Chapter 1

GENERAL

CONTENTS

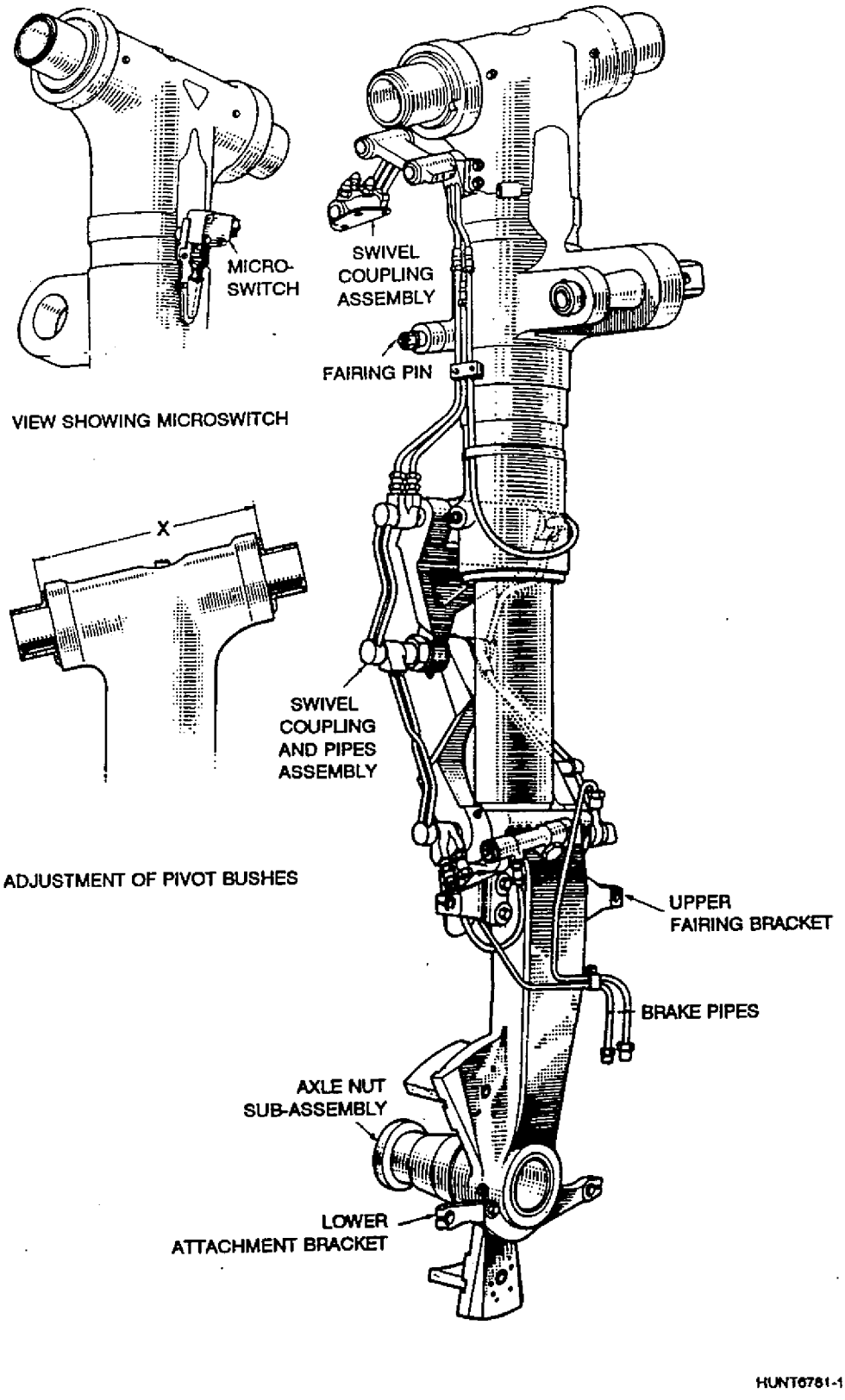


Fig 1 Main undercarriage

Leading particulars

1 Leading particulars for the unit are as follows:

1.1	Hydraulic fluid	Oil OM15
1.2	Length (axle centre to centre between main pivots)	50.080 to 50.250 in
1.3	Stroke	10.000 to 10.110 in

Modification state

2 The information in this publication includes all appropriate modifications up to and including issue 3.

Introduction (Fig 1)

3 The main undercarriage is a retractable telescopic unit, fitted with a cantilever axle and incorporating a liquid spring shock absorber assembly. The shock absorber is pressurised by the aircraft hydraulic system through a recuperator valve, which ensures that the correct pressure is maintained in the assembly for operational requirements. A microswitch mounted at the upper end of the undercarriage unit provides a safety cut-out for the armament control and for the undercarriage retraction when the aircraft is on the ground.

Constructional description (Figs 1 to 5)

4 The main fitting houses a sliding cylinder from the lower end and at the upper end provides an anchorage point for the shock absorber piston rod, which is extended from the sliding cylinder. The pivot pins, by which the undercarriage is attached to the airframe structure, are secured in bosses at the upper end with bolts, washers and stiffnuts. A bearing cap and a pivot bush are fitted over each main pivot pin and on one side, a shim is interposed between the bearing cap and the main pivot bush for adjustment purposes. Lugs on the main fitting accommodate a tapered retraction pin and a torque link pin and also provide for a towing attachment point. A microswitch bracket is located on the side of the main fitting. A swivel coupling and pipes assembly connecting to the wheel brake installations and to the recuperator valve is secured by bolts to a side lug of the main fitting.

5 The tapered retraction pin is packed with grease and has radial lubrication passages to communicate with the bushed lugs of the main fitting. An eye-end formed on one end of the retraction pin is bushed and lubricated through a lubrication nipple: the bore is closed by a sealed plug. The retraction pin is secured in the lugs with a thrust collar, shims and a collar and locked by a shear pin and a split pin.

6 The lower end of the main fitting accommodates a lower bearing which screws in, is fitted with a wiper ring and lubricated through a lubrication nipple. The lower bearing is locked in position with a locking screw screwed into a screwed insert. On each side of the main fitting, adjacent to the torque link, a fairing pin is secured in a boss by a pin and another fairing pin is secured likewise near the microswitch.

