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of AP 4515B Vol 3 Pt 1 Sect 2 Chap 15)

NOSEWHEEL JACK DOWTY AEROSPACE HYDRAULICS Part No 103031018, 103020019, 103021022 and 103030020

GENERAL AND TECHNICAL INFORMATION (-1) PARTS CATALOGUE AND RELATED INFORMATION (-3)

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence

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GENERAL

CONTENTS

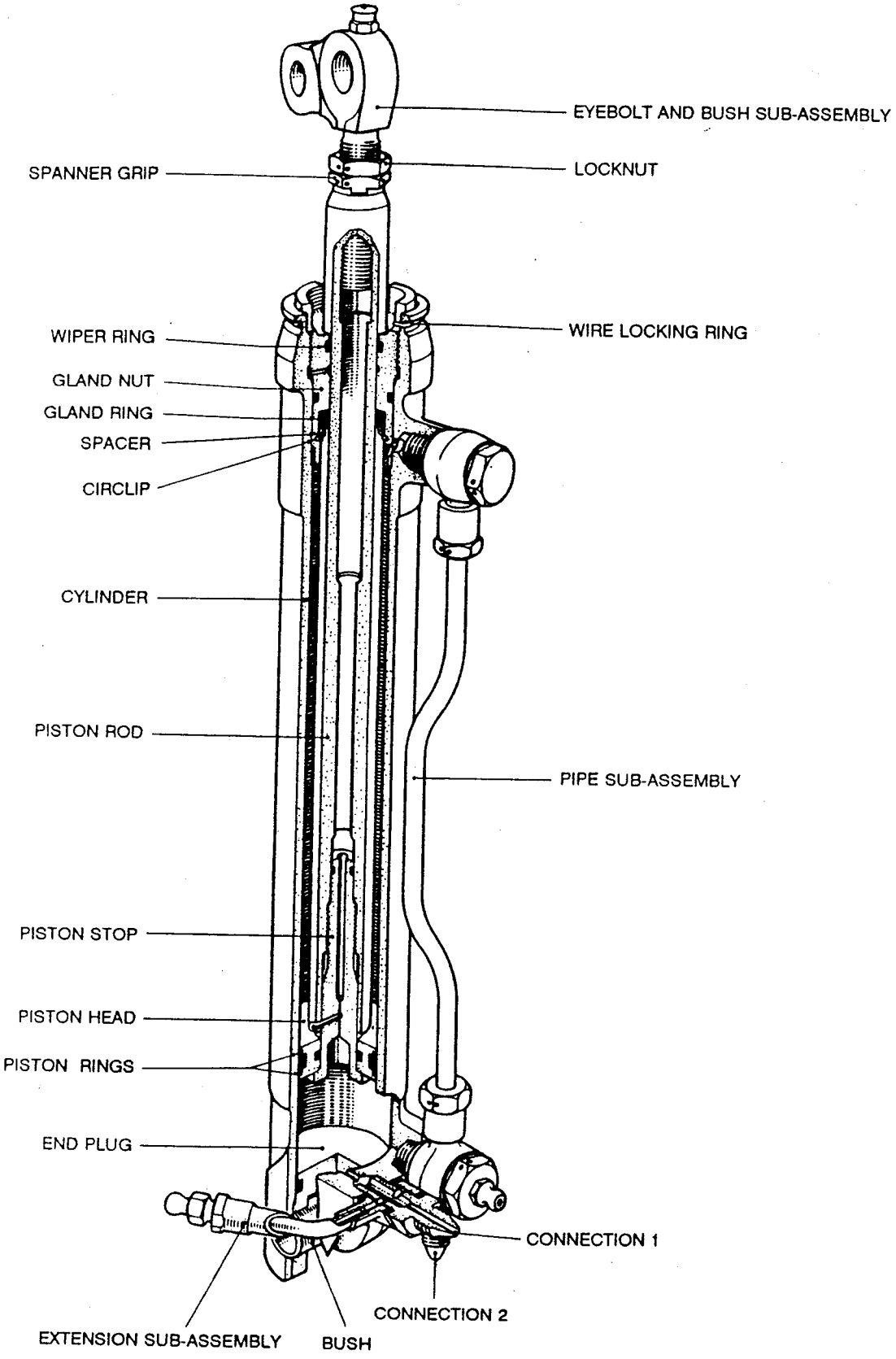

Fig 1 Nosewheel jack

Leading particulars

1 Refer to the relevant annex for the leading particulars.

Modification state

2 Refer to the appropriate annex for the relevant modification state.

Introduction (Fig 1)

3 This jack functions as a double acting hydraulic actuator. The unit comprises a cylinder which houses a piston rod sub-assembly that has an adjustable eyebolt and bush sub-assembly. The method of attachment of the piston head to the piston rod prevents the full hydraulic load being applied to the airframe structure at the end of the stroke. A basic type is described and illustrated in the general text and variations are covered in the annexes.

Constructional description (Fig 1)

4 The cylinder is closed at one end by an end plug which is grooved for an O-ring and secured by a bush through two lugs. The opposite end is internally threaded for a gland assembly comprising a gland nut fitted with a wiper ring and a gland ring and spacer retained by a circlip. The gland nut is secured by a wire locking ring. Two integral side bosses are tapped for pipe connections, one at the gland nut end and two at the end plug end.

5 The tubular piston rod is slotted and tapped at one end to receive a spigoted spanner grip and an eyebolt and bush sub-assembly. A locknut secures the eyebolt. A piston head is retained at the other end of the piston rod by a sealed piston stop which is screwed into the piston rod and locked with a split pin.

