bracket to the nylon housing at the top of the cylinder. Withdraw the cylinder from the pivot bracket.

6. Detach the two feed/return unions from the cylinder. (The fluid in the pipes will escape and if possible the fluid should be trapped or collected).

To Refit the Rams

1. Re-connect the hydraulic unions. Note that the union connection at the top of the cylinders are threaded into the nylon end cap. When fitted, the 'L' leg of the union must travel parallel and adjacent to the long axis of the cylinder. If not fitted in this position the union could be damaged beyond repair when the roof is operated.

2. With the ram in the retracted position, offer it up to the frame and replace the inner half of the hinge bracket using the two nuts.

3. Replenish the hydraulic reservoir with the correct fluid. See Section Q9B. To gain access remove the two loudspeaker inspection panels from the luggage compartment and then the forward trim panel. Remove the filler plug from the left hand side of the unit and replenish using an oil can. The level is correct when the fluid reaches the filler orifice. Replace trim panels.

4. Operate the roof under power in small increments until the pivot pins for the rams can be replaced. Refit the split pins or spring clips (used on later vehicles).

5. Refit the inner panel and replace the quarter trim panels.

   Note: Air bubbles may be visible in the opaque plastic feed pipes to the cylinders. Such bubbles are a normal characteristic and are not an indication of a fault in the self-bleed system.

Hydraulic Pump/Motor - Remove and Refit

To remove hydraulic pump/motor assembly

1. Remove the speaker inspection panels and forward trim panel from the luggage compartment.

2. Disconnect the pipe union immediately facing the rear(hydraulic fluid will escape, therefore collect or trap the fluid when disconnecting).

3. Remove the two attachment bolts from the box of the pump/motor and withdraw the assembly. (The forward side is located by two spigots).

4. Disconnect the remaining pipe union and remove the assembly from the car.

To refit pump/motor assembly

1. Refit the hydraulic pipe unions.

2. Replace the assembly and refit the two attachment bolts.

3. Remove the level/filler plug from the left hand side and replenish with the correct grade of fluid. See Section Q9B. The level is correct when the fluid reaches the bottom of the filler hole.

4. Replace the rear panels.

   Note: Air bubbles may be visible in the opaque plastic feed pipes to the pump, such bubbles are a normal characteristic and are not an indication of a fault in the self bleed system.

Pump Pressures and Fault Finding

The system operating pressure varies between 50 - 250lb/in depending on the roof frame position at any one moment. Maximum pressures occur at the initial stage of the raising or lowering sequence.

The pressure should be checked with a suitable pressure gauge inserted at the outlet union concerned. For the 'lower' sequence connect to the rear of the pump. For the 'raise' sequence connect to the front of the pump (this will necessitate removal of the pump/motor assembly from its mountings.

Fault Finding

First check that the reservoir level is correct.

Motor runs sluggishly and slowly	
Possible cause	Suggested remedy
Battery low	Check with the engine running.
Faulty wiring	Check earth wire and feed wires to the motor.
Motor does not run	
Possible cause	Suggested remedy
Faulty wiring	Check all connections.
Faulty relays ('up' or 'down')	Replace
Faulty motor	Replace pump/motor assembly.
Low fluid level - reservoir/low pressure	
Possible cause	Suggested remedy
Incorrect level	Replenish to correct level
Leakage at pump unions	Check tightness and threads. Replace as necessary.
Leakage at operating cylinders (top and bottom)	Check unions. Check threads, particularly at the nylon end cap. Replace as necessary.