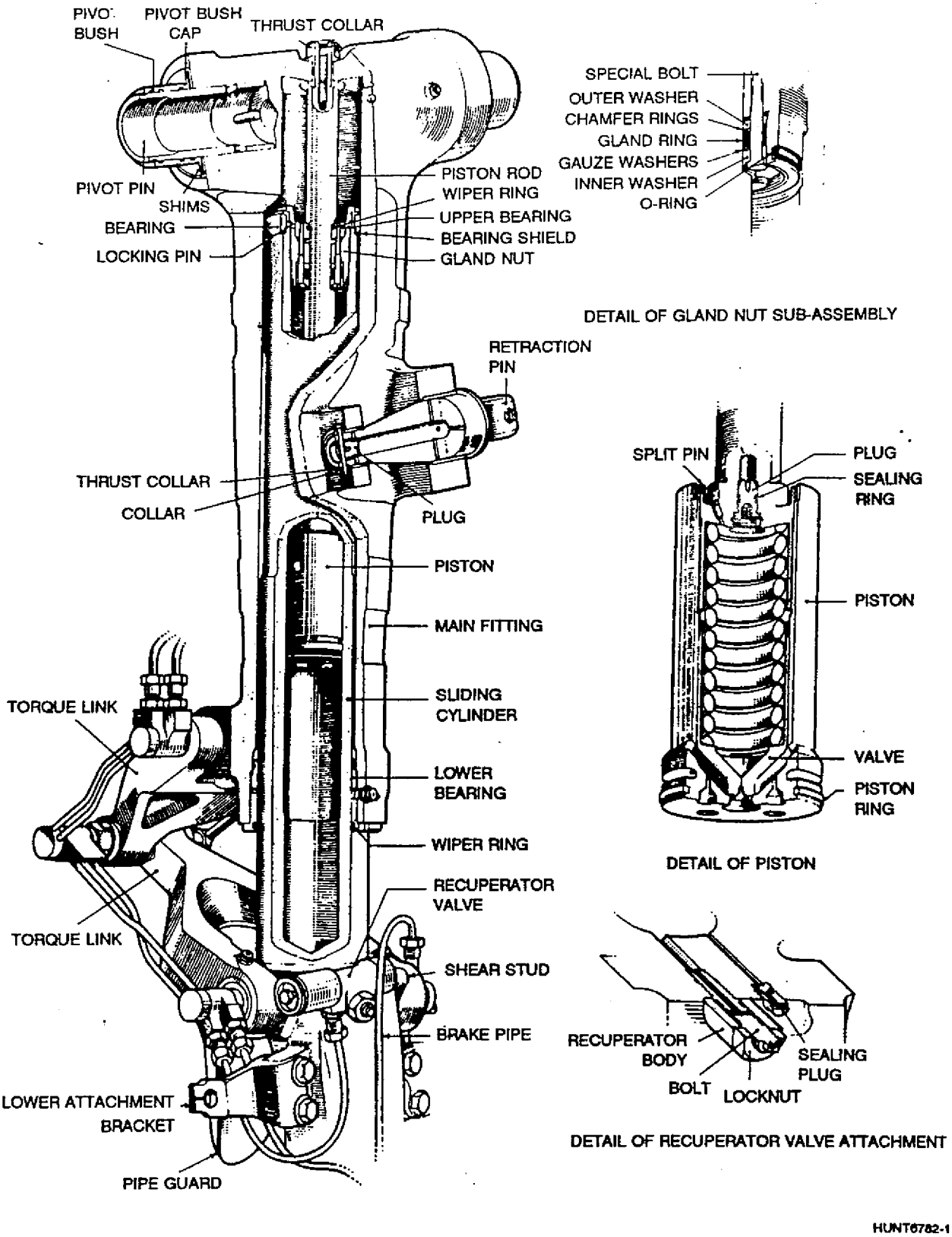


Fig 2 Main undercarriage assembly

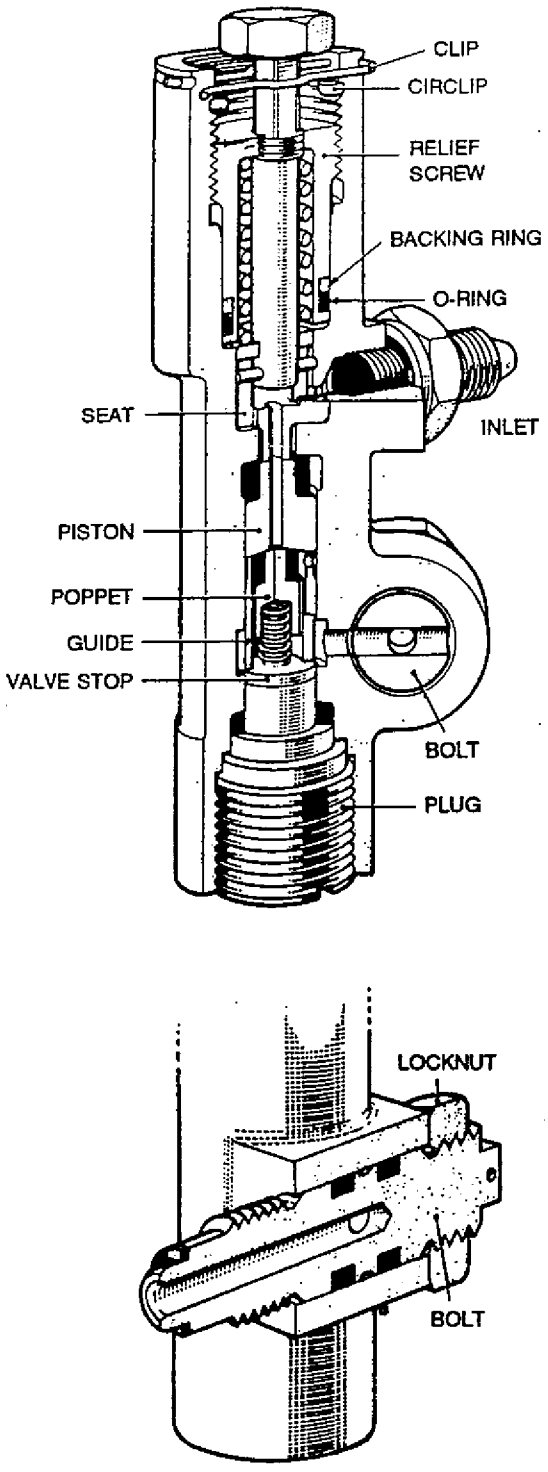


Fig 3 Recuperator valve

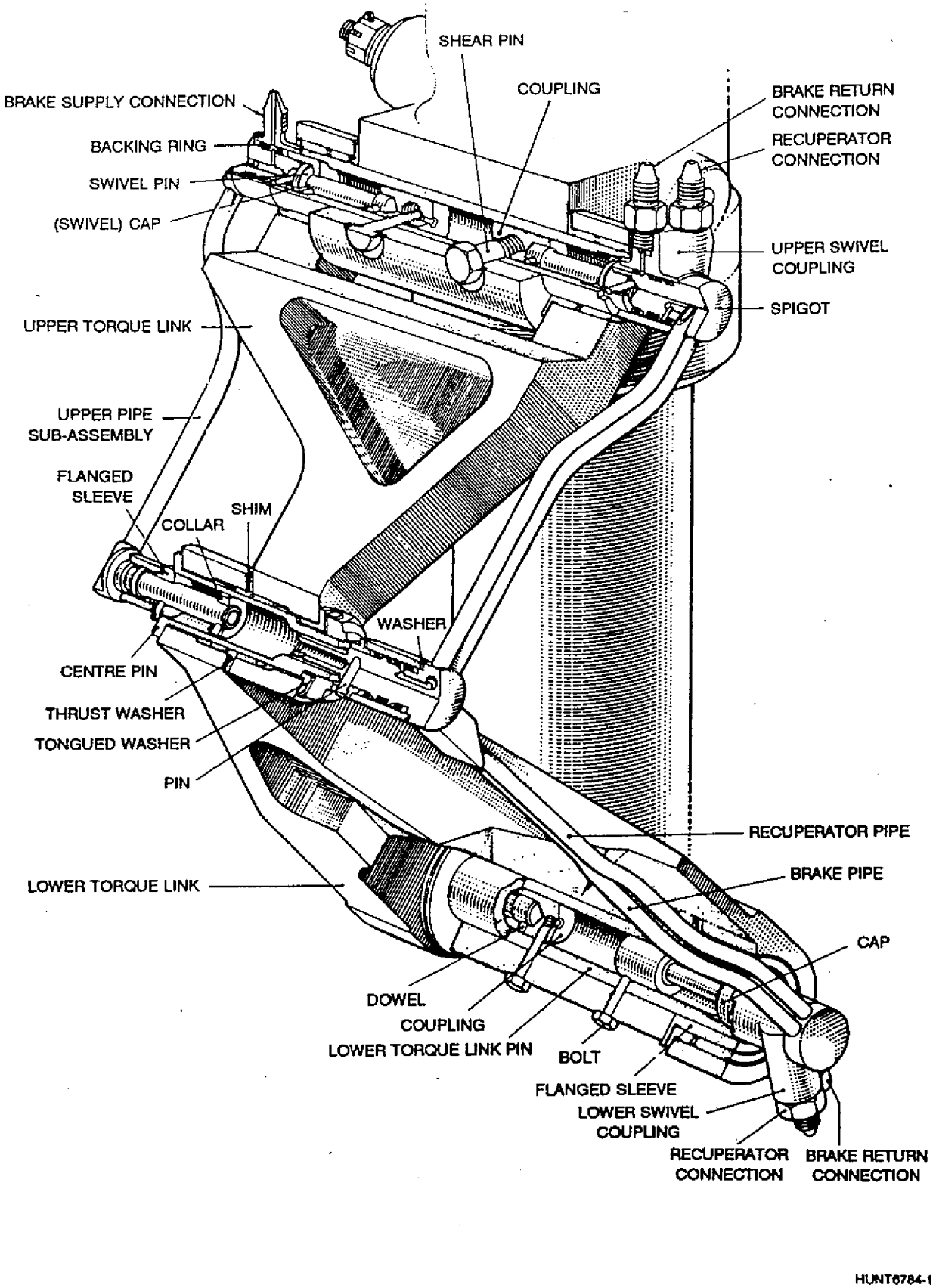


Fig 4 Torque links and swivel coupling and pipe assemblies

7 The sliding cylinder houses the shock absorber assembly. An upper bearing and a bearing shield are carried at its upper end and at its lower end is a recuperator valve and a sealing plug sub-assembly, which communicate with the sliding cylinder bore. The sliding cylinder is integral with a wheel fork arm, drilled to receive a stub axle and the lower torque link pin. The fork arm is also flanged for the attachment of the brake gear and has lugs for fairing attachment brackets.

8 The piston rod of the shock absorber is hollow and formed as a hollow piston head at the lower end. A plug, fitted with an O-ring and retained by a circlip, blanks off the lower end of the bore and the piston head is screwed into a piston to contain a spring-loaded valve. Four fluid leak holes in the end of the piston communicate with eight holes in the piston wall and a central orifice in the piston is normally covered by the spring-loaded valve.

9 The piston assembly is housed in the bore of the sliding cylinder which is filled with fluid. The piston rod extends outwards through a gland nut sub-assembly screwed into the cylinder and its upper end is anchored through the main fitting with a thrust collar and a pin.

10 The gland nut sub-assembly consists of a gland nut, recessed at one end for a bearing with a wiper ring and at the other end for an outer washer, a gland ring fitted with one large and four small chamfer rings, two gauze washers and an inner washer. The gland nut and the assembled parts, which are located on four special bolts secured with spring washers and special nuts, is screwed into the cylinder and secured with a locking pin. The locking pin is fitted under the upper bearing of the sliding cylinder and through the cylinder wall to the gland nut.

11 The recuperator valve body is bored from each end and a small orifice connects the two bores. A boss, tapped for an inlet connection, and a flange, drilled to receive a banjo type attachment bolt, each communicate through a fluid way to one of the two bores respectively. The inlet connection is a standard pipe adapter, fitted with a gauze filter and screwed into the boss against a bonded seal. The bolt, fitted with O-rings and a sealing washer, is screwed into the tapping of the sliding cylinder and the recuperator valve is then secured on the bolt by a locknut.

12 A relief screw, with a hollow and fluted seat pinned to its inner end, is screwed into one end of the recuperator valve body. The seat is located through the small orifice against a centrally drilled piston in the opposite bore. A bonded rubber and steel poppet, housed in a guide, is normally held against the piston by a spring, a valve stop and a plug and also by the internal pressure of the shock absorber applied through the banjo type bolt.

13 The inner end of the tubular axle is pressed in and located to the wheel fork arm by two ferrules, secured by a bolt and a stiffnut. The outer end is internally threaded for an axle nut sub-assembly, which is adjusted to give the necessary wheel end play and locked with a locking screw.

