Chapter 1

GENERAL

CONTENTS

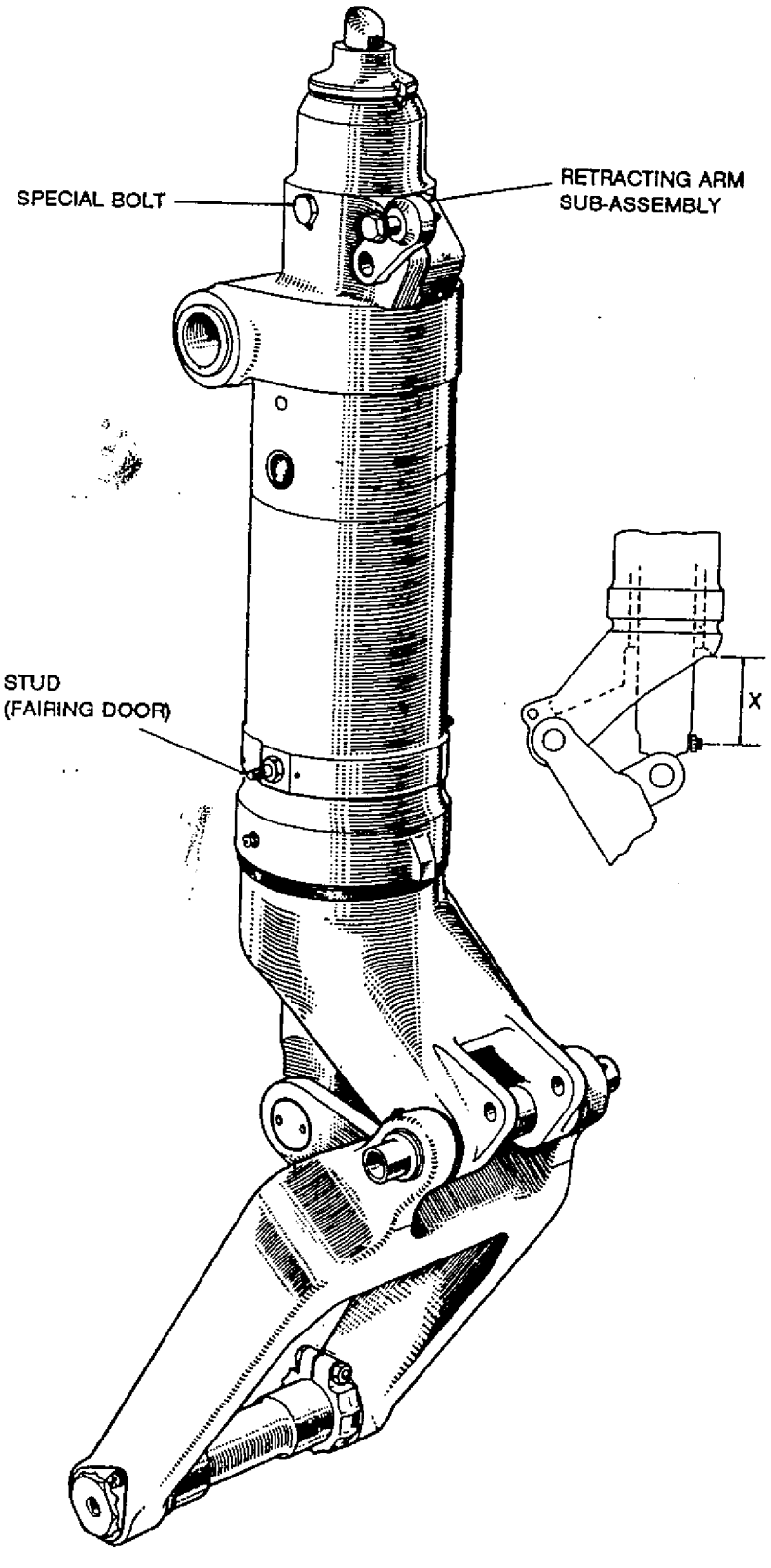

Fig 1 Nose undercarriage

Leading particulars

1 Leading particulars of this unit are as follows:

1.1	Length (between pintle and axle centres) extended	33.780 to 34.060 in
1.2	Shock absorber fluid	Oil OM15
1.3	Shock absorber pressure (fully extended)	2000 lbf/in^2

Modification state

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

Introduction

3 This undercarriage is a forward retracting, fully castoring unit, incorporating a liquid spring shock absorber and fitted with a self-centring mechanism, a centring lock and a down lock.

Constructional description (Figs 1, 2 and 3)

4 The main fitting sub-assembly houses the pivot bracket sub-assembly, self-centring lock and down lock assemblies and has a boss, bushed and fitted with a lubrication nipple for the main attachment point to the aircraft structure. Shims are fitted behind the bushes during assembly to give the correct dimension for installation. A side drilling, fitted with a rubber bung, gives access to a pip-pin which secures the shock absorber assembly to the pivot bracket sub-assembly. Fairing door studs on each side of the main fitting sub-assembly are secured by locknuts and locking wires.

5 The upper end of the main fitting sub-assembly is bushed for a retracting arm sub-assembly and slotted for a pawl which is secured to one end of the retracting arm sub-assembly by a washer, slotted nut and split pin. The pawl engages with the down lock and self-centring mechanism. A jack attachment bolt is secured to the opposite end of the retracting arm sub-assembly by a slotted nut and split pin. A cover plate over the slot is retained by two screws and spring washers. A lower outer bearing, lubricated through a lubrication nipple is pressed into the lower end of the main fitting sub-assembly.

6 The down lock assembly consists of a plunger which is flanged and located in the grooved bore of a plunger housing; the plunger housing is screwed into the main fitting and secured with a lockwasher. The lower end of the plunger is slotted and housed in the bore of a cam. Two springs and a washer retain a stop plate in a slide which is slotted to receive the pawl and drilled for a cam pin. The ends of the pin engage with the cam face through the slots of the plunger. The stop plate together with the washer provide a seat for a third spring fitted over the plunger.