RECOMMENDED LUBRICANTS & HYDRAULIC FLUIDS

INDEX

Q.5 APPROVED LUBRICANTS FOR JENSEN [INTERCEPTOR]

	SHELL	BP	ESSO	CASTROL	PETROFINA	MOBIL	TEXACO	DUCKHAMS
Engine Above + 32°F	Shell Super Motor Oil	BP Super Visco-Static 10W/30 10W/40 20W/50	Esso Extra Motor Oil 10W/30	Castrol GTX or Castrol XL	Super Grade Motor Oil 20W/50	Mobiloil Super 10W/50	Havoline 30 or Havoline 10W/30	Q20-50
As low as + 10°F	Shell Super Motor Oil	BP Super Visco-Static 10W/30 10W/40 20W/50	Esso Extra Motor Oil 10W/30	Castrol GTX or Castrol XL	Super Grade Motor Oil 20W/50	Mobiloil Super 10W/50	Havoline 20-20W or Havoline 10W/30	Q20-50
As low as - 10°F	Shell Oil 5W/20 5W/30	BP Super Visco-Static 10W/30 10W/40	Esso Extra Motor Oil 10W/30	Castrol-ite or Castrol Super	Fina Multi-grade Motor Oil 10W/30	Mobiloil Super 10W/50	Havoline 10W or Havoline 10W/30	Q20-50
Below - 10°F	5W/20A 5W/30	BP Super Visco-Static 5W/20	Esso Extra Motor Oil 5W/20	Castrol 5W/20	Fina Super grade Motor Oil 5W/20	Mobiloil 5W	Havoline 5W/20	Q20-50
Oil Filter Air Cleaner	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine Engine	As for Engine	As for Engine	As for Engine
Distributor	As for Engine	As for Engine	As for Engine	Castrol-ite	As for Engine	As for Engine	As for Engine	As for Engine
Automatic Transmission	ATF Dexron (R)	BP Autran DX	Esso Auto Trans Fluid	Castrol TQ Dexron (R)	Fina Dexron ATF	Mobil ATF-220	Texamatic Fluid	D-Matic
Rear Axle	Shell Limited Slip Differential Oil S.6721A	BP Limslip Gear Oil 90/1	-	Castrol Hypoy LS	Fina Pontonic Plus	Mobilube HD 90	3450 Gear Oil	Hypoid 90 D.L.

Q.5 APPROVED LUBRICANTS FOR JENSEN [INTERCEPTOR]

	SHELL	BP	ESSO	CASTROL	PETROFINA	MOBIL	TEXACO	DUCKHAMS
All Grease Points	Shell Retinax A	BP Energrease L2	Esso Multi-Purpose Grease	Castrol LM Grease	Fina Marson HTL 2	Mobil-grease M.P.	Marfak All-Purpose.	L.B.10 Grease
Accelerator Clutch, and Fork Linkages	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine
Compressor	Clavus 33							

NOTE

Additives to any of the above lubricants are not recommended.

APPROVED HYDRAULIC FLUIDS

Brakes: Castrol/Girling Brake & Clutch Fluid Amber.

Steering Pump: Chrysler Fluid Pt. No. 2084329 or Veedol ATF Special 3433 or Shell S7545.

Q.6 CAPACITIES - INTERCEPTOR

COMPONENT	IMPERIAL UNIT	UNITED STATES UNIT	LITRES
ENGINE SUMP INCLUDING FILTER	$8\frac{1}{2}$ pints	10 pints	4.7
EXTRA WHEN REFILLING AFTER FITTING NEW FILTER	2 pints	2.4 pints	1.19
GEARBOX (AUTOMATIC)	17 pints	20 pints	9.5
REAR AXLE	3 pints	3.6 pints	1.7

Q.7 APPROVED LUBRICANTS FOR JENSEN [FF]