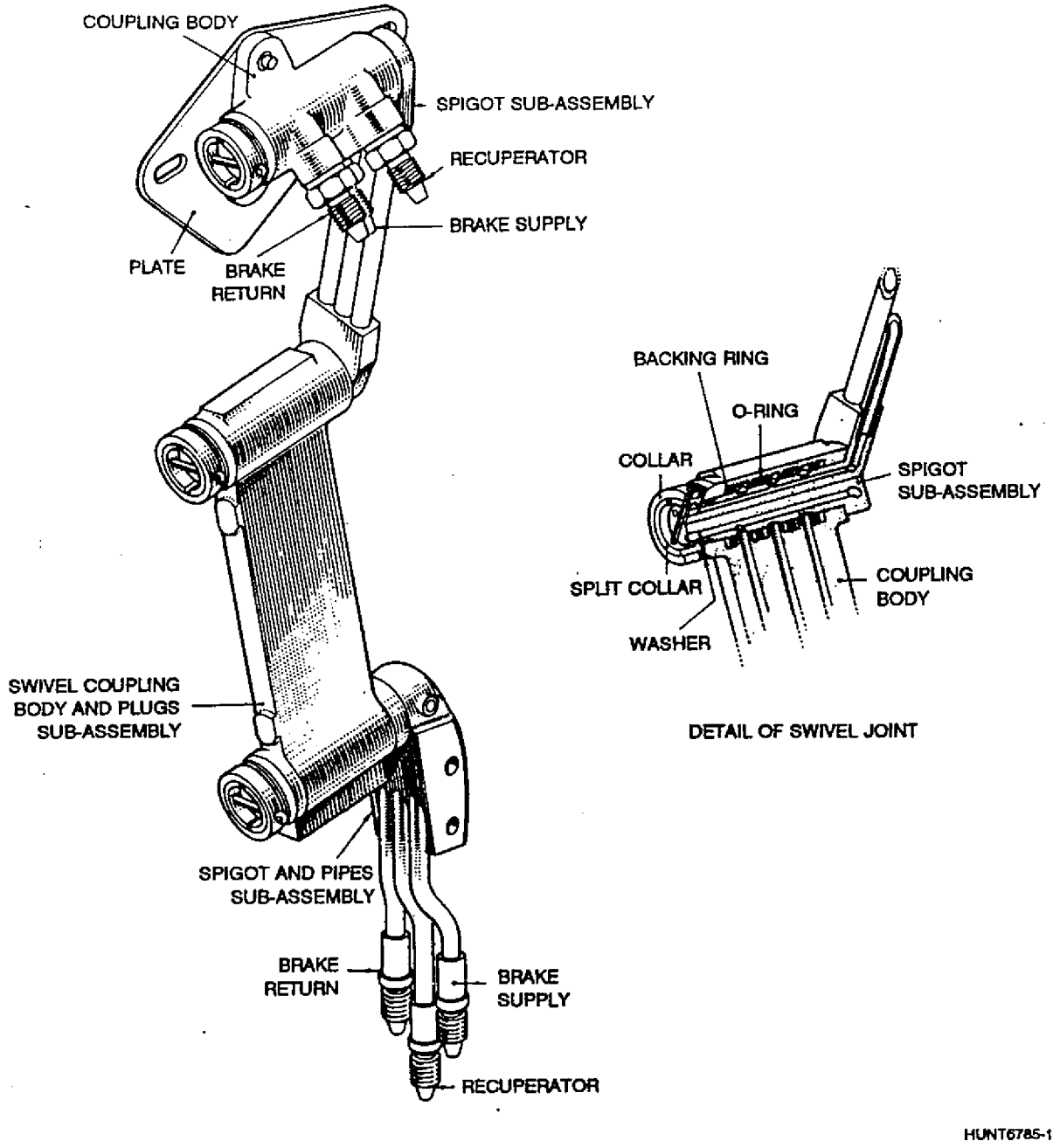


Fig 5 Upper swivel coupling assembly

14 The upper and lower torque link sub-assemblies are connected to the main fitting sub-assembly and to the cylinder and axle sub-assembly respectively by hollow pins secured by bolts. The lower link sub-assembly carries flanged sleeves secured to the cylinder and axle sub-assembly by shear studs wirelocked together. The interconnecting ends of the torque link sub-assemblies, fitted with a thrust washer and a shim between the mating faces, are joined together by a pin. The pin is keyed for a tongued washer and secured with a nut locked by a tab washer.

15 The various swivel and pipe assemblies provide for fluid supply from the aircraft hydraulic system to the recuperator valve and to the wheel brake installations. They consist of two swivel coupling assemblies and two sets of rigid pipes. The upper swivel coupling assembly is secured at the top of the main fitting and is joined by a set of rigid pipes to the second swivel coupling and pipes sub-assembly adjacent to the torque links. The lower swivel coupling is connected to the recuperator valve and to the wheel brake installations by the second set of rigid pipes. A pipe guard is secured to a fairing bracket adjacent to the recuperator valve to protect the pipes in the event of tyre burst.

16 The upper swivel coupling assembly is of four sections, comprising a coupling body, a swivel coupling body and plugs sub-assembly, a spigot sub-assembly and a spigot and pipes sub-assembly. These sections are secured end-to-end and are free to swivel at the joints.

17 Each spigot is integral with a block at one end and has three annular grooves which individually communicate with longitudinal fluid ways in the spigot and block. Three pipes, in parallel, are soldered into the blocks; the blocks of the spigot sub-assemby being soldered to the opposite ends of common pipes. The free ends of the pipes for the spigot and pipes sub-assembly terminate in externally coned connections.

18 The swivel coupling body and plugs sub-assembly is bored transversely at each end and has annular grooves machined in each bore. Three grooves of one bore are separately joined by longitudinal fluid ways to the corresponding grooves in the opposite end and each set of fluid ways is sealed off from the others by O-rings and backing rings. The coupling body has one transverse bore with communicating grooves and fluid ways sealed off in a similar manner. The outer ends of the longitudinal fluid ways in this body are tapped to receive standard pipe adapters screwed in against bonded seals.

19 Two of the spigots are located through the bores of the swivel coupling body and plugs sub-assembly and each is secured with a washer, a split collar, a sleeve and a split pin. The remaining spigot is secured likewise through the bore of the coupling body.

20 A plate is attached by countersunk bolts to the lugs of the coupling body and the complete assembly is secured by bolts to a side lug of the main fitting sub-assembly.

21 The lower swivel pipe unit comprises a single and a twin pipe assembly which is secured in the bores of the upper and lower torque link pins and connected by three rigid pipes to the upper swivel coupling assembly. The single pipe and one of the twin pipes serve the wheel brake installations and the remaining pipe of the twin assembly provides for the recuperator valve.

22 Each pipe assembly consists of two sections. One section is fitted with a spigot at each end and the other has a spigot and a coupling. The spigots, which are grooved and have communicating fluid ways, are fitted with O-rings and backing rings. The coupling of one section is fitted over a spigot of the second section and with an interposed washer is secured with a flanged sleeve, a pin and split pins to form a centre swivel joint. The outer spigots are located through swivel couplings and together with a swivel cap and swivel pin are secured by dowels. For the twin pipe assembly, the swivel couplings are tapped for adapters screwed in against bonded seals, while on the single pipe assembly a banjo connection is used. A coupling is dowelled to the inner ends of the swivel pins and a collar is pinned to the inner end of the centre spigot for the single pipe assembly. The spigots and swivel pins are positioned in the hollow torque link pins and the couplings at the ends of the swivel pins are held by shear pins or bolts located through the torque links and torque link pins. The connections are only supported in the centre joint pin and no separate locking device is employed.

23 The microswitch is mounted on a serrated switch bracket secured by three bolts and opposes a plunger which is housed in the lower end of the switch bracket. The plunger is spring-loaded away from the microswitch and retained in the switch bracket by a plug, locked with a tab washer and fitted with a dust excluder. The plunger head is in contact with one end of a striker, which is secured in the bracket by a pin and protrudes into the bore of the main fitting to contact the upper bearing of the sliding cylinder. On the extension of the undercarriage, the bearing shield moves the striker to depress the plunger and operate the microswitch.

Functional description (Fig 6)

24 Diagram A shows the undercarriage under no load. The undercarriage is fully extended and the valve is closed. Diagram B shows the undercarriage under the influence of landing load. The load forces the sliding cylinder over the piston, reducing the internal volume and compressing the fluid. Fluid below the piston is forced through the drillings to the other side. Further increase in the loading opens the valve to permit the quick transfer of the fluid. Diagram C shows the undercarriage recoiling. At the end of the compression stroke, pressure is equal on both sides of the piston, but as the area below the piston is greater than the area above it, the forces on the piston are unbalanced and the greater force below the piston causes the undercarriage to extend. The valve is closed and the flow of fluid is restricted to the drillings in the piston which regulates the speed of the recoil. Diagram D shows the undercarriage under a static load. The undercarriage is compressed under the aircraft load and the piston enters the cylinder increasing the internal pressure until it supports the applied load.

25 When the undercarriage is under static load, the relief screw of the recuperator valve is screwed fully into the body. The pressure in the shock absorber, which is increased by the further entry of its piston into the cylinder, is greater than the pressure in the aircraft hydraulic system. Consequently, the poppet valve, seals off the recuperator piston, which, in turn forces back the fluted seat to compress the relief screw spring. This allows the piston to seal off the orifice in the recuperator valve body, thereby sealing the shock absorber.

26 When the shock absorber extends on take off, the pressure in the shock absorber drops, due to the increase in capacity caused by the withdrawal of the piston. The extension of the relief screw spring against the seat, forces the piston away from the orifice in the body. Although the piston is sealed by the poppet, a small gap between the piston and the body permits the pressures of the shock absorber and the aircraft hydraulic system to equalise. If the pressure in the shock absorber falls below that required for its satisfactory operation, the pressure of the fluid at the piston automatically moves the poppet and charges the unit to the correct pressure.