6 Connection 1, for extending the jack, consists of an extension sub-assembly and bonded seals secured to a drilled through tapping of the cylinder by a banjo bolt. Connection 2, for closing the jack is fitted adjacent, and consists of a double banjo fitting with bonded seals secured to a blind tapping by a banjo bolt with a bleed screw. A third connection, connected by a pipe to connection 2, consists of a banjo with bonded seals, secured by a banjo bolt to a drilled through tapping at the gland nut end of the cylinder.

Functional description (Fig 1)

7 The piston head is allowed a certain amount of free movement between the end of the piston rod and the flanged head of the piston stop and, when fluid is supplied to extend the jack, the piston head is first forced against the end of the piston rod. The normal extending stroke is then made until the piston head is stopped against the gland nut. Thereafter, the fluid pressure acts only on the head of the piston stop to complete the stroke and thus protects the aircraft structure from the full hydraulic load. On the closing stroke, neither the piston nor the piston stop contact the end plug.

MAINTENANCE

Special tools and equipment

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

Part No	Description	Application
ST947 MkA	Circlip pliers	Dismantling/Assembling
ST1214	Vice clamp	Dismantling/Assembling
ST1214-4	Collet	Dismantling/Assembling
ST1337	C key spanner	Dismantling/Assembling
ST1686	Drift	Dismantling/Assembling
ST1754	Sleeve	Assembling
-	Trichloroethane (TS367D)	Cleaning
-	White spirit (BS245)	Cleaning
-	Oil OM15 (DTD585)	Assembling
-	Corrosion preventative PX1	Preservation
-	Locking wire (DTD189A)	Locking parts

Safety and maintenance notes

9 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)

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

10.1 Remove the bleed screw from the extension sub-assembly. Remove the banjo bolt, extension sub-assembly and bonded seals.

10.2 Remove the bleed screw from the banjo bolt and remove both banjo bolts together with the pipe sub-assembly. Separate the pipe sub-assembly, banjos and bonded seals.

10.3 Slacken the locknut and remove the eyebolt and bush sub-assembly and the spanner grip.

10.4 Remove the spanner grip, locknut and lubrication nipple. If necessary for renewal purposes, remove the bush from the eyebolt.