	SHELL	BP	ESSO	CASTROL	PETROFINA	MOBIL	TEXACO	DUCKHAMS
Engine Above + 32°F	Shell Super Motor Oil	BP Super Visco-Static 10W/30 10W/40 20W/50	Esso Extra Motor Oil 10W/30	Castrol GTX or Castrol XL	Super Grade Motor Oil 20W/50	Mobiloil Super 10W/50	Havoline 30 or Havoline 10W/30	Q20-50
As low as + 10°F	Shell Super Motor Oil	BP Super Visco-Static 10W/30 10W/40 20W/50	Esso Extra Motor Oil 10W/30	Castrol GTX or Castrol XL	Super Grade Motor Oil 20W/50	Mobiloil Super 10W/50	Havoline 20-20W or Havoline 10W/30	Q20-50
As low as - 10°F	Shell Oil 5W/20 5W/30	BP Super Visco-Static 10W-30 10W-40	Esso Extra Motor Oil 10W/30	Castrol-ite or Castrol Super	Fina Multi-grade Motor Oil 10W/30	Mobiloil Super 10W/50	Havoline 10W or Havoline 10W/30	Q20-50
Below - 10°F	5W/20A 5W/30	BP Super Visco-Static 5W/20	Esso Extra Motor Oil 5W/20	Castrol 5W/20	Fina Super-grade Motor Oil 5W/20	Mobiloil 5W	Havoline 5W/20	Q20-50
Oil Filter Air Cleaner	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine
Distributor	As for Engine	As for Engine	As for Engine	Castrol-ite	As for Engine	As for Engine	As for Engine	As for Engine
Automatic Transmission and 4 - wheel Drive Unit	ATF Dexron (R)	BP Autran DX	Esso Auto Trans Fluid	Castrol TQ Dexron (R)	Fina Dexron ATF	Mobil ATF-220	Texamatic Fluid	D-Matic
Rear Axle	Shell Limited Slip Differential Oil S.6721A	BP Limslip Gear Oil 90/1	-	Castrol Hypoy LS	Fina Pontonic Plus	Mobilube HD 90	3450 Gear Oil	Hypoid 90 D.L.

Q.7 APPROVED LUBRICANTS FOR JENSEN [FF]

	SHELL	BP	ESSO	CASTROL	PETROFINA	MOBIL	TEXACO	DUCKHAMS
Front Axle	Shell Spirax 90EP	BP Gear Oil SAE 90EP	Esso Gear Oil GP 90/140	Castrol Hypoy	Fina Pontonic	Mobilube GX 90	Multigear Lubricant 90EP	Hypoid 90
All Grease Points	Shell Retinax A	BP Energrease L2	Esso Multi-Purpose Grease	Castrol LM Grease	Fina Marson HTL 2	Mobil-grease MP.	Marfak All-Purpose	L.B.10 Grease
Accelerator, Clutch, and Fork Linkages	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine
Compressor	Clavus 33							

NOTE

Additives to any of the above lubricants are not recommended.

APPROVED HYDRAULIC FLUIDS

Brakes: Castrol/Girling Brake & Clutch Fluid Amber.

Steering Pump: Chrysler Fluid Pt. No. 2084329 or Veedol ATF Special 3433 or Shell S7545.

Q.8 CAPACITIES - JENSEN [FF]

COMPONENT	IMPERIAL UNIT	UNITED STATES UNIT	LITRES
ENGINE SUMP INCLUDING FILTER	8½ pints	10 pints	4.7
EXTRA WHEN REFILLING AFTER FITTING NEW FILTER	2 pints	2.4 pints	1.19
GEARBOX (AUTOMATIC)	17 pints	20 pints	9.5
REAR AXLE, FRONT DIFFERENTIAL, CENTRE DIFFERENTIAL	3 pints each	3.6 pints each	1.7 each

Q.6A CAPACITIES - JENSEN III AND S.P.

COMPONENT	IMPERIAL UNIT	UNITED STATES UNIT	LITRES
Engine sump including filter	10.2 pints	12 pints	5.8
Extra when re-filling after fitting new filter	2 pints	2.4 pints	1.19
Gearbox (Automatic)	16 pints	19 pints	9
Rear Axle	3 pints	3.6 pints	1.7

Q.5A APPROVED LUBRICANTS FOR JENSEN III AND S.P.