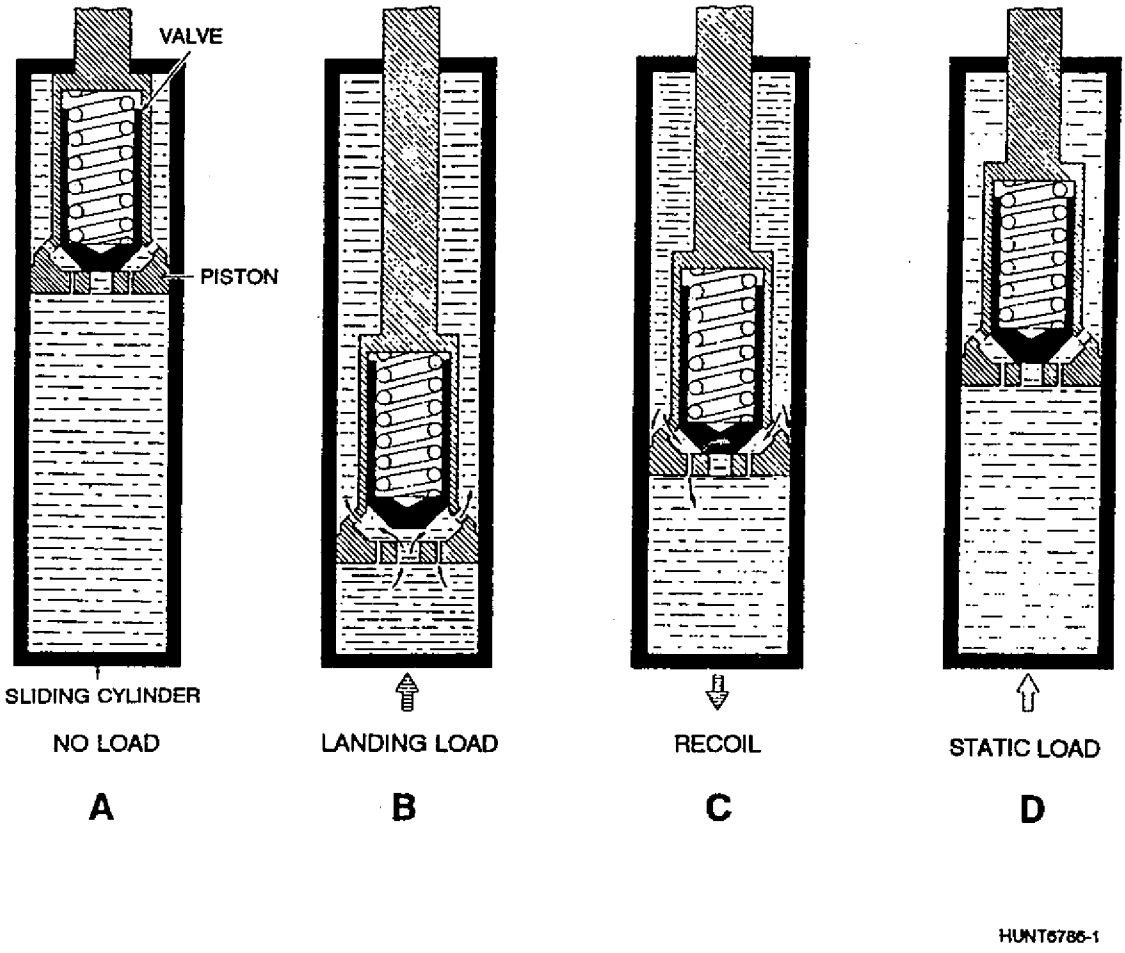


Fig 6 Functional diagram

Chapter 2

MAINTENANCE

CONTENTS

Special tools and equipment

1 The following special tools, equipment and materials are required to carry out the maintenance procedures detailed.

Part No	Description	Application
ST1089	C-key spanner	Dismantling/Assembling
ST111 MK23	Tommy bar	Assembling
ST111 MK31	Tommy bar	Dismantling
ST1214	Vice clamp	Dismantling/Assembling
ST1698	Extractor	Dismantling
ST1900 MK1	Drift	Dismantling
ST1900 MK4	Drift	Assembling
ST1900 MK5	Drift	Dismantling/Assembling
ST1900 MK6	Drift	Dismantling/Assembling
ST1903 MK2	Drift bar	Dismantling/Assembling
ST1903 MK5	Drift bar	Dismantling/Assembling
ST1903 MK8	Drift bar	Dismantling
ST1915	Extractor	Dismantling
ST1963	Extractor	Dismantling
ST1965	Tubular key spanner	Dismantling
ST1977	Extractor	Dismantling
ST1978	Extractor	Dismantling
ST1979	C-key spanner	Dismantling/Assembling
ST1980	Peg spanner	Dismantling/Assembling
ST1983	Extractor	Dismantling
ST1984	Alignment tool	Assembling
ST1986	Tubular key spanner	Assembling
ST1997	Sleeve	Assembling
ST2028	Assembly tool	Assembling
ST2040 MK46	Drift	Dismantling/Assembling

Part No	Description	Application
ST2040 MK73	Drift	Assembling
ST2040 MK82	Drift	Dismantling/Assembling
ST2143	Assembly post	Assembling
ST2387	Drift	Dismantling/Assembling
ST2427	Assembly/removal tool	Dismantling/Assembling
ST2446	Test fixture	Assembling
ST947A	Circlip pliers	Dismantling/Assembling
460001016	Assembly post	Assembling
-	Trichloroethane (TS367D)	Cleaning
-	White spirit (BS245)	Cleaning
-	Jointing compound JC5A	Assembling
-	Oil OM15 (DTD585)	Assembling
-	Grease XG315 (DEF STAN 91-56)	Assembling
-	Grease XG287 (DEF STAN 91-53)	Assembling
-	Corrosion preventative PX1	Preservation
-	Corrosion preventative PX28	Preservation
-	Locking wire (DTD189A)	Locking parts

Safety and maintenance notes

2 Safety and maintenance notes or other general safety/maintenance requirements appropriate to the equipment, or to the main equipment, must be complied with where relevant throughout the work detailed in this publication.

BAY MAINTENANCE

Dismantling (Chap 1, Figs 1 to 5)

WARNING

SPECIFIC INTERNAL DETAILS OF THIS UNIT ARE SUBJECT TO SPRING PRESSURE AND CARE MUST BE EXERCISED WHEN DISMANTLING.

3 Discard all forms of sealing rings after removal from the unit.

3.1 Remove the locking screw from the axle nut sub-assembly. Remove the PK screws and instruction plate from the axle nut. Unscrew the axle nut from the axle using tubular key spanner ST1965 and tommy bar ST111 MK31.

NOTE

Only remove the PK screws and the instruction plate if necessary.

3.2 Unscrew the stiffnut, withdraw the bolt securing the axle to the sliding cylinder and, using the extractor ST1698, remove the two ferrules. Use the assembly/removal tool ST2427 to remove the axle.

3.3 Unscrew the torque bolts and, using the drift ST2387, remove the torque pins.

3.4 Remove the split pins from the slotted nuts attaching the two lower attachment brackets to the sliding cylinder. Unscrew the slotted nuts and remove the washers and bolts and the two lower attachment brackets.

3.5 Remove the split pins from the slotted nuts attaching the two upper fairing brackets and the pipe guide to the sliding cylinder. Unscrew the slotted nuts and remove the washers. Remove the pipe guide and bolts and the two upper fairing brackets.

3.6 Disconnect the three upper pipe sub-assemblies from the spigot and pipes sub-assembly. Unscrew the two nuts from the two attachment bolts. Remove the washers and the bolts and remove the swivel coupling assembly from the main fitting.

3.7 Dismantle the swivel coupling assembly as follows:

3.7.1 Remove the split pin, the sleeve, the split collar and washer from the end of each of the three spigots to free the joints.

3.7.2 Separate the coupling body, the spigot sub-assembly, the swivel coupling body and plugs sub-assembly and the spigot and pipes sub-assembly.

3.7.3 Unscrew the three plugs and remove the rubber washers. Remove the two sets of O-rings and backing rings from the swivel coupling body and plugs sub-assembly.

3.7.4 Remove the O-rings and backing rings from the body coupling. Unscrew the three cone adapters from the body coupling and remove the bonded seals. Unscrew the two countersunk bolts attaching the body coupling to the mounting plate and collect the mounting plate.

3.8 Disconnect the two upper pipe sub-assemblies from the two cone adapters fitted in the upper swivel coupling. Disconnect the single upper pipe sub-assembly from the banjo connection. Unscrew the stiffnut from the bolt holding the clip sub-assembly. Remove the bolt, clip sub-assembly and packing piece. Unscrew the two nuts from the bolts securing the three rigid pipes in the clamp block, remove the washers and bolts and collect the two halves of the clamp block.

3.9 Disconnect the pipe sub-assembly from the recuperator valve and from the outer cone adapter of the lower swivel coupling. Unscrew the nut from the bolt in the pipe clip securing the two pipe sub-assemblies together. Remove the washer and the bolt and collect the pipe clip. Disconnect the two pipe sub-assemblies, one from the banjo connection and one from the inner cone adapter of the lower swivel coupling.

3.10 Remove the two shear pins securing the swivel coupling and pipes assembly in the upper torque link pin. Remove the two bolts securing the swivel coupling and pipes assembly in the lower torque link pin. Withdraw the swivel coupling and pipes assembly from the ends of the upper and lower torque link pins and the centre joint pin.

3.11 Dismantle the swivel coupling and pipes assembly as follows:

3.11.1 Remove the dowel securing the coupling to the swivel pin in the lower pipe sub-assembly. Remove the coupling from the swivel pin. Remove the dowel securing the coupling to the swivel pin in the upper pipe sub-assembly. Remove the coupling from the swivel pin. Slide the lower swivel coupling from the spigot of the lower pipe sub-assembly and over the cap and swivel pin. Remove the two cone adapters and bonded seals.

3.11.2 Remove the dowel from the cap and the spigot of the lower pipe sub-assembly to free the spigot and the swivel pin. Separate the cap and swivel pin from the spigot of the lower pipe sub-assembly. Separate the cap and swivel pin. Remove the O-rings and backing rings from the spigot of the lower pipe sub-assembly.

3.11.3 Remove the two split pins from the dowel securing the flanged sleeve to the spigot of the centre swivel joint. Remove the dowel and the flanged sleeve. Remove the lower pipe sub-assembly.

3.11.4 Slide the upper swivel coupling from the spigot of the upper pipe sub-assembly and over the cap and swivel pin. Remove the two cone adapters and bonded seals. Remove the dowel from the cap and spigot to free the spigot of the upper pipe sub-assembly and swivel pin.

3.11.5 Separate the cap and swivel pin from the upper pipe sub-assembly spigot. Separate the cap and swivel pin. Remove the O-rings and backing rings from both spigots of the upper pipe sub-assembly.

3.12 Dismantle the brake pipe assembly as follows:

3.12.1 Remove the dowel securing the coupling to the swivel pin in the lower pipe sub-assembly. Remove the coupling from the swivel pin. Remove the dowel securing the coupling to the swivel pin in the upper pipe sub-assembly. Remove the coupling from the swivel pin.

3.12.2 Slide the lower banjo connection from the spigot of the lower pipe sub-assembly and over the cap and swivel pin. Remove the dowel from the cap and spigot to free the lower pipe sub-assembly spigot and swivel pin.

3.12.3 Separate the cap and swivel pin from the spigot of the lower pipe sub-assembly. Separate the cap and swivel pin. Remove the O-rings and backing rings from the spigot of the lower swivel pipe sub-assembly.

3.12.4 Remove the dowel from the drive collar. Slide the drive collar from the spigot of the upper pipe sub-assembly. Remove the two split pins from the dowel securing the collar and remove the dowel. Slide the collar from the spigot of the upper pipe sub-assembly. Separate the lower pipe sub-assembly from the upper pipe sub-assembly.

3.12.5 Remove the O-rings and backing rings from the spigot of the upper pipe sub-assembly.

3.12.6 Slide the upper banjo connection from the spigot of the upper pipe sub-assembly and over the cap and swivel pin. Remove the dowel from the cap and spigot to free the spigot of the upper pipe sub-assembly and swivel pin.

3.12.7 Separate the cap and swivel pin from the spigot of the upper pipe sub-assembly. Separate the cap and swivel pin. Remove the O-rings and backing rings from the spigot of the upper pipe sub-assembly.

3.13 Unscrew the locknut securing the recuperator valve on the bolt or bolt and filter sub-assembly, remove the washer and withdraw the recuperator valve.

3.14 Dismantle the recuperator valve as follows:

3.14.1 Unscrew the cone adapter sub-assembly and remove the bonded seal. Unscrew the plug and remove the sealing washer. Withdraw the valve stop, spring, poppet sub-assembly and guide from the body and piston sub-assembly.

3.14.2 Remove the clip and using the circlip pliers ST947A, remove the circlip. Unscrew the relief screw sub-assembly and withdraw it together with the spring and seat. Remove the O-ring and backing ring.