10.5 Remove the wire locking ring and unscrew the gland nut from the cylinder using C-key spanner ST1337. Withdraw the piston rod and gland assemblies.

10.6 Slide the gland assembly from the piston rod. Remove the O-ring and the wiper ring. Remove the circlip using circlip pliers ST947 MkA and withdraw the spacer and gland ring from the gland nut.

10.7 Secure the piston rod sub-assembly in the collet ST1214-4 and vice clamp ST1214.

10.8 Remove the split pin and unscrew the piston stop from the piston rod. Slide the piston head from the piston stop and remove the sealing rings and piston rings from the piston stop and the piston head.

10.9 Remove the bush from the end plug and cylinder using the drift ST1686 and discard the bush.

10.10 Extract the end plug and remove 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.

11 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

12 Visually examine all parts for damage and corrosion. Check parts for permissible wear in accordance with paragraph 14.

Superficial damage

13 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:

13.1 Not exceeding 0.500 in long.

13.2 Not exceeding 0.010 in deep.

13.3 Not less than 0.250 in from any hole or bearing surface.

NOTE

Burrs must be removed and sharp edges blended out. Minor scores and abrasions in non-sealing bores may be ignored provided that proud portions of the abrasion are removed.

Fits and clearances

14 Check that the dimensions are within the specified limits.

TABLE 1 FITS, CLEARANCES AND REPAIR TOLERANCES

Ref No on Fig 2	Parts and Description	Dimension New	Permissible Worn Dimension		Permissible Clearance		Remarks
			Interchangeable Assembly	Selective Assembly	New	Worn	
1	CYLINDER						
	Cylinder i/d	$\frac{1.380}{1.375}$	1.383	1.383	-	-	
2	PISTON ROD IN GLAND NUT						
	Gland nut i/d	$\frac{0.7525}{0.7495}$	0.7545	0.7565	$\frac{0.0055}{0.0005}$	0.0075	
	Piston rod o/d	$\frac{0.7490}{0.7470}$	0.7450	0.7420			

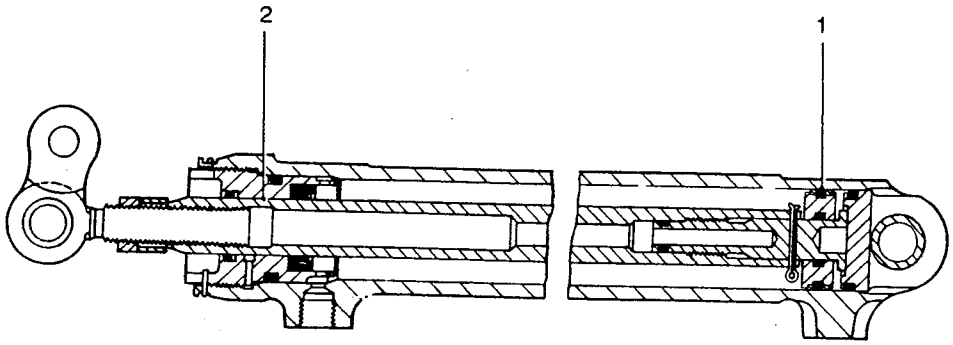

Fig 2 Fits and clearances

Assembling (Fig 1)

15 Lightly lubricate all bonded seals, sealing rings and O-rings with clean oil OM15 prior to assembling.

15.1 If the end plug has been dismantled, assemble to it a new O-ring and position the end plug in the end of the cylinder. Fit a new bush, which is a drive fit, through the end plug and the lugs on the cylinder end using drift ST1686. Check line ream the bush to between 0.4995 and 0.5005 in.

15.2 Fit the sealing ring to the piston stop and the sealing rings and supporting piston rings to the piston head.

NOTE

If new piston rings are fitted they are to be gapped 0.009 to 0.012 in on assembly and the sharp edges at the gap, on the flat faces only, removed up to a maximum radius of 1/64 in.