	SHELL	B.P.	ESSO	CASTROL	FINA	MOBIL	TEXACO	DUCKHAMS
Engine Above + 32°F	Shell Super Motor Oil	B.P. Super Visco-Static 10W/30 10W/40 20W/50	Uniflow 10W/40	Castrol GTX or Castrol XL	Super Grade Motor Oil 20W/50	Mobiloil Super 10W/50	Havoline 30 or Havoline 10W/30	Duckhams Q Motor Oil
As low as + 10°F	Shell Super Motor Oil	B.P. Super Visco-Static 10W/30 10W/40 20W/50	Uniflow 10W/40	Castrol GTX or Castrol XL	Super Grade Motor Oil 20W/50	Mobiloil Super 10W/50	Havoline 20-20W or Havoline 10W/30	Duckhams Q Motor Oil
As low as - 10°F	Shell Oil 5W/20 5W/30	B.P. Super Visco-Static 10W/30 10W/40	Uniflow 10W/40	Castrol-ite or Castrol Super	Fina Multi-grade Motor oil 10W/30	Mobiloil Super 10W/50	Havoline 10W or Havoline 10W/30	Q10W/50
Below - 10°F	5W/20A 5W/30	B.P. Super Visco-Static 5W/20	Esso extra Motor oil 5W/20	Castrol 5W/20	Fina Super Grade Motor oil 5W/20*	Mobiloil Super 5W/30	Havoline 5W/20	Q5W/30
Oil Filter Air cleaner	As for Engine	As for engine	As for Engine	Castrol GTX or Castrol XL	As for engine	Mobiloil Super 10W/50	Havoline 30 or 10W/30	As for engine
Distributor	As for Engine	As for engine	As for Engine	As for Engine	Fina Multi-Grade Motor oil 10W/30	Mobiloil Super 10W/50	Havoline 10W/30	As for engine
Automatic Transmission	ATF Dexron (R)	B.P. Autran DX	Esso Auto Trans fluid	Castrol TQ Dexron (R)	Fina Dexron ATF	Mobil ATF-220	Texamatic fluid	D-Matic

Q.5A APPROVED LUBRICANTS FOR JENSEN III AND S.P.

	SHELL	B.P.	ESSO	CASTROL	FINA	MOBIL	TEXACO	DUCKHAMS
Rear axle	Shell Ltd. Slip differential oil S.7143	B.P. Limslip gear oil 90/1	-	Castrol Hypoy LS	-	-	3450 gear oil	-
All grease points	Shell Retinax A	B.P. Energrease L2	Esso Multi Purpose grease	Castrol LM grease	Fina Marson HTL2	Mobil grease MP	Marfak All Purpose	LB10 grease
Accelerator linkages Air conditioning compressor	As for engine Clavus 33	As for engine	As for engine	As for engine	As for engine	As for engine	As for engine	As for engine

NOTE: Additives to any of the above lubricants are not recommended.

APPROVED HYDRAULIC FLUIDS

Brakes: U.K. Only Castrol/Girling Universal Brake and Clutch Fluid. Overseas (except N. America) Castrol/Girling Brake Fluid Green. N. America Castrol GTLMA Brake Fluid.

Where these proprietary fluids are not available, others which meet SAE J1703C specification may be used.

Steering Pump: Chrysler Fluid Pt.No. 2084329 or Veedol ATF Special 3433.

Q.9.B APPROVED LUBRICANTS FOR INTERCEPTOR (CONVERTIBLE)