3.14.3 Remove the fixing pin from the seat and collect the seat and the spring.

NOTE

The seat need not be removed from the relief screw sub-assembly unless necessary.

3.14.4 Remove the bolt or bolt and filter sub-assembly and remove the O-ring and sealing washer. Remove the sealing plug sub-assembly and drain the fluid from the sliding cylinder.

3.15 Remove and dismantle the torque link assemblies as follows:

3.15.1 Unscrew the nut and remove the tab washer and the tongued washer. Withdraw the pin and collect the thrust washer and laminated shims or washer(s).

NOTE

The thickness of the shim pack or washers should be noted in order that a shim pack or washers of the required thickness can be fitted on re-assembly.

3.15.2 Unscrew the shear studs retaining the flanged sleeves at the lower torque link pin. Remove the lower and upper torque link pins using the drift ST1900 MK1 and drift bar ST1903 MK2.

3.15.3 Unscrew the three lubrication nipples and the two lubrication adapters from the upper torque link sub-assembly. Remove the two upper torque link bushes and their shims. Remove the centre joint bush using the extractor ST1977.

3.15.4 Remove the flanged sleeves from the lower torque link sub-assembly using the drift ST1900 MK5 and drift bar ST1903 MK2. Unscrew the three lubrication nipples and the two lubrication adapters. Remove the centre joint bush using the extractor ST1977. Do not remove the cleat. Remove the two remaining bushes and their shims using the drift ST2040 MK46 and drift bar ST1903 MK5.

3.16 Remove the split pin from the shear pin securing the retaining collar of the retraction pin sub-assembly. Remove the shear pin and remove the retaining collar. Remove the shim and thrust collar and withdraw the retraction pin sub-assembly. Unscrew the lubrication nipple. Remove the retraction pin plug from its bore. Remove the O-ring from the retraction pin plug.

3.17 Remove the split pins, slotted nuts and washers from the three fairing pins. Remove the split pins retaining the pins in the fairing pins. Remove the pins and remove the fairing pins from the side bosses of the main fitting sub-assembly using the extractor ST1983.

3.18 Remove the pivot bushes, shims and pivot bush caps from the main pivot pins.

3.19 Unscrew the two bolts securing the microswitch sub-assembly to the switch bracket; remove the switch plate and the microswitch sub-assembly. Remove the dust excluder. Unlock the tab washer and remove the plug, tab washer, spring and plunger from the switch bracket.

3.20 Unscrew the three bolts and remove the switch bracket from the main fitting sub-assembly. If necessary, remove the pin and the striker from the switch bracket.

3.21 If necessary, remove the strap and the nameplate from the main fitting sub-assembly.

3.22 Remove the two split pins, the pin and the thrust collar securing the piston rod and valve sub-assembly to the main fitting sub-assembly.

3.23 Remove the bearing locking screw from the main fitting sub-assembly and, using C-key spanner ST1089, unscrew the lower bearing from the main fitting sub-assembly. Withdraw the sliding cylinder from the main fitting sub-assembly.

3.24 Using the extractor ST1978, remove the bush and remove the shim from the top of the main fitting sub-assembly. Using the extractor ST1978, remove the piston rod bush from the inside of the top of the main fitting sub-assembly. Remove the screwed insert for the bearing locking screw from the main fitting sub-assembly.

3.25 Remove the stiffnuts and washers and extract the special bolts securing the main pivot pins in the main fitting sub-assembly. Withdraw the two main pivot pins using the extractor ST1915.

NOTE

The main pivot pins are an interference and selective fit in the main fitting sub-assembly and can only be removed by local heating of the main fitting sub-assembly in oil or water to a temperature of 50° C.

3.26 Using the extractor ST1963, remove the towing pin bushes and, using drifts ST2040 MK82 and ST1900 MK6 with drift bars ST1903 MK8 and ST1903 MK2 respectively, remove the retraction pin bushes from the main fitting sub-assembly.

3.27 Remove the upper bearing and the two half bearing shields at the upper end of the sliding cylinder. Slide the threaded lower bearing from the sliding cylinder. Remove the wiper ring from the lower bearing.

3.28 Remove the locking pin (tapped 6BA to facilitate extraction), from the sliding cylinder to release the gland nut sub-assembly. Unscrew the gland sub-assembly using C-key spanner ST1979 and withdraw the piston rod and valve sub-assembly along with the gland nut sub-assembly from the sliding cylinder. Slide the gland nut sub-assembly from the piston rod and valve sub-assembly.

3.29 Remove the O-ring and dismantle the gland nut sub-assembly as follows:

3.29.1 Remove the four special nuts and spring washers.

3.29.2 Remove the bearing and extract the wiper ring.

3.29.3 Remove the bolts and extract the inner washer, two gauze washers, gland ring, anti-extrusion ring, four chamfer rings and the outer washer.

3.30 Remove the piston ring and the split pin from the piston.

3.31 Secure the piston rod in the vice clamp ST1214 and, using the peg spanner ST1980, unscrew the piston. Remove the spring and the valve.

3.32 Using the circlip pliers ST947A, remove the circlip from the end of the piston rod. Remove the plug and the O-ring.

Cleaning

WARNING

CLEANING AGENT SHOULD BE USED IN A WELL VENTILATED AREA, AWAY FROM NAKED FLAMES. CARE SHOULD BE TAKEN NOT TO BREATHE THE FUMES OR ALLOW UNDUE CONTACT WITH THE SKIN.

CAUTION

Chlorinated solvents can combine with minute amounts of water found in operating hydraulic systems to form hydrochloric acid which will corrode internal metallic surfaces. It is imperative that all internal surfaces are dry and free from any traces of residual solvent prior to assembly and installation. For those applications where it is difficult to remove all traces of solvent, clean unused white spirit is recommended.

4 To enable all items to be visually examined for damage and wear, each part must be thoroughly cleaned using the appropriate cleaning agents and methods. When cleaning is completed, parts must be dried using compressed air; clean, lint-free cloth or tissues and all subsequent handling must be with clean PVC or polythene gloves. If delays occur before assembly, parts must be suitably protected against corrosion using temporary corrosion preventative PX1.

Examination and checking

5 Visually examine all parts for damage and corrosion.

Superficial damage

6 Superficial damage in the form of external isolated scores, smooth dents and abrasions free from cracks are to be regarded as negligible provided that internal dimensions are not affected and the damage is within the following limits:

6.1 Not exceeding 0.750 in long.

6.2 Not exceeding 0.030 in deep.

6.3 Not less than 0.250 in from any bearing surface and is not on a blend radius.

6.4 Not less than one diameter from any hole.

NOTE

Burrs must be removed and sharp edges blended out providing the area affected is not more than 1 in^2 in every 10 in^2 of surface area. Minor scores and abrasions in non-sealing bores may be ignored provided that proud portions of the abrasion are removed.

Checking data

7 Spring 500Y112

7.1 Number of working coils: 7.5

7.2 Wire size: 0.080 in (14 SWG)

7.3 Free length: 1.245 to 1.275 in

7.4 Check length: 0.875 in

7.5 Load at check length: 35 to 41 lbf.

8 Spring 500Y447

8.1 Number of working coils: 9.5

8.2 Wire size: 0.3125 in

8.3 Free length: 4.530 to 4.570 in

8.4 Check length: 3.550 in

8.5 Load at check length: 388 to 419 lbf.

9 Spring 500Y459

9.1 Number of working coils: 8

9.2 Wire size: 0.020 in (25 SWG)

9.3 Free length: 0.430 to 0.450 in

9.4 Check length: 0.220 in

9.5 Load at check length: 1.50 to 1.75 lbf.

10 Spring 500Y481

10.1 Number of working coils: 12

10.2 Wire size: 0.040 in (19 SWG)

10.3 Free length: 1.030 to 1.060 in

10.4 Check length: 0.700 in

10.5 Load at check length: 6.40 to 7.20 lbf.

Assembling (Figs 1 and 2 and Chap 1, Figs 1 to 5)

11 Lightly lubricate all forms of sealing rings and threaded parts with clean oil OM15 prior to assembling.

11.1 Ensure that the bore of the piston rod is treated with corrosion preventative PX28. Fit the O-ring to the plug and secure the plug in the end of the piston rod with the circlip using the circlip pliers ST947A.

11.2 Position the valve and the spring in the piston. With the details completely immersed in a bath of clean oil OM15, screw the piston onto the piston rod. Remove the assembly from the oil bath, with the piston rod uppermost to prevent loss of oil from the inner chamber.

11.3 Secure the piston rod in the vice clamp ST1214 and, using the peg spanner ST1980, screw the piston fully onto the piston rod.

11.4 Adjust the spring load on the valve as follows, or, to the alternative method described in paragraph 11.5.

11.4.1 Fit the test fixture ST2446 as shown in Figure 1 in the following order:

11.4.1.1 Unscrew the special adapter from the centre bolt and remove the spindle from the special adapter. Fit a bonded seal to the adapter and screw it tightly into the centre bolt.

11.4.1.2 Unscrew the pegs sufficiently to allow the fixture to slide across the piston and engage in the piston ring groove. Screw the pegs in flush with the fixture.

11.4.1.3 Slacken the locknut and tighten the centre bolt to ensure a seal against the piston. Tighten the locknut.

11.4.1.4 Connect the supply line of the hydraulic test rig to the adapter.

11.4.2 Apply a pressure and adjust the piston rod by screwing it in or out of the piston until the valve lifts at a pressure between 2070 and 2180 lbf/in^2. Ensure that one slot of the piston is aligned with a split pin hole in the head of the piston rod between these limits of pressures and lock the piston with a split pin. The split pin should be reduced in length to 0.375 in and assembled as shown in Chapter 1, Figure 2. The head and the leg of the split pin must not protrude beyond the diameter of the piston.

11.4.3 Disconnect the supply line and remove the special adapter and bonded seal. Remove the bonded seal from the adapter and screw the spindle into the adapter.

11.4.4 Check the minimum valve lift of the assembly as follows:

11.4.4.1 Screw the special adapter into the centre bolt until the spherical end of the spindle lightly abuts the valve. Measure the dimension of the gap A on Figure 1.