15.3 Secure the piston rod in the collet ST1214-4 and vice clamp ST1214.

15.4 Slide the piston head over the piston stop and screw the piston stop into the piston rod until the split pin holes exactly align. Ensure that the piston head end float is 0.100 to 0.110 in. Lock the piston stop with the split pin.

NOTE

When fitting the split pin, ensure that the head does not protrude more than 0.200 in from the piston rod. Cut off the end of the pin to within 0.100 to 0.200 in of the rod and splay the ends just sufficiently to retain the pin.

15.5 Insert the piston sub-assembly in the cylinder using the sleeve ST1754.

15.6 Assemble the O-ring, wiper ring, the gland ring and spacer to the gland nut. Secure the gland nut and spacer with the circlip using the circlip pliers ST947 MkA. Slide the gland nut assembly carefully over the piston rod and screw the nut tightly into the cylinder using C-key spanner ST1337. Lock the gland nut with the wire locking ring.

15.7 If necessary, press a new bush into the eyebolt and check ream to between 0.4995 and 0.5005 in. Screw the lubrication nipple into the eyebolt. Screw the locknut onto the eyebolt, locate the spanner grip and screw the eyebolt and bush sub-assembly into the piston rod to give a closed centres dimension of 17.100 to 17.500 in.

NOTE

Final adjustment and locking will be made on installation.

15.8 Assemble the bonded seals to the extension sub-assembly and secure it with the banjo bolt to its respective boss. The extension sub-assembly is to be positioned against the cylinder for transit and storage purposes. Screw the bleed screw into the extension sub-assembly.

15.9 Assemble the pipe sub-assembly to the banjos of connection 2 and the third connection, and secure them, together with the bonded seals, to their bosses with their appropriate banjo bolt. Screw the bleed screw into the banjo bolt.

15.10 After final assembly and test, wirelock the bleed screws, banjo bolts and the banjos together.

TESTING

Special tools and test equipment

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

Part No	Description	Application
-	Static hydraulic test rig (with power pump capable of delivering 3.45 gal/min)	Apply hydraulic pressure

Testing the unit (Fig 1)

17 The pipes between the test rig and the unit under test must be 3/8 in outside diameter for metal pipes and 3/8 in nominal diameter for flexible hose. Ensure the unit is hydraulically full and bled free of air. Using the equipment specified in paragraph 16, carry out the following test procedure:

17.1 Connect the supply line of the static hydraulic test rig to connection 1 and apply pressure to fully extend the jack. Gradually increase the pressure to 4950 lbf/in^2. Leakage must not occur.

17.2 Decrease the pressure to 2000 lbf/in^2 and insert a 0.50 in diameter pin (class X fit) into the end plug bush. The pin should rotate freely. Release the pressure and disconnect the supply line.

17.3 Connect the supply line to connection 2 and apply pressure to fully close the jack. Gradually increase the pressure to 4950 lbf/in^2. Leakage must not occur. Release the pressure and disconnect the supply line.

17.4 Connect the supply line of the power pump rig to connection 1 and apply pressure to fully extend the jack. The pressure required to extend the jack must not exceed 140 lbf/in^2 and the time required must not exceed six seconds. Release the pressure and disconnect the supply line.

17.5 Connect the supply line to connection 2 and apply pressure to fully close the jack. The pressure required to close the jack must not exceed 180 lbf/in^2 and the time required must not exceed six seconds. Release the pressure and disconnect the supply line.

Annex A

NOSEWHEEL JACK

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

Part No 103031018

Leading particulars

1 Leading particulars of this unit are as follows:

1.1	System fluid	.. Oil OM15 (DTD585)
1.2	Closed centres	17.100 to 17.500 in
1.3	Stroke	12.050 to 12.120 in
1.4	Connections	0.125 in BSP

Modification state

2 The information in this annex includes all appropriate modifications up to and including issue 18.

Introduction

3 This unit is identical to that described and illustrated in the general text.

Annex B

NOSEWHEEL JACK

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

Part No 103020019

Leading particulars

1 Leading particulars of this unit are as follows:

1.1	System fluid	.. Oil OM15 (DTD585)
1.2	Closed centres	17.100 to 17.500 in
1.3	Stroke	12.050 to 12.120 in
1.4	Connections	0.125 in BSP

Modification state

2 The information in this annex includes all appropriate modifications up to and including issue 20.

Introduction

3 This unit is similar to that described and illustrated in the general text except for the fitment of a strengthened cylinder.