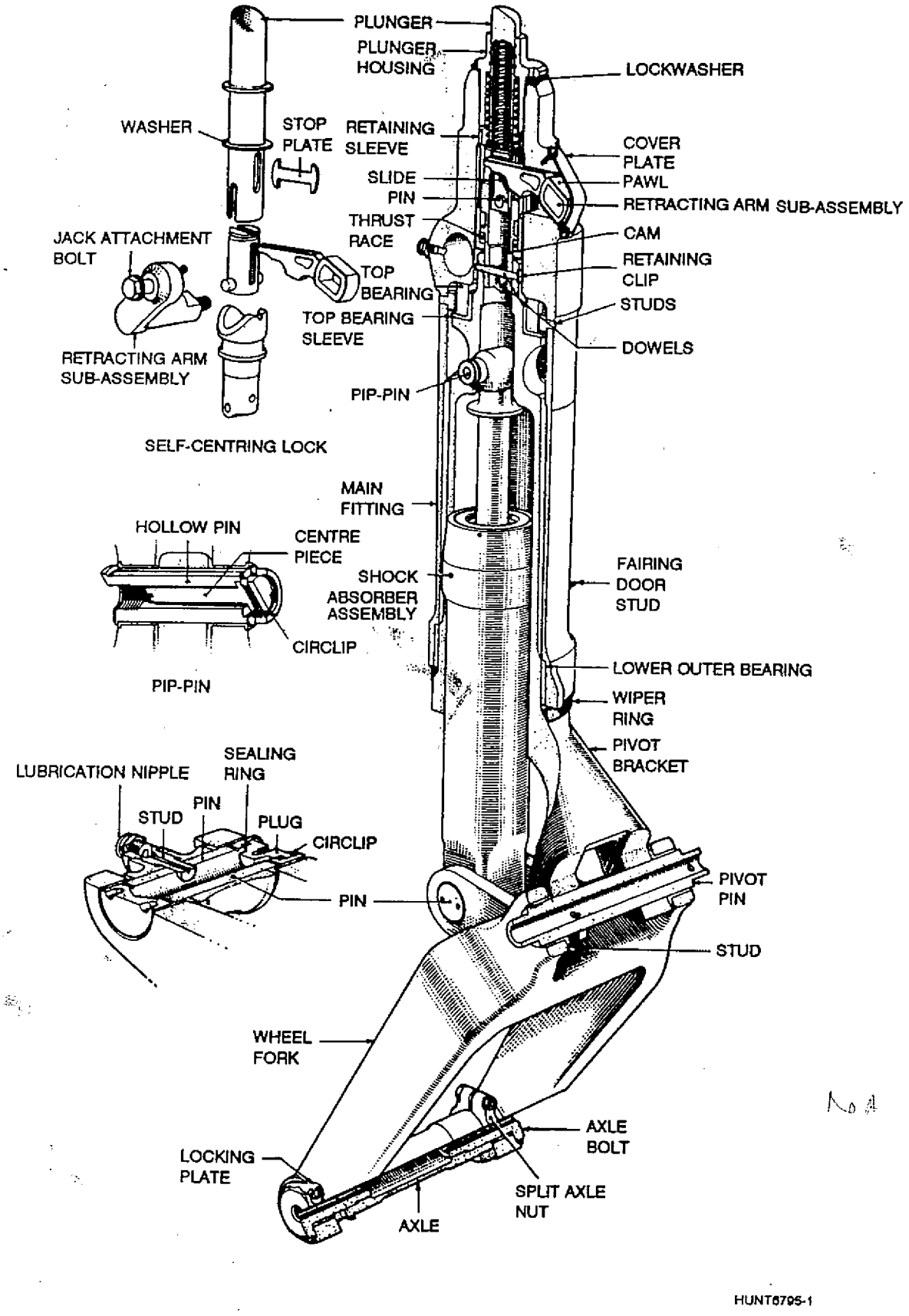

Fig 2 Nose undercarriage assembly

7 The complete assembly rotates freely on a thrust race bearing located between the cam and a retaining sleeve which is also slotted for the pawl. The sleeve is screwed into the main fitting sub-assembly from the lower end and locked in position by two special bolts and tab washers.

8 The pivot bracket sub-assembly houses the shock absorber assembly and is attached at the lower end to the wheel fork sub-assembly. The upper end of the pivot bracket sub-assembly is shouldered for a top bearing sleeve which rotates against the top bearing located by two studs to the main fitting sub-assembly. Connection to the lower end of the cam is by two dowels retained by a spring clip. This end of the pivot bracket sub-assembly is also drilled and bushed to receive the pip-pin for the attachment of the shock absorber assembly.

9 The pip-pin, which is self-locking, consists of a flanged hollow pin housing a centre piece secured with a circlip. Rotation of the centre piece through 90° by means of a screwdriver slot at one end either locks or unlocks the hollow pin. When unlocked, two balls housed in the end of the hollow pin are seated in corresponding indentations in the centre piece. As the centre piece is rotated, these balls are forced to protrude and so prevent the pip-pin from being withdrawn. To locate the centre piece in the locked position, two balls with a spring between are retained in the centre piece and locate with two corresponding indentations in the bore of the hollow pin. A special tool is required to remove the pip-pin after the ball lock has been released.

10 The wheel fork sub-assembly has lugs which are bushed for attachment to the pivot bracket sub-assembly and shock absorber assembly. The wheel fork sub-assembly is attached to the pivot bracket sub-assembly by a pivot pin secured by a stud and a spring washer and, to the shock absorber assembly, by a pin sub-assembly secured by a stud fitted with a lubrication nipple. One end of the pin sub-assembly has a plug and an O-ring. The plug is tapped to facilitate withdrawal and is secured by a circlip. Lubrication nipples are fitted to the two wheel fork lugs connecting to the pivot bracket sub-assembly.

11 An axle nut located by a bolt, a washer and a stiffnut, secures the wheel against a flange on the axle. The axle is secured by axle bolts attaching through the drilled and bushed wheel fork arms. The axle bolts are locked by locking plates, set screws and washers screwed into inserts in the wheel fork arms and wirelocked to the axle bolts.

12 The liquid spring shock absorber consists of a cylinder housing a piston and a gland sub-assembly.

13 The cylinder is closed at one end and houses a locating ring and a gland sub-assembly at the other end. The closed end is machined to form a lug fitting which is drilled and tapped for the stud securing an attachment pin. Two through drillings at this end enter the cylinder bore and are tapped to receive a sealing plug and a charging valve sub-assembly.

14 The charging valve sub-assembly consists of a valve body drilled throughout its length. One end is tapped for a cap and the other end houses a pin and seal, a spring, a washer and a plug retained by a pin. A sealing ring is fitted between the valve body and the cylinder.