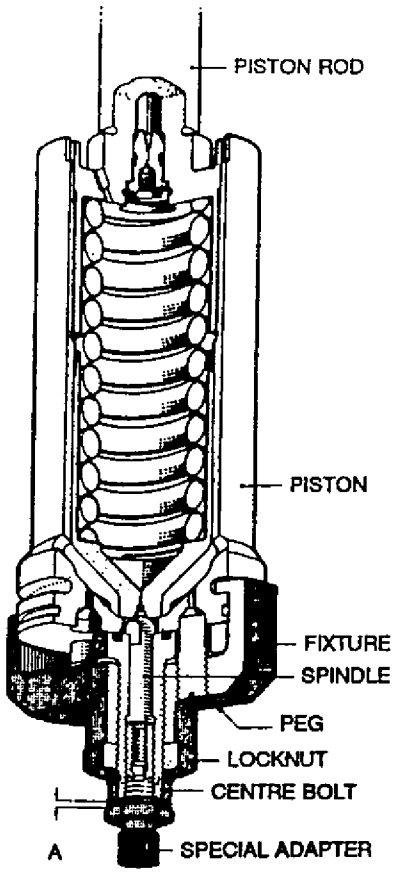


Fig 1 Use of test fixture ST2446

11.4.4.2 Gradually screw the special adapter into the centre bolt until the dimension of the gap has been decreased by 0.133 in. If this is not possible, the minimum lift cannot be obtained and the piston and piston rod must be re-adjusted as follows:

11.4.4.2.1 Unscrew the piston from the piston rod to the next aligned position for the split pin, then test the assembly for the blow-off pressure between 2070 and 2180 lbf/in^2.

11.4.4.2.2 Re-check the minimum lift. If this is satisfactory, lock the piston rod and piston with the split pin.

11.5 If the spring load is to be adjusted by the alternative method, proceed as follows:

11.5.1 Position the piston assembly in a press and apply a load through the central orifice of the piston, to the valve, sufficient to lift the valve by a minimum of 0.133 in from its seat. The load must be within the limits of 380 to 420 lbf and if necessary, the piston is to be adjusted on the piston rod to obtain these conditions consistent with the alignment of the split pin hole in the piston rod with a slot in the piston. Fit the split pin as in paragraph 11.4.2.

11.6 Fit the piston ring to the piston. If a new piston ring is fitted, it is to be gapped 0.012 to 0.015 in on assembly and the sharp edges at the gap, on the flat faces only, removed up to a maximum radius of 0.0156 in.

11.7 Assemble the details of the gland nut sub-assembly over the bolts, fitting the inner washer, the two gauze washers with the meshes at 45 degrees to each other, the gland ring, the anti-extrusion ring, the chamfer rings and the outer washer in that order.

11.8 Fit the wiper ring to the bearing and position the bearing in the gland nut. Pack the cavity between the nut and the bearing with grease XG315. Slide the gland nut over the four bolts and ensure that the gland assembly is properly bedded in the recess of the gland nut. Fit the spring washers and screw on the special nuts but do not tighten to compress the assembly.

11.9 Assemble the O-ring to the gland nut sub-assembly. Using the assembly post 460001016, carefully slide the gland nut sub-assembly over the piston rod.

11.10 Using the sleeve ST1997, insert the piston assembly into the sliding cylinder. Screw the gland nut sub-assembly tightly into the sliding cylinder using the C-key spanner ST1979. Screw the gland nut sub-assembly back sufficiently to insert the locking pin.

11.11 Assemble the recuperator valve as follows:

11.11.1 Fit the O-ring and the backing ring to the relief screw sub-assembly, with the rough surface of the backing ring adjacent to the O-ring.

11.11.2 If they have been removed, fit the spring over the spindle of the relief screw sub-assembly followed by the seat. Secure the seat to the spindle of the screw with the fixing pin located through the slots. Screw the relief screw sub-assembly into the appropriate end of the body and piston sub-assembly with the seat located in the interconnecting orifice. Fit the circlip using the circlip pliers ST947A, and fit the clip.

11.11.3 Fit the spring and the poppet sub-assembly over the spigot of the valve stop and slide the guide over the poppet sub-assembly. Insert the assembly in the body and piston sub-assembly, with the guide leading, to abut the piston.

11.11.4 Fit the sealing washer to the plug and screw the plug tightly into the recuperator body to retain the poppet and valve stop.

11.11.5 Fit the bonded seal to the cone adapter sub-assembly for the inlet connection and screw the cone adapter sub-assembly tightly into the appropriate boss of the body.

11.11.6 Using the assembly post ST2143, fit the O-rings to the shank of the banjo bolt or bolt and filter sub-assembly. Assemble the sealing washer to the inner end of the bolt. Fit the locknut to the bolt and insert the bolt through the drilled lug of the recuperator valve.

11.11.7 Test the recuperator valve to the procedure detailed in Chapter 3.

11.12 Fill and charge the shock absorber as detailed in Chapter 3.

11.13 Heat the main fitting by immersing in oil at 50°C and maintain the temperature until the main fitting is fully heat soaked.

11.14 Smear the main pivot pins with jointing compound JC5A and, using drift ST2040 MK73 and drift bar ST1903 MK5, assemble the main pivot pins to the main fitting with their transverse holes aligned. Remove any surplus jointing compound.

11.15 Insert the special bolts through the transverse holes of the main fitting and main pivot pins and secure with the washers and stiffnuts.

11.16 Assemble the pivot bush caps and pivot bushes over the main pivot pins. Refer to Chapter 1, Figure 1 and measure dimension X between the assembled pivot bush flanges. Prepare and fit, between the forward pivot bush cap and the main fitting, a laminated shim to give a measured dimension X of 11.872 to 11.874 in. Temporarily secure the pivot bushes to the main pivot pins for storage and/or transit.

11.17 Smear the retraction pin bushes with jointing compound JC5A. Assemble the larger retraction pin bush to the main fitting, flush with the outer face of the lug, using the drift ST2040 MK82. Assemble the smaller retraction pin bush to the main fitting using the drift ST1900MK6 and drift bar ST1903 MK2. Remove any surplus jointing compound.

11.18 Smear the towing pin bushes with jointing compound JC5A and assemble them to the main fitting using the assembly tool ST2028 and drift bar ST1903 MK2.

11.19 Smear the piston rod bushes and shim with jointing compound JC5A. Assemble the piston rod bush internally and the shim and bush externally using the assembly tool ST2028 and drift bar ST1903 MK2.

11.20 Assemble the screwed insert, for the lower bearing locking screw, into the main fitting.

11.21 Fit the wiper ring to the lower bearing and slide the lower bearing over the sliding cylinder.

11.22 Fit the split bearing shield to the lower shoulder of the groove for the upper bearing of the sliding cylinder and locate the upper bearing in the groove to retain the shield. It is important that the gaps in the bearing shield are positioned at 90 degrees to the striker of the microswitch assembly when the sliding cylinder is housed within the main fitting.

11.23 Insert the sliding cylinder assembly in the main fitting and secure the piston rod through the main fitting with the thrust collar, the pin and the split pins. The maximum permissible end play of the piston rod in the main fitting is 0.006 in. The thrust collar may be reversed to obtain this condition.

11.24 Screw the lower bearing into the main fitting using C-key spanner ST1089 and lock it in position with the locking screw through the torque link lug.

11.25 Screw the lubrication nipple into the main fitting opposite the lower bearing locking screw.

11.26 Assemble the upper torque link sub-assembly.

11.26.1 Measure the distance between the lug faces and the thickness of the flanges of the two upper torque link bushes. Calculate the thickness of two equal shim packs to produce a between flanges dimension of 4.423 to 4.425 in when the bushes and shims are assembled. Prepare the shim packs.

11.26.2 Smear the upper torque link bushes and shims with jointing compound JC5A and assemble them to the torque link using the drift ST1900 MK5 and drift bar ST1903 MK2. Apply a bead of sealant PR1422A2 between the flanges and the torque link.

11.26.3 Check line ream the upper torque link bushes to between 0.99975 and 1.00050 in.

11.26.4 Smear the centre joint bush with jointing compound JC5A and assemble it to the torque link using the drift ST1900 MK4 and drift bar ST1903 MK2. Apply a bead of sealant PR1422A2 around the bush to torque link joint.

11.26.5 Check ream the centre joint bush to between 0.93725 and 0.093800 in.

11.26.6 Assemble the two lubrication adapters and three lubrication nipples to the torque link. Charge the lubrication points with grease XG287 to lubricate the bushes and ensure the greaseways are not obstructed.

11.27 Connect the upper torque link sub-assembly to the main fitting with the upper torque link pin using the tubular key spanner ST1986, tommy bar ST111 MK23, drift ST1900 MK1 and drift bar ST1903 MK2 and align the holes for the two shear pins.

11.28 Assemble the lower torque link sub-assembly.

11.28.1 Measure the distance between the lug faces and the thickness of the flanges of the two lower torque link bushes and the flanged sleeves. Calculate the thickness of two equal shim packs to produce an assembled dimension between the flanged sleeves of 4.748 to 4.750 in. Prepare the shim packs.

11.28.2 Smear the bushes and shims with jointing compound JC5A and assemble them to the torque link using the drift ST2040 MK46 and drift bar ST1903 MK5. Apply a bead of sealant PR1422A2 between the flanges and the torque link.

11.28.3 Check line ream the lower torque link bushes to between 1.37475 and 1.37575 in.

11.28.4 Smear the centre joint bush with jointing compound JC5A and assemble it to the torque link, chamfered end leading, using the drift ST1900 MK4 and drift bar ST1903 MK2. Apply a bead of sealant PR1422A2 around the bush to torque link joint.

11.28.5 Check ream the centre joint bush to between 0.93725 and 0.93800 in.

11.28.6 Assemble the two lubrication adapters and three lubrication nipples to the torque link. Charge the lubrication points with grease XG287 to lubricate the bushes and ensure the greaseways are not obstructed.

11.28.7 Assemble the flanged sleeves to the flanged bushes in the lower torque link sub-assembly.

11.29 Locate the flanged sleeves in the lower torque link sub-assembly, position the torque link sub-assembly to the sliding cylinder and secure the flanged sleeves with the shear studs. Wirelock the shear studs together.

11.30 Insert the lower torque link pin using the tubular key spanner ST1986, tommy bar ST111 MK23, drift ST1900 MK1 and drift bar ST1903 MK2 and align the two transverse bolt holes.

11.31 Turn the sliding cylinder in the main fitting to bring the upper and lower torque link pins into direct fore and aft alignment. Insert the thrust washer into the lower torque link sub-assembly to engage with the slots in the centre joint bush. Bring the apex ends of the upper and lower torque link sub-assemblies together and insert the centre joint pin.

11.32 Move the thrust washer so that its flange abuts the upper torque link. Measure the gap between the thrust washer flange and the lower torque link sub-assembly and prepare a laminated shim and/or washer pack to that thickness.