	SHELL	BP	ESSO	CASTROL	FINA	MOBIL	REGENT/ TEXACO	DUCKHAMS
Engine Above +32 F	Shell Super Motor Oil	BP Super Visco-Static 10W/30 or 10W/40 or 20W/50	Uniflo 10W/40	Castrol GTX or Castrol XL	Supergrade Motor Oil 20W/50	Mobiloil Super 10W/50	Havoline 30 or Q 10W/30	Duckhams Motor Oil
[illegible] 10 F	Shell Oil 5W/20 or 5W/30	BP Super Visco-Static 10W/30 or 10W/40	Uniflo 10W/40	Castrolite or Castrol Super	Fina Multi-grade Motor Oil 10W/30	Mobiloil Super 10W/50	Havoline 10W or Havoline 10W/30	Q10W/50
Below 10 F	Shell Oil 5W/20A 5W/30	BP Super Visco-Static 5W/20	Esso Extra Motor Oil 5W/20	Castrol 5W/20	Fina Super-grade Motor Oil 5W/20	Mobiloil Super 5W/30	Havoline 5W/20	Q5W/30
Oil Filter Air Cleaner	As for Engine	As for Engine	As for Engine	Castrol XL or Castrol GTX	As for Engine	Mobiloil Super 10W/50	Havoline 30 or 10W/30	As for Engine
Distributor	As for Engine	As for Engine	As for Engine	As for Engine	Fina Multi-grade Motor Oil 10W/30	Mobiloil Super 10W/50	Havoline 10W/30	As for Engine
Automatic Trans-mission/Power Roof Reservoir	Shell ATF Dexron	BP Autran DX	Esso Auto Trans Fluid	Castrol TQ Dexron	Fina Dexron ATF	Mobil ATF-220	Texamatic Fluid	D-matic
Rear Axle	Shell Spirax Super 90	BP Limslip Gear Oil 90/1	—	Castrol Hypoy LS	—	—	3450 Gear Oil	—
All Grease Points	Shell Retinax A	BP Energrease L-2	Esso Multi-Purpose Grease	Castrol LM	Fina Marson HTL 2	Mobilgrease MP	Marfak All-Purpose	LB 10 Grease
Accelerator Linkages	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine	As for Engine
Air Conditioning Compressor	Clavus 33	Energol LPT 100						

[illegible] lubricants which do not have [illegible] SAE grade number [illegible] service classification shown on the container should not be used.

[illegible] vehicle [illegible] very high speeds or very rapid acceleration) the engine requires [illegible] normal lubr[illegible] the high speeds, loads, and temperature of [illegible] For best protection of the engine under these conditions, the heaviest available engine oil [illegible] be used that will permit satisfactory cold starting. SAE 30 and SAE 40 are recommended, multi viscosity [illegible] SAE 20W-40 and SAE 20W-50 may also be used.

When outside temperatures are consistently below 32°F (0°C), SAE 10W-30 or SAE 10W-40 are recommended for ease in cold starting. However, even in cold weather, these grades should not be used if the vehicle is driven in competition or other forms of maximum performance operation.

APPROVED HYDRAULIC FLUIDS

Brakes: U.K. only-Castrol/Girling Universal Brake and Clutch Fluid.

Overseas (except N. America)—Castrol Girling Brake Fluid (Green).

N. America—Castrol GTLMA Brake Fluid.

Steering Pump: Chrysler Fluid Pt. No. 2084329 or Veedol ATF. Special 3433.

Q10B CAPACITIES - INTERCEPTOR (CONVERTIBLE)

Component	Imperial Unit	United States Unit	Litres
Engine (Sump including filter)	8.5 pints	10 pints	4.7 litres
Extra when refilling after fitting new filter.	2 pints	2.4 pints	1.2 litres
Gearbox (Automatic)	17 pints	20 pints	9.5 litres
Roof Operating Reservoir	1.5 pints	1.8 pints	0.85 litres
Rear Axle	3 pints	3.6 pints	1.7 litres