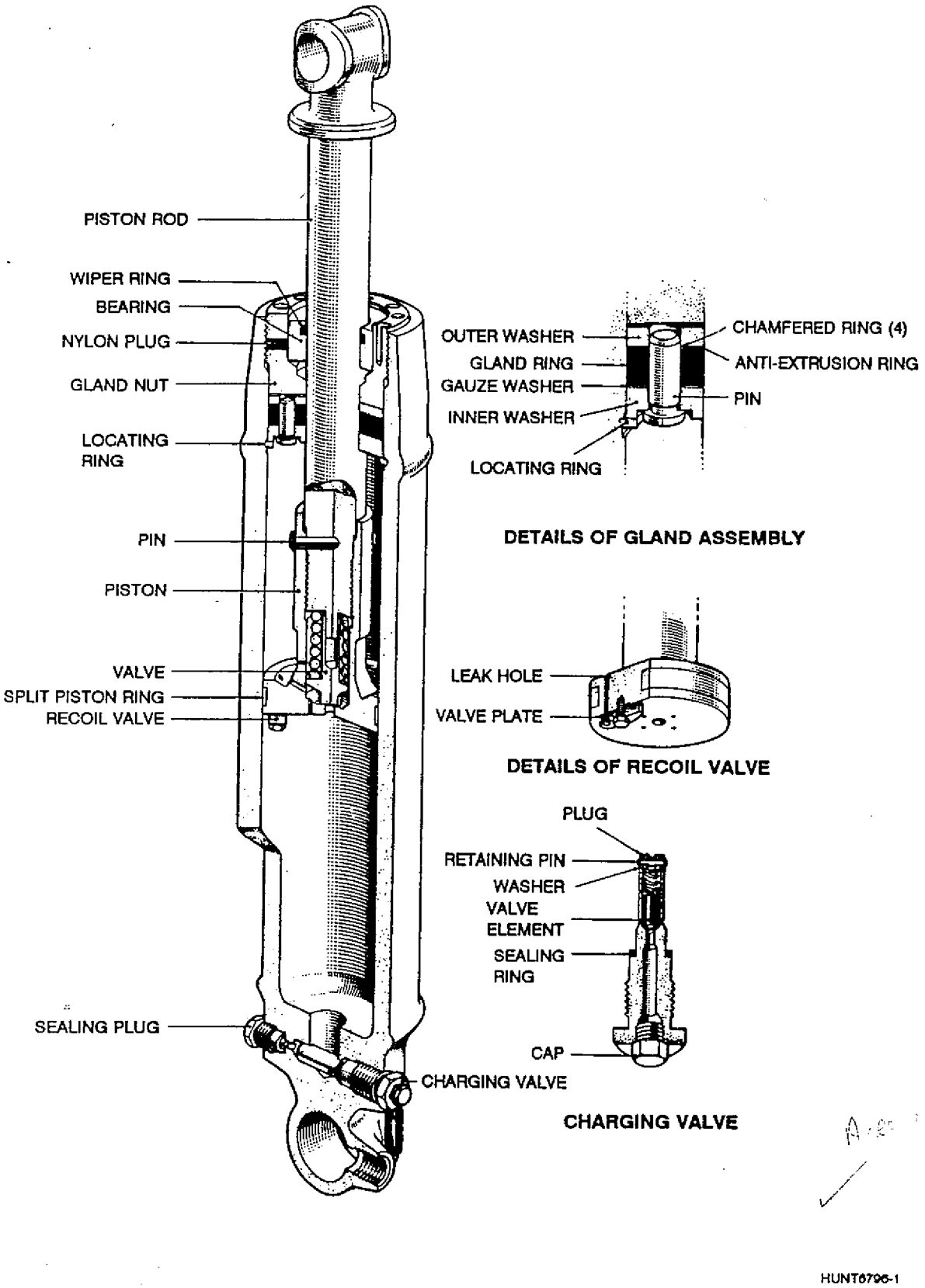

Fig 3 Shock absorber assembly

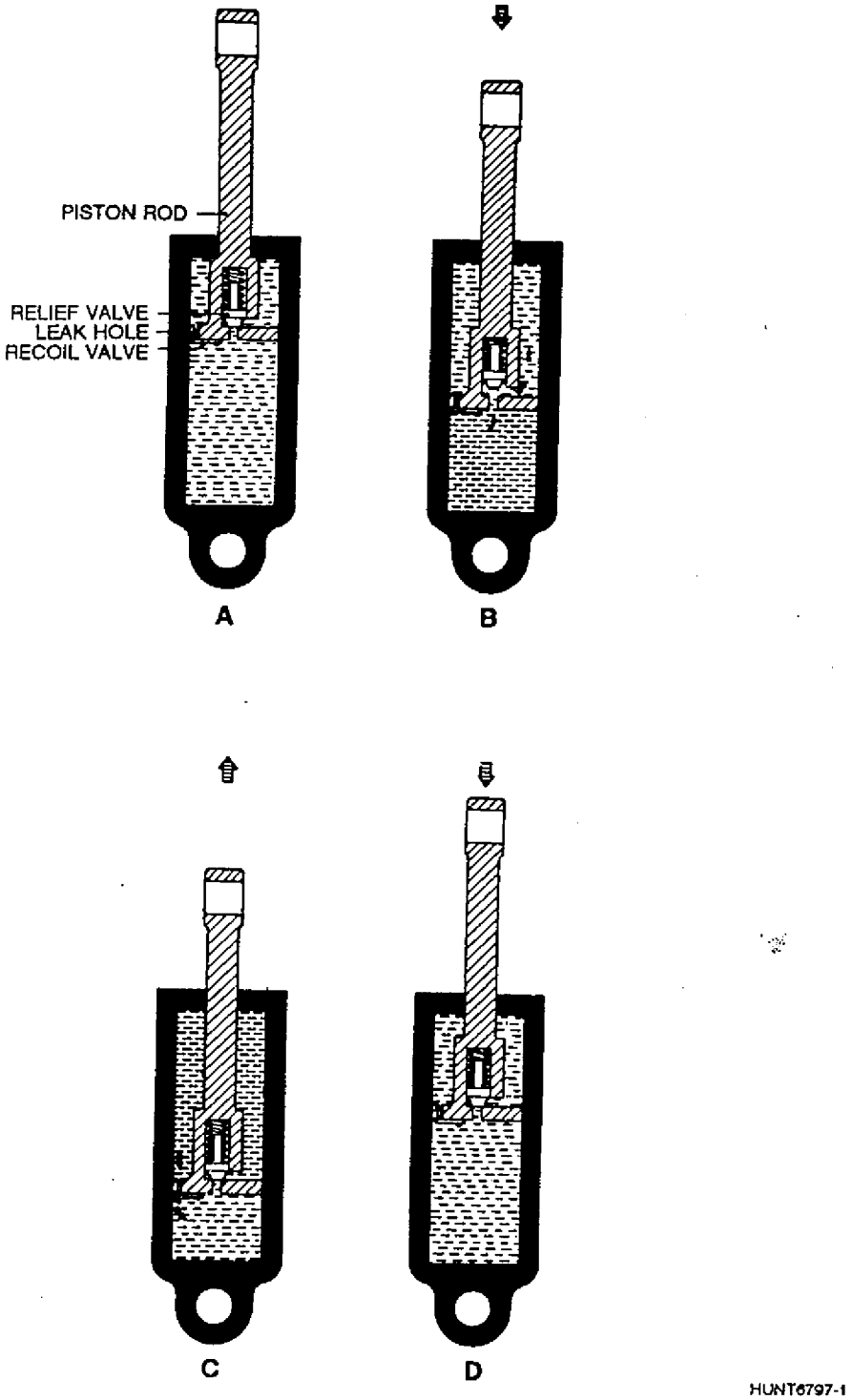

Fig 4 Functional diagram of shock absorber assembly

15 The gland sub-assembly comprises an inner washer into which four guide pins are pressed, two gauze washers, a gland ring, an anti-extrusion ring, four small chamfered rings and an outer washer. The gland sub-assembly is retained in the cylinder against the locating ring by a gland nut, locked by two nylon plugs and into which is pressed a bearing fitted with a wiper ring.

16 One end of the piston rod provides the upper attachment fitting of the shock absorber assembly to the pivot bracket sub-assembly and at the other end is formed as a spigot. The spigot is threaded for the attachment of a piston and to locate a relief valve. The piston is drilled for fluid ports, grooved for a piston ring and houses the spring-loaded relief valve. A pin and a split pin secure the piston to the piston rod. A recoil valve plate is positioned on the underside of the piston to cover a leak hole and is secured by a set screw and recoil valve.

Functional description (Figs 1, 2, 3 and 4)

17 When the undercarriage is in the down position, the plunger is forced by the pressure of the plunger springs to engage in the aircraft structure and lock the undercarriage in the down position. The plunger, the slide and the cam pin are held in the central position by the pawl and the pressure exerted on the slide by the springs tends to force the slide downwards. Because the cam is engaged with the centralised cam pin, this downward movement is reciprocated by the cam secured in the attached pivot bracket sub assembly, causing the pivot bracket sub-assembly to rotate to the central position.

18 When the undercarriage is retracted, the pull of the jack rotates the retracting arm sub-assembly and the pawl depresses the slide. The pawl is also at the lower end of the plunger slot and the downward force, whilst withdrawing the plunger from the down lock, ensures a greater compression of the springs and an increased centring effort on the cam and the pivot bracket sub-assembly. The pawl is depressed until it engages with a slot in the upper end of the cam to lock the undercarriage in the central position for retraction into the aircraft.

19 Figure 4, detail A shows the shock absorber fully extended in a no-load condition: both the relief valve and the recoil valves are closed. When a load is applied (detail B), the piston rod is forced into the cylinder, reducing the internal volume and compressing the fluid. The differential pressure causes fluid to transfer to the upper chamber through a number of small drillings in the piston and also through the relief valve: the recoil valve remains closed.

20 At the end of the compression stroke, the pressure is equal on both sides of the piston, but because of the differential areas, the piston rod is forced out of the cylinder (detail C). The relief valve closes under spring pressure and the passage of fluid through the piston is restricted to just the small drillings and the leak hole, the recoil valve having opened under the flow of fluid. This regulates the recoil speed and applies the desired damping action. Detail D shows the shock absorber compressed under a static load with the piston rod sufficiently inside the cylinder, with subsequent increase in pressure, to create an equalising force on the piston to support the applied load.

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
ST111 Mk23	Tommy bar	Dismantling/Assembling
ST111 Mk9	Tommy bar	Assembling
ST1253	C-key spanner	Dismantling/Assembling
ST1511	Tubular key spanner	Dismantling/Assembling
ST1512	C-key spanner	Dismantling/Assembling
ST1900 Mk1	Drift	Assemble bushes to pivot bracket and wheel fork
ST1900 Mk5	Drift	Assemble bearing to main fitting
ST1901 Mk2	Drift	Assemble bush of wheel fork
ST1901 Mk4	Drift	Assemble bush of main fitting
ST1903 Mk2	Drift bar	Use with ST1900 Mk1 and 5
ST1903 Mk5	Drift bar	Use with ST1901 Mk1, 2 and 4
ST1914	Extractor	Remove bush of main fitting
ST1917	Extractor	Dismantling
ST1959	Extractor	Remove bearing of main fitting
ST1969	Extractor	Remove fairing door bracket stud
ST1974	Extractor	Remove bearing of pivot bracket
ST1987	Extractor	Remove bearing of main fitting
ST2001	Checking gauge	Assembling

Part No	Description	Application
ST2002	Extractor	Remove bush of pivot bracket
ST2007	Special tube	Assemble bearing sleeve of pivot bracket
ST2009	Flat peg spanner	Assembling
ST2011	Extractor and assembly tool	Dismantling/Assembling
✳ST2020	C-key spanner	Dismantling/Assembling
ST2032	Distance piece	Use with ST2001
ST2158	Compressor	Dismantling/Assembling
ST2860	Extractor	Remove bearing of gland nut
-	Trichloroethane (TS367D)	Cleaning
-	White spirit (BS245)	Cleaning
-	Oil OM15 (DTD585)	Assembling
-	Grease (DTD900-4802) ESSO ANDOK 260	Assembling 348-9150-99-2247686
-	Grease XG285 (DEF STAN 91-54)	Assembling
-	Grease XG287 (DEF STAN 91-53)	Assembling
-	Corrosion preventative PX1	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 (Fig 1 and Chap 1, Figs 1,2 and 3)

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 two set screws, washers and locking plates from the two axle bolts. Remove the axle bolts. Withdraw the axle assembly from the wheel fork sub-assembly.

3.2 Unscrew and remove the stiffnut, the washer and the bolt from the axle nut. Unscrew the axle nut from the axle.

3.3 Remove the stud and spring washer and withdraw the pivot pin securing the wheel fork sub-assembly to the pivot bracket sub-assembly.

3.4 Remove the stud, complete with lubrication nipple and withdraw the shock absorber lower attachment pin sub-assembly. Remove the circlip then insert a 2BA bolt in the tapping provided and pull out the plug. Remove the lubrication nipple from the stud and the sealing ring from the plug.

3.5 Remove the wheel fork sub-assembly and remove the lubrication nipples from the wheel fork sub-assembly.

NOTE

Only remove the screw inserts if necessary for renewal.