Annex C

NOSEWHEEL JACK

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

Part No 103021022

Leading particulars

1 Leading particulars of this unit are as follows:

1.1	System fluid	Oil OM15 (DTD585)
1.2	Closed centres	17.420 to 17.820 in
1.3	Stroke	11.730 to 11.800 in
1.4	Connections	0.125 in BSP

Modification state

2 The information in this annex includes all appropriate modifications up to and including issue 23.

Introduction

3 This unit is similar to the type described and illustrated in the general text but differs in the fitment of a strengthened cylinder and has dimensional differences in the piston stop which allow for a decrease in piston travel.

Assembling

4 In paragraph 15.7 of the general text, screw in the eyebolt and bush sub-assembly to give a closed centres dimension of 17.420 to 17.820 in.

Annex D

NOSEWHEEL JACK

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

Part No 103030020

Leading particulars

1 Leading particulars of this unit are as follows:

1.1	System fluid	Oil OM15 (DTD585)
1.2	Closed centres	17.420 to 17.820 in
1.3	Stroke	11.730 to 11.800 in
1.4	Connections	0.125 in BSP

Modification state

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

Introduction

3 This unit is similar to the type described and illustrated in the general text but differs in the fitment of a different piston rod sub-assembly with dimensional differences in the piston stop which allow for a decrease in piston travel.

Assembling

4 In paragraph 15.7 of the general text, screw in the eyebolt and bush sub-assembly to give a closed centres dimension of 17.420 to 17.820 in.

PARTS CATALOGUE AND RELATED INFORMATION

FOR

NOSEWHEEL JACK

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

Part No 103031018, 103020019, 103021022 and 103030020

MODIFICATION RECORD

Mod No	AL No	Mod No	AL No	Mod No	AL No	Mod No	AL No	Mod No	AL No	Mod No	AL No
AC3907	*										
AC4074	*										

* Incorporated in initial issue of Catalogue
NA Mod not applicable to this Catalogue
C Mod cancelled
AS Amendment Sheet

PARTS CATALOGUE AND RELATED INFORMATION (TOPIC 3)

MEMORANDUM OF INSTRUCTIONS

Demands

1 Requirements for demands are:

1.1 The demand must quote the appropriate Reference Number for each item. Unreferenced parts are not normally provisioned as spares and demands for such items must quote the maker's Part Number and the name and type of the equipment. The location of each part within the equipment should be clearly indicated.

1.2 Demands are to be prepared in accordance with the procedure laid down in AP 830 Volume 1 or BR4.

Local manufacture

2 Parts annotated 'LM' are to be manufactured from local resources. If the manufacture of such items is beyond the capacity of the Unit, the demand is to be endorsed 'Unable to manufacture locally'.

Major repair

3 'MR' indicates that an item is required for major repair purposes only and will not normally be held in store by Units other than those authorised to undertake major repair of the equipment.

Units per assembly

4 The number quoted is the quantity required per next higher assembly in the position shown except 'attaching parts' which quote the quantity required to attach one item. The letters 'AR' in the 'Units per Assy' column indicate that the quantity is 'as required'. Where applicable the quantity normally fitted is shown as a nominal figure, eg (Nom 3). Where an item is listed only for reference purposes the letters 'RF' are quoted.