11.33 Remove the centre joint pin and thrust washer and reassemble with the prepared laminated shim and/or washers interposed between the thrust washer and the lower torque link sub-assembly. Assemble the tongued washer, the tab washer and the nut and torque tighten to between 70 and 80 lbf in. Lock the nut with the tab washer.

11.34 Assemble the brake pipe assembly.

11.34.1 Assemble the backing rings and O-rings to the spigots of the upper and lower pipe sub-assemblies.

NOTE

The rough face of each backing ring is to abut the adjacent O-ring.

11.34.2 Slide the coupling of the lower pipe assembly over the spigot of the upper pipe assembly and secure with the collar, dowel and two split pins. Wirelock the eye-ends of the split pins together. Assemble the drive collar and secure with the dowel.

11.34.3 Locate the swivel pins and caps to the spigots of the upper and lower pipe sub-assemblies and insert the dowels. Slide the appropriate banjo connections over the swivel pins, caps and spigots to secure the dowels. Place the couplings over the swivel pins and secure with the dowels.

11.35 Test the brake pipe assembly as detailed in Chapter 3.

11.36 Lubricate the bores of the upper and lower torque link pins and the centre joint pin with grease XG287. Locate the two couplings and the drive collar in the appropriate pins, pack the annular cavities around the swivel pins with grease XG287 and ease the brake pipe assembly into position. Align the tappings in the couplings with the transverse holes in the torque link pins and secure the brake pipe assembly with the appropriate shear pin and bolt.

11.37 Assemble the swivel coupling and pipes assembly.

11.37.1 Assemble the backing rings and O-rings to the spigots of the two pipe sub-assemblies.

NOTE

The rough face of each backing ring is to abut the adjacent O-ring.

11.37.2 Slide the coupling of the lower pipe sub-assembly over the spigot of the upper pipe sub-assembly and secure with the flanged sleeve, the dowel and two split pins.

11.37.3 Locate the swivel pins and caps to the spigots of the two pipe sub-assemblies and insert the dowels. Slide the upper and lower swivel couplings over the respective swivel pins, caps and spigots to secure the dowels. Place the couplings over the swivel pins and secure with the dowels.

11.37.4 Screw two cone adapters, each with a bonded seal, into each upper and lower swivel coupling.

11.38 Test the swivel coupling and pipes assembly as detailed in Chapter 3.

11.39 Lubricate the bores of the upper and lower torque link pins and the centre joint pin with grease XG287. Locate the two couplings and the centre spigot extension in the appropriate pins: pack the annular cavities around the swivel pins with grease XG287 and ease the swivel coupling and pipes assembly into position. Align the tappings in the couplings with the transverse holes in the torque link pins and secure the swivel coupling and pipes assembly with the remaining shear pin and bolt.

11.40 Wirelock the two bolts at the lower torque link pin together, the two shear pins at the upper torque link pin together and one of the shear pins to the locking screw for the lower bearing.

11.41 Assemble the swivel coupling assembly.

11.41.1 Place a rubber washer in each of the three tapped holes in the coupling and screw in the three plugs. Ball punch metal into the slots in the plugs to lock them.

11.41.2 Assemble the O-rings and backing rings to the swivel coupling body and plugs sub-assembly and to the coupling body.

NOTE

The rough face of each backing ring is to abut the adjacent O-ring.

11.41.3 Insert one spigot of the spigot sub-assembly and the spigot of the spigot and pipes sub-assembly in the bores of the swivel coupling body and plugs sub-assembly.

11.41.4 Fit a washer, a split collar and a sleeve over each protruding end of the spigots and secure them with split pins.

11.41.5 Insert the remaining spigot of the spigot sub-assembly in the bore of the single coupling body. Fit a washer, a split collar and a sleeve over the end of the spigot and secure them with a split pin. Fit a bonded seal to each of the three cone adapters and screw them tightly into the tappings of the coupling body.

11.41.6 Test the swivel coupling assembly as detailed in Chapter 3.

11.42 Secure the plate to the coupling body with the countersunk bolts.

11.43 Secure the swivel coupling assembly to the main fitting with the bolts, washers and nuts. Wirelock the heads of the bolts together and the two nuts together.

11.44 Connect the three upper pipe sub-assemblies between the swivel coupling assembly and the brake pipe assembly and the swivel coupling and pipes assembly. Fit the clamp block to the pipes and secure it with the bolts, washers and stiffnuts.

11.45 Fit the packing piece to the pipe leading to the single brake pipe assembly adjacent to the torque links and secure the pipe and packing piece to the main fitting with the clip sub-assembly, bolt and stiffnut. The pipe is to be bound with PVC tape where it is in contact with the clip sub-assembly.

11.46 Connect the pipe between the lower swivel coupling and the recuperator valve and the remaining two pipes to the lower swivel coupling and the banjo connection in preparation for attachment to the wheel brake installations.

NOTE

The recuperator pipe is to be coupled to the outermost connection, adjacent to the lower torque link. The swivel coupling for this connection is stamped 'OUTLET C'.

11.47 Secure the two brake pipes together with the clip, the bolt, washer and the stiffnut. The pipes are to be bound with PVC tape where they are in contact with the clip. The nipple adapters to the brake units are to be placed in a bag and secured to the pipes for transit and storage.

11.48 Test the complete pipe installation as detailed in Chapter 3.

11.49 Fit the O-ring to the retraction pin plug. Pack the bore of the retraction pin with grease XG9287 and insert the plug. Locate the retraction pin in the lugs of the main fitting, fit the thrust collar, laminated shim and retaining collar and secure the assembly with the shear pin and the split pin. The laminations of the shim should be adjusted to allow free rotation of the retraction pin without end play. Screw the lubrication nipple into the retraction pin.

11.50 Secure the striker in the switch bracket with the pin ensuring that the flat face of the rounded end is uppermost and within the switch bracket. Peen the switch bracket sufficiently to retain the pin. Insert the switch bracket in the side drilling of the main fitting, ensuring that the striker is located under the lower edge of the sliding cylinder upper bearing. Secure the switch bracket with the three bolts and wirelock the heads of the bolts together.

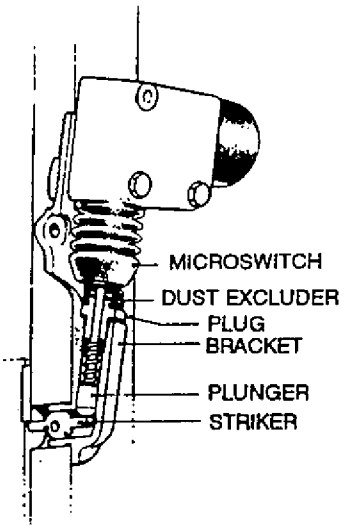
NOTE

The switch bracket C3300Y709 is to be fitted at the highest point of the main fitting. All movement allowed by the slots in the switch bracket should be fully taken up by moving the switch bracket towards the main pivot pins to the fullest extent before tightening the bolts.

11.51 Insert the plunger and the spring into the switch bracket, fit the tab washer to the plug and screw the plug tightly into the switch bracket and over the plunger. Bend the tab washer to lock the plug and fit the dust excluder.

11.52 The microswitch sub-assembly should be fitted and adjusted on installation and the procedure is detailed in paragraph 12.

11.53 Insert the main fairing pins into the side bosses of the main fitting and align the transverse holes using the alignment tool ST1984. Secure the fairing pins with the pins and split pins. Fit a washer, slotted nut and split pin to each fairing pin; open the legs of the split pins only sufficiently to retain.



DETAIL OF MICROSWITCH

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Fig 2 Microswitch assembly

11.54 If necessary, fit the nameplate, correctly annotated, with the strap. Fold the ends of the strap through the slots in the nameplate and solder the folds using soft solder and non-corrosive flux.

11.55 Secure the upper fairing attachment brackets to the lugs of the sliding cylinder with the special bolts, washers, slotted nuts and split pins. The pipe guard is to be secured with the bracket adjacent to the recuperator valve.

11.56 Secure the lower fairing attachment brackets, with the forward bracket outermost, to the sliding cylinder with the special bolts, washers, slotted nuts and split pins.

11.57 Assemble the torque pins to the sliding cylinder using the drift ST2387 and secure with the torque bolts.

11.58 Using the assembly/removal tool ST2427, assemble the axle to the sliding cylinder and align the transverse holes. Insert the two ferrules and secure the assembly with the bolt and stiffnut.

11.59 Attach the instruction plate to the axle nut with the PK screws. Screw the axle nut sub-assembly into the axle and secure with the locking screw.

11.60 Positively wirelock the pipe unions, the cone adapter of the recuperator valve to the end plug of the recuperator valve and the locknut of the bolt to the adjacent sealing plug sub-assembly of the shock absorber.

11.61 Ensure that the passages of all lubrication nipples are free from obstruction by charging each point with grease XG287 until fresh grease exudes from the appropriate bearing or orifice.

Installation of microswitch sub-assembly

12 The microswitch sub-assembly is to be fitted after installation of the main undercarriage as follows:

12.1 Locate the microswitch on the switch bracket in such a position that the switch is just operated when the leg is fully extended. Secure the microswitch to the switch bracket with the bolts and the serrated switch plate.

Chapter 3

TESTING

CONTENTS

Special tools and test equipment

1 The following special tools and test equipment are required to carry out test procedures detailed.

Part No	Description	Application
-	Static hydraulic test rig with power pump	Apply hydraulic pressure
-	Fluid container with delivery pipe and stopcock	Test flow rate of pipe assemblies
ST2475	Test adapter	Test recuperator valve

Testing the unit

2 When testing the various pipe assemblies, ensure each is hydraulically full and bled free of air. Using the equipment specified in paragraph 1, carry out the test procedures detailed.

Filling and charging the shock absorber (Chap 1, Figs 1 and 2)

3 Fill and charge the shock absorber as follows:

3.1 Invert and fully extend the unit and screw the union into the recuperator valve tapping. Connect the supply line of the test rig to the union and pump in oil OM15 until it flows from the sealing plug sub-assembly tapping. Screw in the sealing plug sub-assembly.

3.2 Disconnect the test rig and remove the union.

3.3 Screw the banjo type bolt, or bolt and filter sub-assembly tightly into the appropriate tapping in the sliding cylinder. Locate the recuperator valve and washer on the bolt and screw on the locknut. Orientate the recuperator valve centre-line 10 degrees to the horizontal (refer to Chap 1, Figs 1 and 2) and tighten the locknut.