3.6 Remove the rubber plug from the main fitting sub-assembly and with a screwdriver, turn the centre piece of the pip-pin to the unlocked position (indicated when the end slots of the inner and outer pieces are aligned).

3.7 Withdraw the pip-pin using the extractor and assembly tool ST2011 and remove the shock absorber from the pivot bracket sub-assembly.

3.8 Unscrew and remove the two screws and spring washers retaining the cover plate. Remove the cover plate from the main fitting sub-assembly.

3.9 Remove the split pin, unscrew the slotted nut, remove the washer and withdraw the retraction arm sub-assembly from the pawl and main fitting: remove the pawl. Remove the split pin, slotted nut and jack attachment bolt.

3.10 Unlock the lockwasher retaining the plunger housing. Using C-key spanner ST1512, remove the plunger housing from the main fitting sub-assembly and remove the lockwasher. Withdraw the plunger and spring assembly complete with slide.

3.11 Remove the slide from the plunger and the pin from the slide.

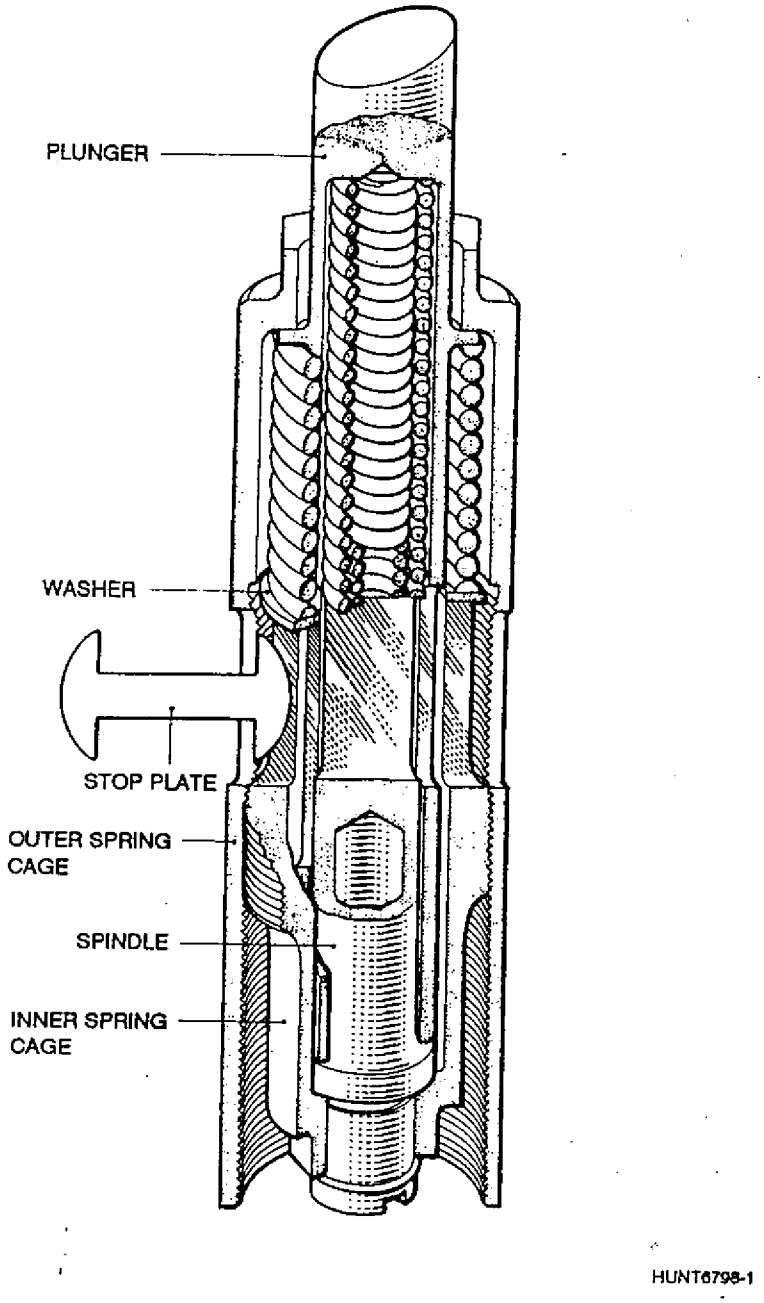

Fig 1 Use of compressor ST2158

3.12 Dismantle the plunger and spring assembly; refer to Figure 1.

3.12.1 Fit the compressor ST2158 over the plunger. Align the slots of the outer spring cage of the compressor with those of the plunger.

3.12.2 Hold the outer spring cage of the compressor ST2158 and screw the inner spring cage in a clockwise direction until the springs are compressed sufficiently to allow the stop plate to be turned through 90 degrees and withdrawn edgewise through the slots of the plunger, the spindle of the compressor and the inner and outer spring cages.

3.12.3 Unscrew the inner spring cage and spindle from the outer spring cage and withdraw the washer, the springs and the plunger.

3.13 Remove the two special bolts and tab washers locating the retaining sleeve. Unscrew the retaining sleeve using tubular key spanner ST1511 and tommy bar ST111 MK23: the retaining sleeve is unscrewed into the main fitting sub-assembly. Withdraw the pivot bracket, cam assembly and retaining sleeve.

3.14 Remove the top bearing from the main fitting sub-assembly using the extractor ST1917 and remove the two locating studs. Remove the two lubrication nipples from the main fitting sub-assembly.

NOTES

1. Do not remove the fairing door bracket studs from the main fitting sub-assembly unless necessary for renewal.

2. The lower outer bearing is a pressed-in fit and should not be removed.

3.15 Move the retaining clip along the pivot bracket to reveal the dowels. Extract the dowels and detach the cam from the pivot bracket sub-assembly; remove the retaining clip. Slide the retaining sleeve and the thrust race from the cam. Collect the two backing washers and the rubber washer. Remove the plug from the pivot bracket sub-assembly and remove the O-ring. Remove the wiper ring from the pivot bracket sub-assembly.

NOTE

The top bearing sleeve is a drive fit on the pivot bracket sub-assembly and is not normally removed.

WARNING

THE SHOCK ABSORBER SUB-ASSEMBLY IS CHARGED WITH HYDRAULIC FLUID AT UP TO 2000 LBF/IN^2 IN THE STATIC CONDITION.

3.16 Slacken the sealing plug to release the hydraulic pressure then remove the sealing plug and charging valve sub-assembly from the shock absorber cylinder.

3.17 Remove the cap and chain sub-assembly. Remove the retaining pin, plug, washer, spring and the valve element, comprising a pin and a seal, from the valve body. Remove the external sealing ring.

3.18 Using the C-key spanner ST2020, unscrew the gland nut and withdraw the piston rod and gland assemblies.

NOTE

A sharp outward movement of the piston rod may be required to dislodge the locating ring.

3.19 Remove the split pin and pin and, using C-key spanner ST1253, unscrew the piston and recoil valve sub-assembly from the piston rod. Withdraw the spring and relief valve from the piston and recoil valve sub-assembly. Remove the piston ring, set screw, recoil valve and recoil valve plate.

3.20 Slide the locating ring, the gland sub-assembly and the gland nut off the piston rod. Remove the wiper ring from the bearing in the gland nut and remove the nylon plugs from the gland nut.

NOTE

The bearing is pressed into the gland nut and is not to be removed except for renewal.

3.21 Dismantle the gland sub-assembly into its detail parts comprising, the outer washer, the anti-extrusion ring, the chamfered rings, the gland ring, the gauze washers and the inner washer complete with pins.

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. Check parts for permissible wear in accordance with fits and clearances, paragraph 12.

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 one diameter from any hole.