SECTION R

WORKSHOP MANUAL

INTERCEPTOR & FF

SPECIAL TOOLS

INDEX

White

R.1 TRANSMISSION

Puller - Pinion & Trans. Drive Flange	C-432
Pliers - Snap Ring	C-484
Puller - Main Shaft Rear Oil Seal	C-748
Switch - Remove Control Starter	C-763
Driver - Extension Housing Rear Brg.	C-3204
Pliers - External Snap Ring - Complete with set of C-3917 Interchangeable Points	C-3915
Pliers - External Snap Ring/W set of C-3917 points	C-3916
Wrench - U Joint Flange & Yoke Holding	C-3281
Pilots - (PR) Front Pump Housing Aligning	C-3288
Gauge - Low Pressure Test With Hose	C-3292
Gauge - High Pressure Test With Hose	C-3293
Indicator - Dial Complete with C Clamp	C-3339
Compressor - Servo Springs	C-3422A
Fixture - Engine Support	C-3487
Adaptor - Kickdown Band Adj. Wrench	C-3705
Stand - Valve Body Repair	C-3749
Puller Set	C-3752
Gauge - Throttle Compensator Setting	C-3763
Driver - Output Shaft Seal	C-3837
Installer - Front Pump Seal	C-3860
Puller - Front Pump Seal	C-3861
Compressor & Installer	C-3863
Tool - Rear Pump Cover Aligning	C-3864
Tool - Front Pump Aligning	C-3881
Adaptor	C-3882
Stand - Repair (Bench Type)	C-3750
Tool Set - Precision Service Bushing Removing and Installing	C-3887

Contents:

SP-1191	NUT	SP-3624	INST. HEAD
1270	METAL CASE	SP-3625	INST. HEAD
SP-3549	HANDLE	SP-3626	INST. HEAD
SP-3550	REM. HEAD	SP-3627	REM. HEAD
SP-3551	REM. HEAD	SP-3628	INST. HEAD

SP-3629	REM. HEAD	SP-3633	RECEIVING CUP
SP-3630	THD. REM. HEAD	SP-3634	INST. HEAD
SP-3631	THD. REM. HEAD	SP-3635	INST. HEAD
SP-3632	THD. REM. HEAD	SP-3636	INST. HEAD

Wrench - (Band Adjusting) C-3380
Installer - (Rear Oil Seal).. .. .. C-3972
Installer & Remover (Extension Housing Bushing) C-3974

FOR 4 WHEEL DRIVE TRANSMISSION TOOLS SEE SECTION B.11

R.2 POWER UNIT

Tappet Remover C-3661
Tappet Plunger Compressor C-3160
Piston Ring Remover & Installer C-3684
General Bearing Remover C-3688
Cylinder Ridge Reamer .. .. AMMO 2100
Rear Main Bearing Oil Seal Installation C-3965
Distributor Bush Remover SP-1193
Distributor Bush Installer C-3053
Timing Cover Oil Seal Remover and Installer SP-2831

R.3 ALTERNATOR

Puller C-4068
Slip Ring Installer C-3900
Endshield Bearings Installer Support.. .. .. C-3770A
Endshield Bearings Installer SP-3381
Endshield Pulley Extractor C-3934
Tool Kit C-828B

R.4 FRONT SUSPENSION

King Pin Bush Reamer 18G597
Spring Compressor (Local Manufacture) ,. .. .. Fig. C12

R.5 FINAL DRIVE

Universal Dial Test Indicator .. .. SE 101
Axle Shaft Extractor .. .. SE 102
Pinion, Differential & Hub Bearing Cone Puller .. .. SE 103

Gear Carrier Stretching Fixture	SE 104
Pinion Bearing Cup Extractor	SE 105
Bearing Cup Installation Tool	SE 106
Pinion Cone Setting Gauge	SE 107
Pinion Oil Seal Installation Collar	SE 108

The complete set of Final Drive Tools are available from:-

Messrs. V. L. Churchill & Co. Ltd.,
Great South West Road,
BEDFONT, Middlesex.

R.6 MISCELLANEOUS

Brake Piston Re-Setting Lever	AO 103742
Brake Caliper Setting Gauge	VBO 20000
Brake Pad Extractor Tool	VBO 60116
Rear Hub Extractor	JDIC/1
Spanner for Tank Unit Lock Ring (Local Manufacture)..	Fig. J.3
Tyre Valve Fitting Tool	268723
Tyre Tourniquet	268722

R.7 POWER STEERING PUMP

Gauge	C-3309B
Installer	C-3640
Stand	C-3643
Installer..	C-3782
Remover	C-3783
Gauge	C-3885A
Adapter	SP 5074
Installer	C-4061
Installer	C-4063
Remover	C-4062