3.4 Incline the unit at an angle of 45 degrees to the vertical with the sealing plug sub-assembly at the highest point.

3.5 Connect the supply line of the test rig to the inlet connection of the recuperator valve. Screw in the relief screw sub-assembly until it is felt to touch the shoulder in the body.

3.6 Pump in fluid to pressurise the unit to 1000 lbf/in^2 then slacken the sealing plug sub-assembly to allow air and fluid to escape.

3.7 Repeat para 3.6 until only fluid, free from air, escapes when the sealing plug sub-assembly is opened. Tighten the sealing plug sub-assembly.

3.8 Pressurise the unit to 3000 lbf/in^2 and allow it to remain in this condition for 30 minutes. De-pressurise the unit and check tighten the four special nuts on the bolts of the gland nut sub-assembly.

3.9 Repeat para 3.8 twice more then tighten and lock the sealing plug sub-assembly.

3.10 Finally, pressurise the unit to 2000 lbf/in^2 and unscrew the relief screw sub-assembly until resistance is just felt. Disconnect the supply line.

3.11 Continue with the assembly procedure in Chapter 2 recommencing at para 11.13.

Adjustment of fluid content for tropical conditions

4 Under tropical conditions, the operating length of the main undercarriage will increase, due to a volumetric change in the fluid content of the shock absorber. This increase in length is undesirable on installed undercarriages as it may render the safety device inoperative and allow the undercarriage to be retracted whilst standing on the ground. It will also render the Armament Circuits LIVE. When aircraft are being operated in conditions where extreme temperature variations between altitude and ground can be expected, the following check is to be carried out at the periods stated in the relevant Servicing Schedule.

4.1 With the main undercarriage under static load, check the distance between the centres of the upper and lower torque link pins.

4.2 Where this dimension exceeds 13.000 in, gradually slacken the sealing plug sub-assembly adjacent to the recuperator valve attachment and allow fluid to escape from the shock absorber until the dimension is decreased to within the limits of 10.000 to 11.000 in. Tighten and wirelock the sealing plug sub-assembly.

Testing the recuperator valve

5

5.1 Assemble the recuperator valve to the test adapter ST2475 by screwing in the banjo type bolt or bolt and filter sub-assembly. Screw in the relief screw until it contacts the shoulder in the recuperator body.

5.2 Connect the supply line of the power pump to the inlet connection of the recuperator valve and apply pressure. Fluid should flow freely from the connection of the test adapter.

5.3 Blank off the test adapter connection and gradually apply a pressure of 3800 lbf/in^2. Leakage must not occur. Release the pressure.

5.4 Unscrew the relief screw of the recuperator valve until resistance is just felt. It is important that the screw is not turned back beyond this point otherwise damage to the retaining clip will result.

5.5 Gradually apply a pressure of 3800 lbf/in^2. Leakage must not occur. Release the pressure, disconnect the supply line and remove the blanking cap from the test adapter connection.

5.6 Connect the supply line to the test adapter connection and screw the relief screw in to contact the shoulder. Gradually apply pressure until fluid emerges from the inlet connection of the recuperator valve.

5.7 Gradually increase the pressure until the piston of the recuperator valve is seated and fluid ceases to flow from the inlet connection. Note the pressure at which the flow ceases. This should occur before a pressure of 600 lbf/in^2 is attained. Leakage must not occur above 600 lbf/in^2.

5.8 Gradually reduce the pressure until fluid commences to flow again from the inlet connection. This should occur at 600 lbf/in^2 or less.

5.9 Gradually increase the pressure to within 50 to 100 lbf/in^2 of the closing pressure noted in operation 5.7. At this selected pressure, measure the rate of flow from the inlet connection. This should not be less than 0.300 in^3 and not more than 1.000 in^3 per minute. It should be noted that if the flow is checked at the low limit of the pressure range, the flow of 1.000 in^3 per minute will be exceeded if the pressure is raised and vice versa. This condition is acceptable.

5.10 Release the pressure and screw out the relief screw to the service position. Gradually apply a pressure of 100 lbf/in^2. Leakage must not occur.

5.11 Release the pressure and screw in the relief screw to contact the internal shoulder.

5.12 Open the bleed plug of the test adapter and gradually apply pressure until fluid only, free from air, emerges from the bleed plug. Tighten the plug.

5.13 Gradually apply a pressure of 8000 lbf/in^2. Leakage from the inlet connection of the recuperator valve must not occur above 600 lbf/in^2.

5.14 Release the pressure and repeat operations 5.6 and 5.7.

5.15 Release the pressure, disconnect the supply line and remove the recuperator valve from the test adapter.

5.16 Continue with the assembly procedure recommencing at Chapter 2, paragraph 11.12.

Testing the brake pipe assembly

6 Arrange the fluid container, delivery pipe and stopcock to provide a 29 to 31 in static head of fluid to the brake pipe assembly. The fluid temperature during the flow test must be maintained between 21 and 23 °C.

6.1 Manually flex the swivel pipes at the centre joint to ensure freedom of movement and check that the banjo connections at the ends of the pipes rotate freely.

6.2 Connect the test rig supply line to the pipe connection at one end of the assembly and blank off the connection at the opposite end. Operate the hydraulic test rig and gradually apply a pressure of 2200 lbf/in^2. Maintain this pressure and exercise the swivel pipes about the centre joint ten times. Leakage must not occur. Release the pressure and remove the blank. Disconnect the assembly from the test rig.

6.3 With the delivery pipe of the fluid container open to atmosphere, check and record the time required to pass 50 in^3 from the container.

6.4 Connect the brake pipe assembly to the delivery pipe of the fluid container ensuring that the assembly is in the horizontal position and fully extended, with the banjo connections in the same horizontal plane. Open the stopcock in the delivery pipe, check and record the time required to pass 50 in^3 through the brake pipe assembly. The difference in time between the two flow recordings must not exceed 6.5 minutes. Disconnect the assembly from the delivery pipe.

6.5 Continue with the assembly procedure recommencing at Chapter 2, paragraph 11.36.

Testing the swivel coupling and pipes assembly

7

7.1 Manually flex the upper and lower pipes to ensure that the centre joint will hinge freely and check that the upper and lower swivel couplings will rotate.

7.2 Connect the supply line of the hand pump in turn to each of the cone adapters at one end and prime the pipe assembly with fluid. Blank off each connection at the opposite end.

7.3 Gradually apply a pressure of 3000 lbf/in^2 to each connection in turn. Leakage must not occur.

7.4 Repeat operations 7.2 and 7.3 at a pressure of 2500 lbf/in^2 with the blanking cap removed and with a gauze filter at each outlet connection. Check the filter for any displaced material. Repeat this operation with the flow in the opposite direction.

7.5 Fit the blanking caps and apply a pressure of 1500 lbf/in^2. Flex the upper and lower pipes and rotate the swivel couplings through the full limit of travel in each direction. Repeat this operation several times.

7.6 Release the pressure, remove the blanking caps and disconnect the hand pump supply line.

7.7 Connect the supply line of the power pump in turn to each of the cone adapters at one end. Apply a pressure of 1500 lbf/in^2 and check the flow through each pipe over a period of one minute. This should not be less than 1.5 gallons.

7.8 Release the pressure and disconnect the power pump supply line.

7.9 Repeat the tests given in 7.1, 7.2 and 7.3.

7.10 Continue with the assembly procedure recommencing at Chapter 2, paragraph 11.39.

Testing the swivel coupling assembly

8 Arrange the fluid container, delivery pipe and stopcock to provide a 29 to 31 in static head of fluid to the swivel coupling assembly. The temperature of the fluid for the flow test must be maintained between 21 and 23°C.

8.1 Manually flex each joint of the swivel pipe coupling assembly to ensure freedom of movement.

8.2 Connect the supply line of the static hydraulic test rig to each of the three cone adapters of the coupling body in turn and apply pressure. Fluid should flow freely from the appropriate connection of the spigot and pipes sub-assembly.

8.3 Blank off the connections of the spigot and pipes sub-assembly and gradually apply a pressure of 3000 lbf/in^2 to each adapter at the opposite end in turn. Leakage must not occur.

8.4 Reduce the pressure to 1500 lbf/in^2 at each connection and rotate each swivel joint through the full limit of travel in each direction. Repeat this operation several times.

8.5 Release the pressure, remove the blanking caps and disconnect the supply line.

8.6 With the delivery pipe open to atmosphere, check the time required to pass 100 in^3 of fluid from the container with the appropriate head of fluid applied at the correct temperature. Note the rate of flow.

8.7 Connect the swivel coupling assembly to the delivery pipe of the container and place the swivel coupling assembly in the horizontal position.

8.8 Check the time required to pass 100 in^3 of fluid through each pipe of the unit under the same conditions as in para 8.6. The difference in the time when compared with the time recorded in para 8.6 should be as follows:

8.8.1 Brake return pipe, not more than 27 minutes.

8.8.2 Brake supply pipe, not more than 30 minutes 45 seconds.

8.8.3 Recuperator pipe, not more than 23 minutes.

8.9 Disconnect the swivel coupling assembly from the delivery pipe.

8.10 Continue with the assembly procedure recommencing at Chapter 2, paragraph 11.42.

Testing the complete pipe installation

9

9.1 Blank off the two brake pipe lines adjacent to the axle assembly.

9.2 Connect the supply line of the static hydraulic test rig to the appropriate brake pipe connection of the swivel coupling assembly and gradually apply a pressure of 3000 lbf/in^2 to each in turn. Check for leakage at all unions and swivel joints throughout the length of the pipes. Release the pressure and disconnect the supply line. Remove the blanking caps.

9.3 Ensure that the relief screw of the recuperator valve is screwed out to allow the shock absorber to be sealed off.

9.4 Disconnect the pipe line from the recuperator valve and connect the supply line of the static hydraulic test rig to the recuperator valve connection of the swivel coupling assembly. Pump in fluid until the complete pipe line is primed and all air is expelled. Connect the primed pipe line to the recuperator valve.

9.5 Gradually apply a pressure of 3000 lbf/in^2 and check for leakage at all unions and swivel joints throughout the length of the pipe. Release the pressure at the test rig.

9.6 Slacken the sealing plug sub-assembly adjacent to the recuperator valve to release the pressure in the shock absorber. Tighten the sealing plug sub-assembly.

9.7 Pressurise the shock absorber to 1500 lbf/in^2.

9.8 Release the pressure at the test rig and disconnect the supply line.

9.9 Complete the assembly procedure in Chapter 2 recommencing at paragraph 11.49.