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

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 SP489-76

7.1 Number of working coils: Not specified

7.2 Wire size: 0.030 in (approx)

7.3 Free length: 0.3515 to 0.3885 in

7.4 Check length: 0.1520 to 0.2080 in

7.5 Load at check length: 1.710 to 1.890 lbf.

8 Spring 500YMK500

8.1 Number of working coils: 11.5

8.2 Wire size: 0.160 in (8 SWG)

8.3 Free length: 4.400 to 4.500 in

8.4 Check length: 2.900 in

8.5 Load at check length: 60 to 70 lbf.

9 Spring 500Y423

9.1 Number of working coils: 5

9.2 Wire size: 0.160 in (8 SWG)

9.3 Free length: 1.300 to 1.340 in

9.4 Check length: 1.106 in

9.5 Load at check length: 185 to 205 lbf.

10 Spring 500Y424

10.1 Number of working coils: 24.5

10.2 Wire size: 0.128 in

10.3 Free length: 5.400 to 5.480 in

10.4 Check length: 4.120 in

10.5 Load at check length: 75.37 to 8.29 lbf.

11 Spring 500Y425

11.1 Number of working coils: 27

11.2 Wire size: 0.116 in

11.3 Free length: 4.060 to 4.140 in

11.4 Check length: 3.600 in

11.5 Load at check length: 100 to 106 lbf.

Fits and clearances (Fig 2 to 6)

12 Check that the dimensions are within the specified limits.

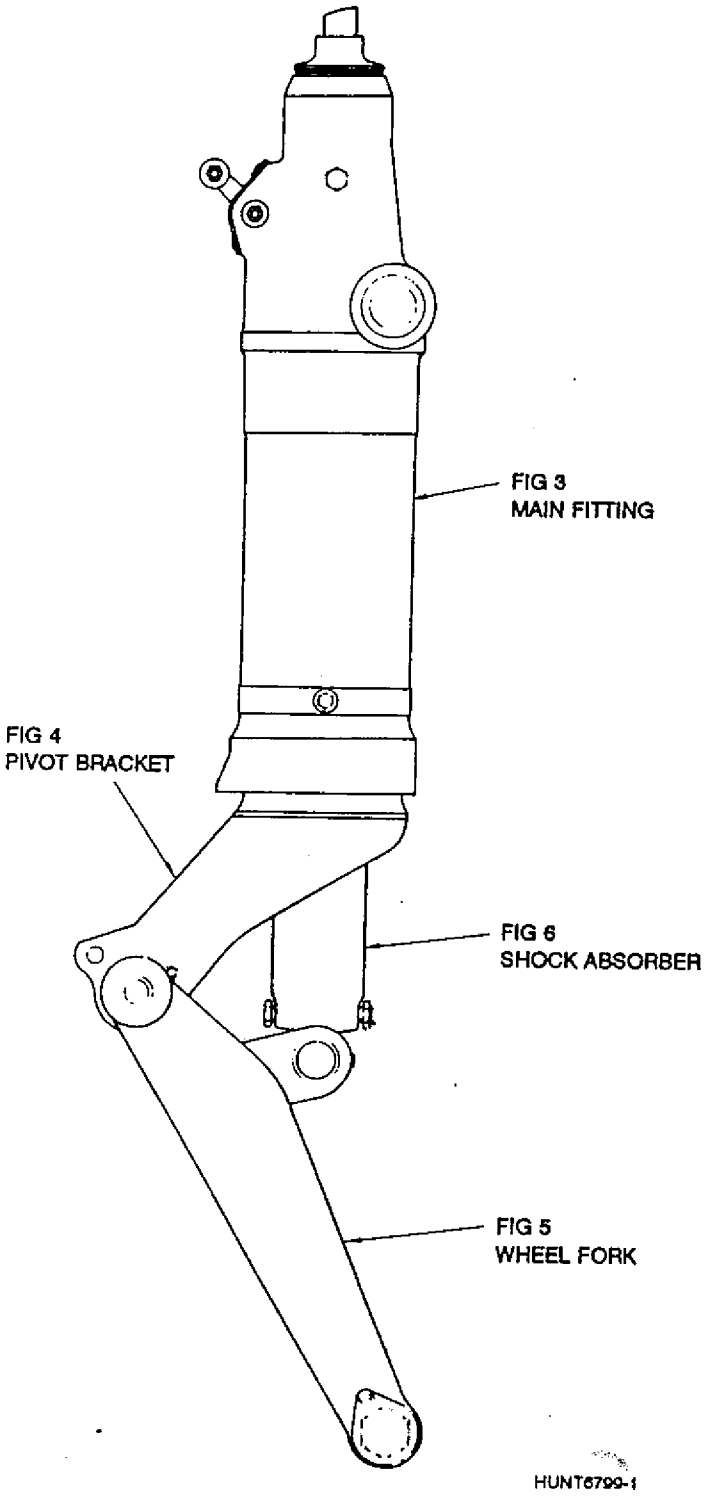

Fig 2 Fits and clearances - key diagram

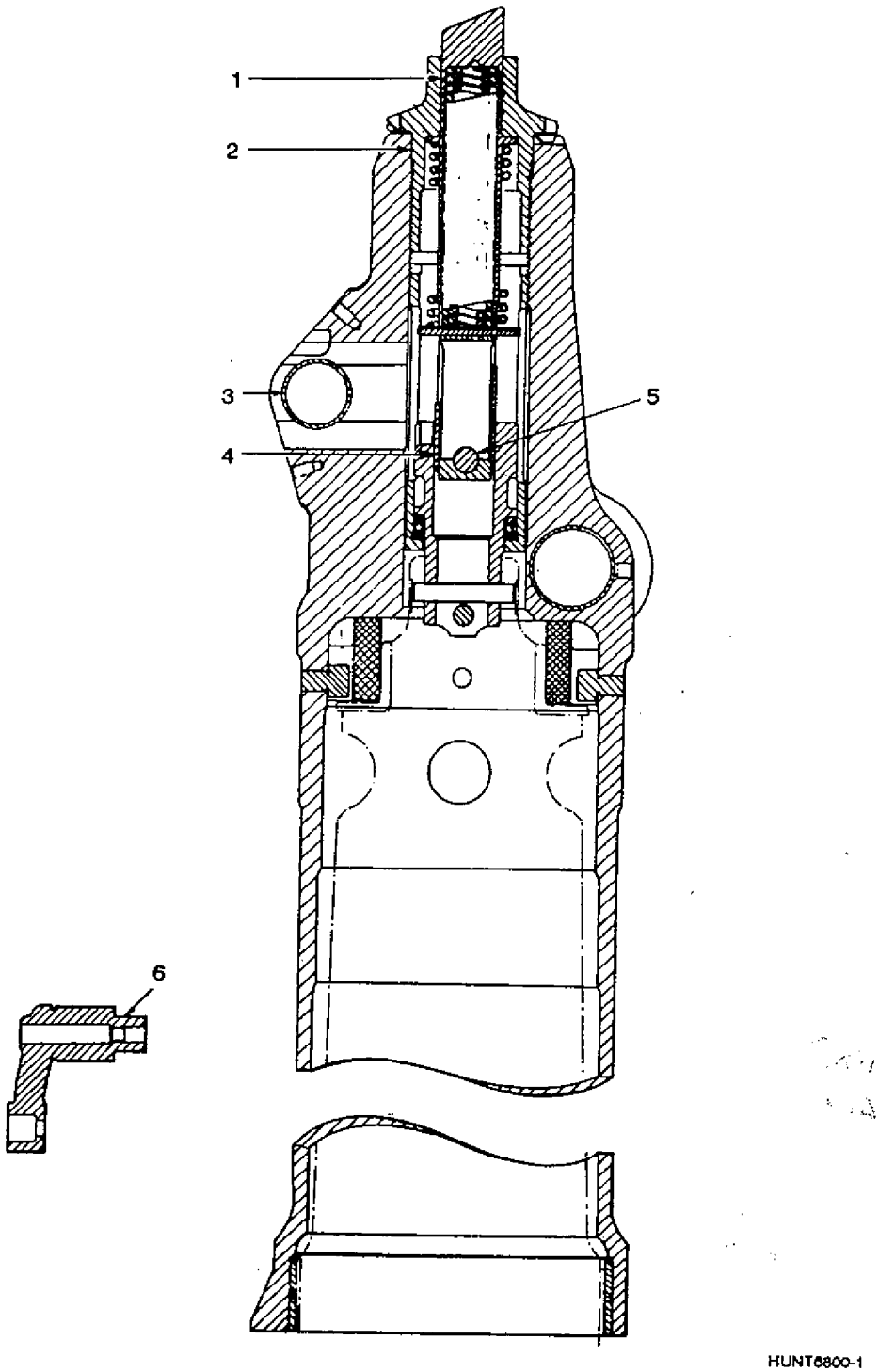

Fig 3 Fits and clearances - main fitting

TABLE 1

FITS, CLEARANCES AND REPAIR TOLERANCES

Ref No on Fig 3	Parts and Description	Dimension New	Permissible Worn Dimension		Permissible Clearance		Remarks
			Interchangeable Assembly	Selective Assembly	New	Worn	
1	PLUNGER IN PLUNGER HOUSING						
	Plunger housing i/d	1.00075 / 0.99950	1.0015	1.0025	0.00525 / 0.00100	0.00700	
	Plunger o/d	0.99850 / 0.99550	0.9945	0.99375			
2	MAIN FITTING						
	Bore for plunger housing	2.00075 / 1.99975	2.00100	2.00100	-	-	
3	RETRACTING ARM IN BEARING						
	Bearing i/d	1.00075 / 0.99950	1.00125	1.00225	0.00350 / 0.00075	0.00500	
	Retracting arm o/d	0.99875 / 0.99725	0.99625	0.99515			
4	PLUNGER IN CAM						
	Cam i/d	1.00075 / 0.99950	1.00500	1.01000	0.02075 / 0.00950	0.03000	
	Plunger o/d	0.99000 / 0.98000	0.97500	0.97075			
5	DOWEL IN RETAINING SLEEVE						
	Sleeve slot width	0.392625 / 0.390125	0.394125	0.394125	0.00325 / 0.00025	0.00475	
	Dowel o/d	0.389875 / 0.389375	-	-			
6	RETRACTING ARM IN PAWL						
	Pawl slot width	0.63000 / 0.62500	0.63250	0.63500	0.01000 / 0.00000	0.01500	
	Retracting arm width across flats	0.62500 / 0.62000	0.61750	0.61500			(Maximum permissible play at end of retracting arm to be 0.12000 in)

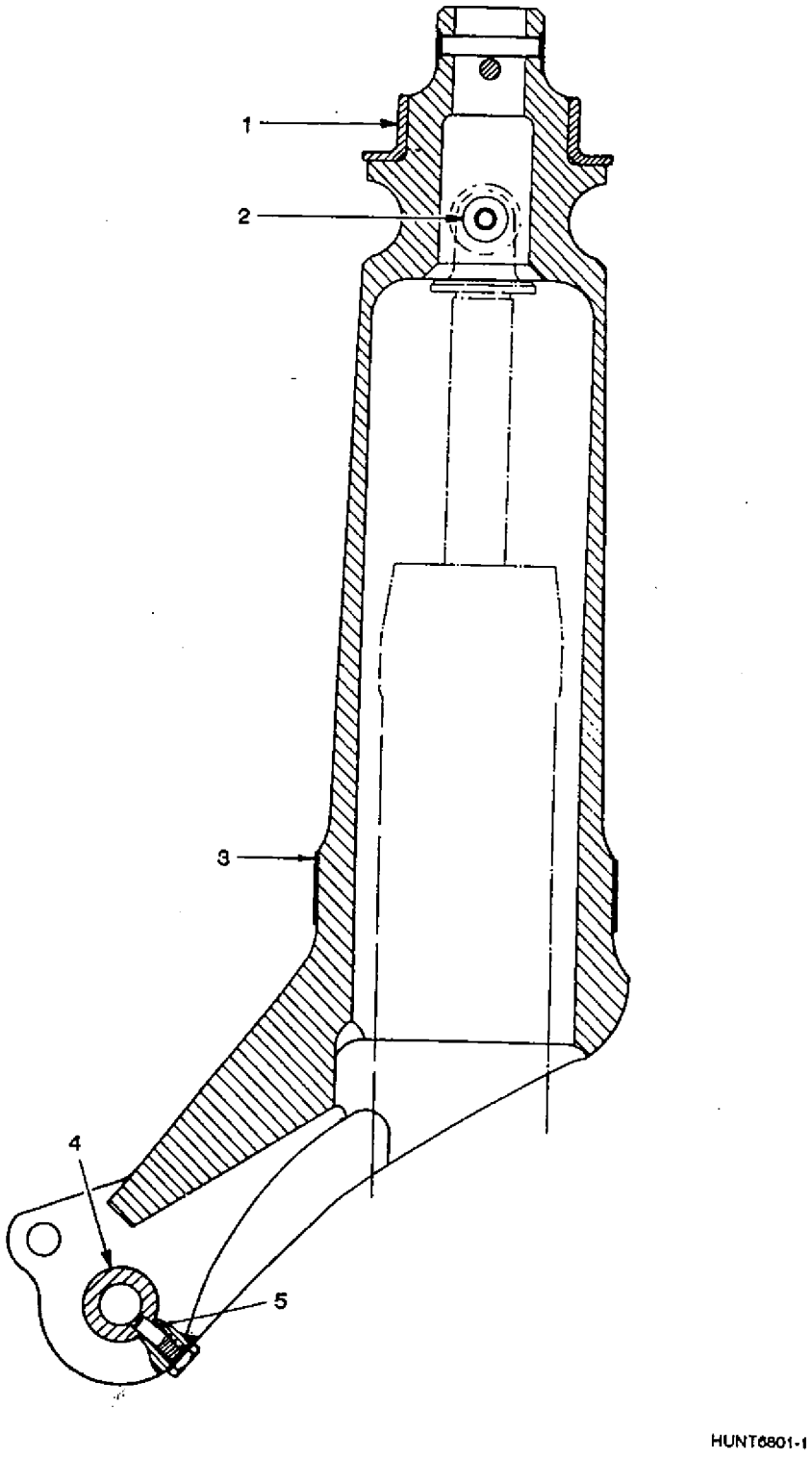

Fig 4 Fits and clearances - pivot bracket

TABLE 2

FITS, CLEARANCES AND REPAIR TOLERANCES

Ref No on Fig 4	Parts and Description	Dimension New	Permissible Worn Dimension		Permissible Clearance		Remarks
			Interchangeable Assembly	Selective Assembly	New	Worn	
1	TOP BEARING SLEEVE IN TOP BEARING						
	Top bearing i/d	2.6300 / 2.6280	2.6310	2.6320	0.0070 / 0.0040	0.0090	
	Top bearing sleeve o/d	2.6240 / 2.6230	2.6220	2.6210			
2	PIP-PIN IN BUSH						
	Bush i/d	0.75075 / 0.74950	0.75100	0.7515	0.00275 / 0.00050	0.0035	
	Pip-pin o/d	0.74900 / 0.74800	0.74750	0.7473			
3	LOWER INNER BEARING IN LOWER OUTER BEARING						
	Outer bearing i/d	4.9443 / 4.9433	4.9455	4.9460	0.0093 / 0.0070	0.0120	
	Inner bearing o/d	4.9363 / 4.9350	4.9335	4.9323			
4	PIVOT PIN IN PIVOT BRACKET						
	Pivot bracket i/d	1.2510 / 1.2495	1.2515	1.2525	0.0035 / 0.0007	0.0050	
	Pivot pin o/d	1.2488 / 1.2475	1.2465	1.2460			
5	STUD IN PIVOT BRACKET AND PIVOT PIN						
	Pivot bracket and pivot pin i/d	0.25050 / 0.24950	0.25125	0.25200	0.00250 / 0.00050	0.00400	
	Stud o/d	0.24900 / 0.24800	0.24725	0.24650			

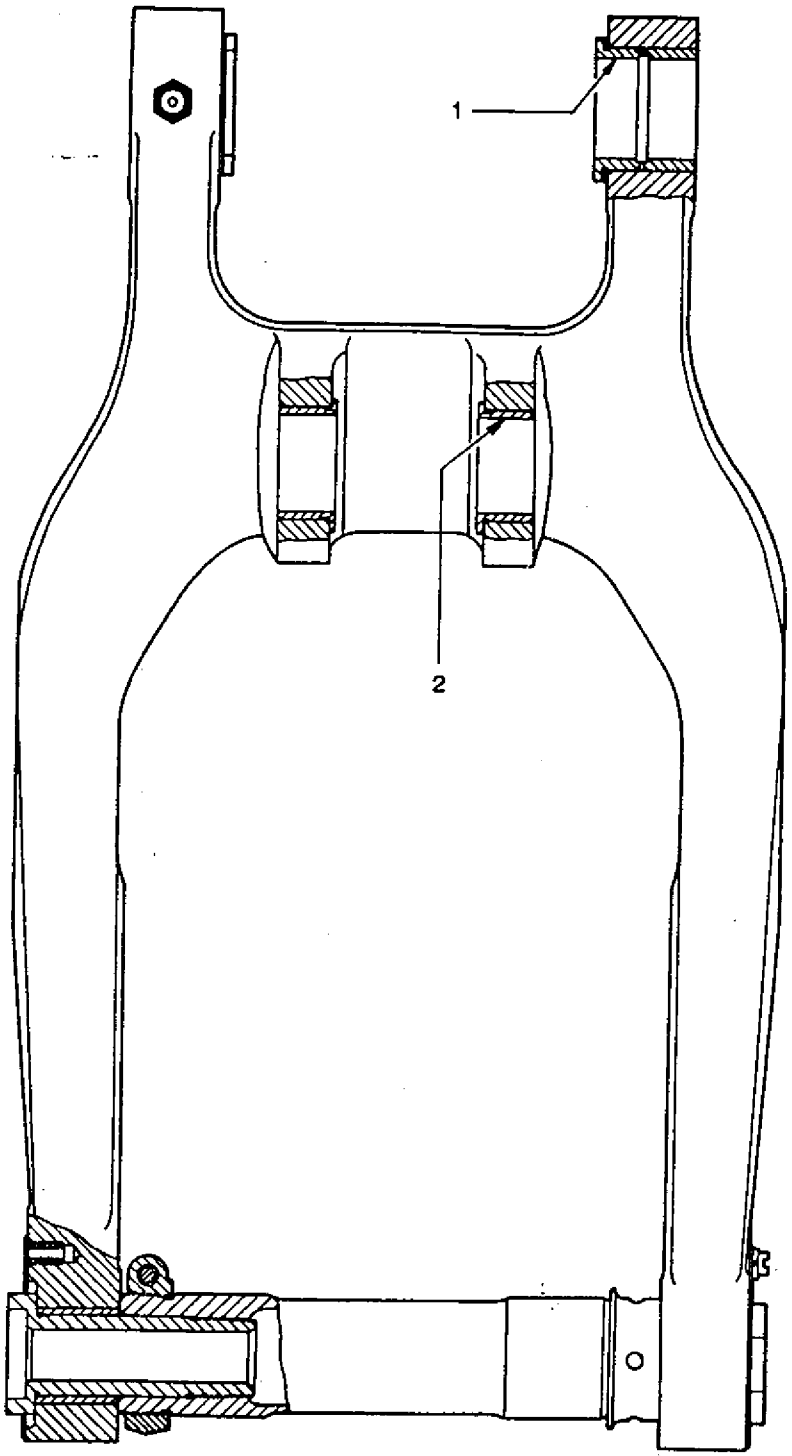

Fig 5 Fits and clearances - wheel fork

TABLE 3

FITS, CLEARANCES AND REPAIR TOLERANCES

Ref No on Fig 5	Parts and Description	Dimension New	Permissible Worn Dimension		Permissible Clearance		Remarks
			Interchangeable Assembly	Selective Assembly	New	Worn	
1	PIVOT PIN IN BUSH						
	Bush i/d	1.25075 / 1.24975	1.25100	1.25150	0.00325 / 0.00100	0.00400	
	Pivot pin o/d	1.24875 / 1.24750	1.24700	1.24675			
2	PIN IN BUSH						
	Bush i/d	1.18850 / 1.18700	1.19000	1.19000	0.00350 / 0.00075	0.00500	
	Pin o/d	1.18625 / 1.18500	1.18500	1.18530			

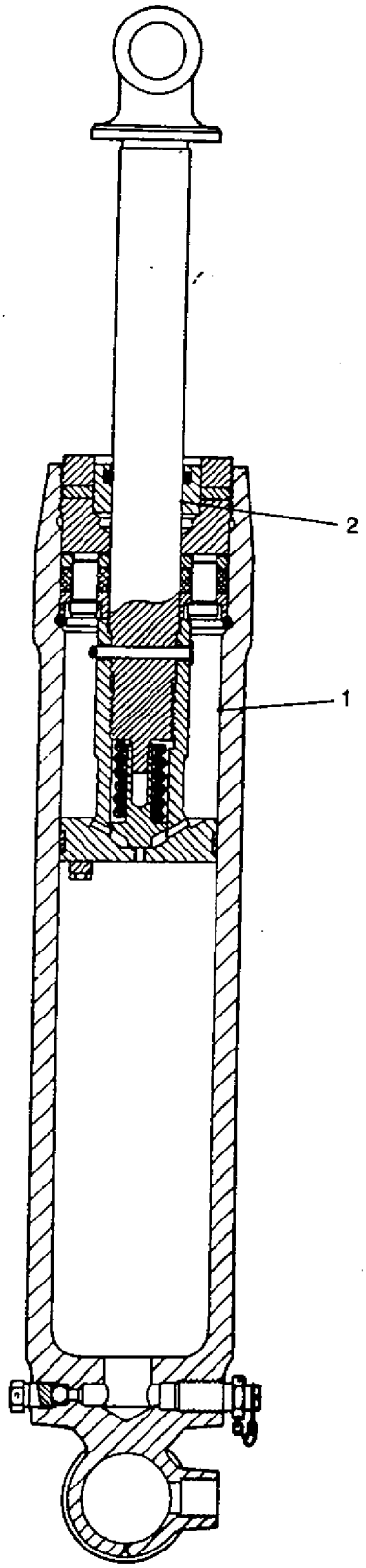

Fig 6 Fits and clearances - shock absorber

TABLE 4

FITS, CLEARANCES AND REPAIR TOLERANCES

Ref No on Fig 6	Parts and Description	Dimension New	Permissible Worn Dimension		Permissible Clearance		Remarks
			Interchangeable Assembly	Selective Assembly	New	Worn	
1	CYLINDER Cylinder bore	$\frac{2.0635}{2.0585}$	2.0650	2.0650	-	-	
2	PISTON ROD IN BEARING Bearing i/d	$\frac{0.93825}{0.93700}$	0.94000	0.94000	$\frac{0.00275}{0.00050}$	0.00450	
	Piston rod o/d	$\frac{0.93650}{0.93550}$	-	-			

Assembling (Figs 1 and 7 and Chap 1, Figs 1, 2 and 3)

13 Using the equipment specified in paragraph 1, assemble the unit as detailed. Lubricate all forms of sealing rings with clean oil OM15 prior to assembling. Lubricate all pivoting and sliding assemblies with grease XG287 during assembly.

Assemble the shock absorber

14

14.1 Attach the cap and chain sub-assembly to the charging valve body by the spring clip and screw the cap into the valve body. Insert the valve element, the spring, the washer and the plug. Secure the plug with the retaining pin and peen the ends of the retaining pin to lock.

14.2 Assemble the sealing ring to the charging valve and screw it into the cylinder. Screw the sealing plug into the cylinder.

14.3 Assemble the wiper ring to the bearing in the gland nut and pack the recess between the bearing and the gland nut with grease (DTD900-4802). Insert the nylon plugs into the gland nut. Slide the gland nut over the piston rod with the wiper ring leading.

14.4 Assemble the two gauze washers, with their meshes at 45 degrees to each other, over the pins on the inner washer followed by the gland ring, the anti-extrusion ring, the chamfered rings and the outer washer. Slide the assembled parts onto the piston rod, outer washer leading, followed by the locating ring.

14.5 Fit the split piston ring to the piston. If a new ring is being fitted it must be gapped on assembly to between 0.009 and 0.012 in and the sharp edges removed, on the flat faces only, with a radius of 1/64 in.

14.6 Locate the recoil valve plate to the spigot of the recoil valve and secure the assembly to the piston with the set screw. Wirelock the set screw to the recoil valve.

14.7 Set the piston and piston rod to obtain the correct relief valve spring dimension: refer to Figure 7.

14.7.1 Fit the distance piece ST2032 and the relief valve to the piston rod and screw on the piston and recoil valve sub-assembly until it contacts the relief valve.

14.7.2 Adjust the checking gauge ST2001 between the head of the gland sub-assembly pin and the piston skirt: lock the gauge at this setting.

14.7.3 Unscrew the piston and recoil valve sub-assembly from the piston rod, remove the distance piece ST2032 and insert the spring. Using the C-key spanner ST1253, screw the piston and recoil valve sub-assembly onto the piston rod to the dimension set on the checking gauge ST2001.

14.7.4 If necessary, screw the piston and recoil valve sub-assembly back to the nearest locking position and secure it with the pin and split pin.

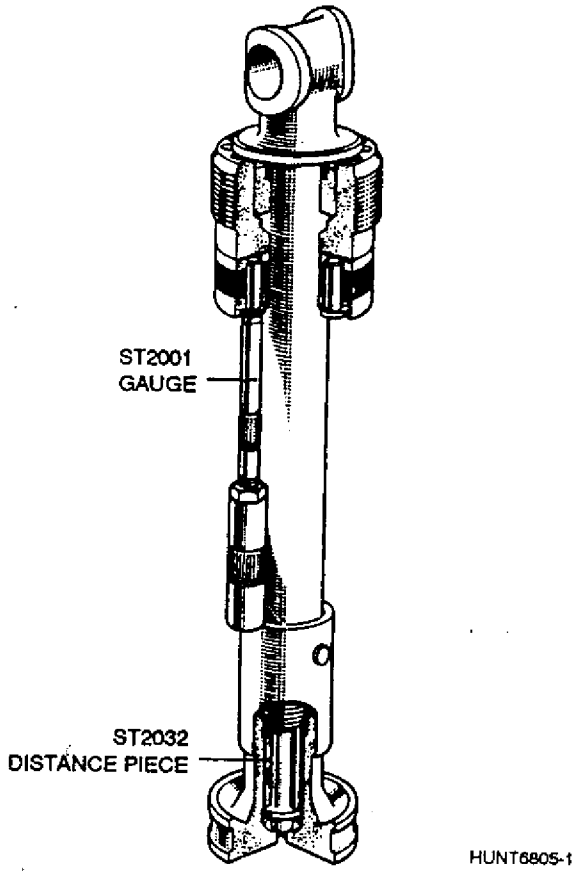

Fig 7 Adjustment for relief valve spring

14.8 Partially fill the cylinder with clean oil OM15. Insert the piston rod and gland assemblies into the cylinder until the piston is submerged. Position the locating ring in the groove in the cylinder.

14.9 With the shock absorber in an upright attitude, position the gland sub-assembly as far as possible into the cylinder. Using the C-key spanner ST2020, screw the gland nut in until the gland sub-assembly is firmly bedded against the locating ring. Unscrew the gland nut and physically check that the four pins have entered the holes in the outer washer. If satisfactory, screw the gland nut into the cylinder and torque tighten to 1200 lbf in.

14.10 Fill, charge and test the shock absorber as detailed in Chapter 3.

14.11 After satisfactory testing, wirelock the charging valve to the sealing plug with the locking wire passed under the end lug on the cylinder.

Assemble the undercarriage

15

15.1 Locate the inner springs and the outer spring to the plunger. Assemble the washer over the plunger and position the plunger, springs and the washer in the compressor ST2158.

15.2 Compress the springs until it is possible to insert the stop plate through the slots of the plunger. Turn the stop plate through 90 degrees and slowly remove the compressor, ensuring the stop plate abuts the ends of the slots in the plunger.

15.3 Position the slide complete with the cam pin in the plunger with the slot in the slide locating with the stop plate.

15.4 Assemble the two thrust rings with the bearing balls interposed to the cam and pack the assembled thrust bearing with grease XG287. Pack the bore of the cam with grease XG285 and position the cam and thrust bearing in the retaining sleeve.

15.5 Assemble the two backing washers, with the rubber washer interposed, onto the cam to abut the retaining sleeve.

NOTE

When tolerances do not permit the assembly of two backing washers, only one is to be fitted, located adjacent to the retaining sleeve.

15.6 Assemble an O-ring to the plug: insert the plug into the pivot bracket sub-assembly and align the holes for the dowels.

15.7 Locate the retaining clip over the end of the pivot bracket sub-assembly without covering the dowel holes. Secure the cam to the pivot bracket sub-assembly with the two dowels, ensuring that the slot at the top of the cam is aligned with the fork arm of the pivot bracket sub-assembly. Slide the retaining clip into the groove to secure the dowels.

15.8 Assemble the wiper ring to the lower end of the pivot bracket sub-assembly.

15.9 Assemble the two studs and the top bearing in the upper end of the main fitting sub-assembly. Screw the two lubrication nipples into the main fitting sub-assembly.

15.10 Position the pivot bracket sub-assembly in the main fitting sub-assembly and screw the retaining sleeve into the main fitting sub-assembly using the tubular key spanner ST1511 and the tommy bar ST111 Mk23. Draw the retaining sleeve in sufficiently to allow an end float of 0.001 to 0.015 in between the top bearing and the top bearing sleeve and to align its slots for locking. Lock the retaining sleeve to the main fitting sub-assembly with the two special bolts fitted with tab washers: lock the tab washers.

15.11 Insert the plunger and spring assembly into the main fitting, locating the cam pin in the cam and aligning the longer slot of the plunger with the slot at the top of the cam.

15.12 Pack the grooves in the bore of the plunger housing with grease XG285. Assemble the lockwasher to the plunger housing and, using the C-key spanner ST1512, screw the plunger housing tightly into the main fitting. Lock the lockwasher by deforming it into the slot in the main fitting and into one slot in the plunger housing.

15.13 Insert the pawl through the slot in the main fitting sub-assembly and position it through the slots in the retaining sleeve, the plunger and the slide.

15.14 Locate the retracting arm sub-assembly in the main fitting, with the lever uppermost, to engage the pawl and secure it with the washer, slotted nut and split pin. Check the plunger travel is between 0.564 and 0.846 in by depressing the pawl with the pivot bracket in the central position.

15.15 Temporarily secure the jack attachment bolt to the retracting arm sub-assembly with the slotted nut and split pin

15.16 Secure the cover plate with the spring washers and set screws.

15.17 Position the shock absorber assembly in the pivot bracket sub-assembly, charging valve to the rear. Using the extractor and assembly tool ST2011, insert the pip-pin through the hole in the main fitting to secure the shock absorber sub-assembly to the pivot bracket sub-assembly.

15.18 Turn the centre piece of the pip-pin with a screwdriver until the slots are at 90 degrees to those in the outer piece to lock the assembly. Fit the rubber plug to the hole in the main fitting sub-assembly.

15.19 Connect the wheel fork sub-assembly to the pivot bracket sub-assembly with the pivot pin, aligning the holes for the stud with the tommy bar ST111 Mk9. Apply jointing compound JC5A to the full length of the stud and secure the assembly with the spring washer and the stud. Apply a fillet of sealant PR1422A-2 to the joint between the inner faces of the pivot bracket sub-assembly and the pivot pin. Screw the two lubrication nipples into the wheel fork sub-assembly.

15.20 Assemble the sealing ring and the plug to the pin and secure with the circlip. Locate the shock absorber assembly to the wheel fork sub-assembly and insert the pin sub-assembly. Align the transverse locking hole using the flat peg spanner ST2009 and secure with the stud. Install the lubrication nipple. Wirelock the stud to the charging valve sub-assembly.

15.21 Screw the split axle nut onto the axle and temporarily secure with the bolt, washer and stiffnut.

15.22 Position the axle between the arms of the wheel fork sub-assembly and screw in the axle bolts. Temporarily lock the axle bolts with the locking plates, washers and set screws.

15.23 Attach a grease gun charged with grease XG287 to each lubrication nipple in turn and apply pressure until fresh grease exudes from the appropriate locations. Remove surplus grease with a clean lint-free cloth.

15.24 Test the nose undercarriage self-centring as detailed in Chapter 3.

Chapter 3

TESTING

CONTENTS

Special tools and test equipment

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

Part No	Description	Application
ST2034	Flexible charging pipe	Testing
-	Tecalamit lubricating gun (Type JC10AM, Oil OM15)	Apply hydraulic pressure
-	Static hydraulic test rig	Apply hydraulic pressure
-	Adapter (1/4 in BSP)	Testing

Testing the unit

2 Using the equipment specified in paragraph 1, carry out the following test procedures.

Filling and charging the shock absorber

3

3.1 Remove the sealing plug and the charging valve sub-assembly.

3.2 Fully extend the unit with the charging valve tapping uppermost. Screw the adapter into the charging valve tapping and connect the hand pump of the static hydraulic test rig to the adapter. Pump in oil OM15 until it flows from the sealing plug tapping. Screw in the sealing plug.

3.3 Disconnect the hand pump and remove the adapter. Ensure that the sealing ring is fitted to the charging valve sub-assembly and screw in the valve.

3.4 Incline the shock absorber at an angle of 45 degrees to the vertical with the sealing plug at the highest point.

3.5 Remove the cap from the charging valve sub-assembly and screw in the flexible charging pipe. Attach the lubricating gun and pump in oil OM15 to pressurise the shock absorber to 100 lbf/in^2.

3.6 Slacken the sealing plug to allow air and fluid to escape.

3.7 Repeat paragraphs 3.5 and 3.6 until air-free fluid is expelled when the sealing plug is opened.

3.8 Tighten the sealing plug and pressurise the unit to 5000 lbf/in^2. Allow the unit to remain in this condition for one hour. De-pressurise the unit. Check the torque on the gland nut is still 1200 lbf in.

3.9 Repeat paragraph 3.8 twice.

3.10 Tighten and lock the sealing plug and pressurise the unit to 2000 lbf/in^2. Remove the lubricating gun and the charging pipe; replace the cap of the charging valve sub-assembly and finally lock the assembly.

Nose undercarriage self-centring check

4 With the nose undercarriage suitably supported and fitted with the wheel assembly or an equivalent weight of 27 lb, check that the self-centring loads are in accordance with Table 1. The axle and wheel assembly is to be moved from the central or trailing position by means of a bar inserted in the bore of the shock absorber lower attachment pin and the loads are to be read at the end of a 20 in lever measured from the centre line of the undercarriage.

TABLE 1

SELF-CENTRING CHECK

Angle of movement	Minimum load	Maximum load
5°	1.6 lb	4.8 lb
10°	2.4 lb	6.4 lb
15°	4.0 lb	9.2 lb

NOTE

The loads quoted in Table 1 are those exerted by the self-centring mechanism and are not the pull-off loads.