Classification of equipment

5 The Class of Store is indicated by a single letter as laid down in AP 830 Volume 1 or BR4.

Fitting code (FC)

6 The FC is indicated by one of the following letters and is only quoted against parts which are not directly interchangeable:

V Open up holes on assembly
W Partially assembled
X Ream or machine on assembly
Y Drill or drill and tap on assembly
Z Trim on assembly

Obsolescent stock

7 An asterisk in the 'Part No' column indicates that no further purchases of the item will be made but the part is to be used until stocks are exhausted.

Modifications

8 When items are affected by a modification the 'Mod No' is quoted in the description. Modifications incorporated in the catalogue are listed in the Modification Record.

Manufacturers NATO code

9 The NATO supply code for manufacturers is an alpha-numeric code for non-US based approved manufacturers and a numeric code for US based approved manufacturers. Manufacturers details related to a specific code are contained in the following publications available from DCA, Kentigern House, 65 Brown Street, Glasgow G2 8EX.

99-H4-1 Name to Code
99-H4-2 Code to Name

Usage code

10 The usage code column is normally left blank indicating full applicability of all items. Where a code letter is shown, it indicates that all items with that letter form part of the same assembly or sub-assembly.

INDEX OF PART NUMBERS

Part Number	DMC	Reference Number	Fig/Index	C of S or LM	FC
AGS1129B	28F	4730-99-9439533	1-8	C	
AGS1174	28F	4730-99-9128952	1-1	C	
AGS1186B	28F	5330-99-9428453	1-3	C	
AGS1213B	28F	4730-99-9143383	1-7	C	
AGS1220B	28F	4730-99-1284011	1-5	C	
AGS596A	28N	5340-99-9128964	1-38	C	
C3654Y3	27Q	4320-99-4118187	1-19	C	
C3836Y11	27Q	4320-99-4118189	1-9	C	
C7583Y2			1-37		
C7583Y5			1-25		
C8264Y3	27Q	4320-99-4118211	1-28A	C	
C8264Y4			1-25A		
C8264Y5	27Q	4320-99-4118201	1-27	C	
D7583Y4	27Q	4730-99-4118185	1-4	C	
GD1218-1			1-39		
SP21	28N	4730-99-9156370	1-13	C	
SP266-19	27Q	5365-99-4118178	1-22	C	
SP584-92	27Q	5330-99-4118193	1-33	C	
SP597-87	27QA	5310-99-4118199	1-29	C	
SP597-88	27QA	5310-99-4118200	1-31	C	
SP818-5	27QA	4320-99-4118195	1-21	C	
SP820-10C	27Q	5315-99-4118196	1-18	C	
SP836-2	27Q	5340-99-4118192	1-32	C	
SP9E10			1-26		
SP900-21	27QA	5330-99-1011353	1-36	C	
SP900-22	27QA	5330-99-1048955	1-20	C	
04532Y016	27Q	3120-99-4118180	1-12	C	
04532Y017			1-15		
07583Y007			1-37A		
100002032	27Q	9905-99-9154510	1-10A	C	
103020019	27QM	1650-99-4680125	1	P	
103020119			1-11A		
103021022	27QM	1650-99-4680126	1	P	
103021122			1-11B		
103030020			1		
103030120			1-11C		
103031018			1		
103031118			1-11		
2000Y135			1-10		
3654Y10	27Q	4320-99-4118198	1-30	C	
3654Y15			1-17		

INDEX OF PART NUMBERS

Part Number	DMC	Reference Number	Fig/Index	C of S or LM	FC
3654Y4	27Q	1650-99-4143679	1-23	C	
3654Y5	27Q	4320-99-4118203	1-28	C	
3836Y13	27Q	4730-99-1233703	1-2	C	
3836Y16	27Q	4320-99-4118190	1-35	C	
4532Y12	27Q	3120-99-4118182	1-14	C	
4532Y5	27Q	5310-99-4118186	1-16	C	
4532Y8	27Q	5315-99-4118177	1-34	C	
5400389	27Q	5330-99-4668641	1-24	C	
750060121			1-36A		
750060122	27QA	5330-99-1048955	1-20A	C	
80771			1-6		

DETAILED PARTS LIST

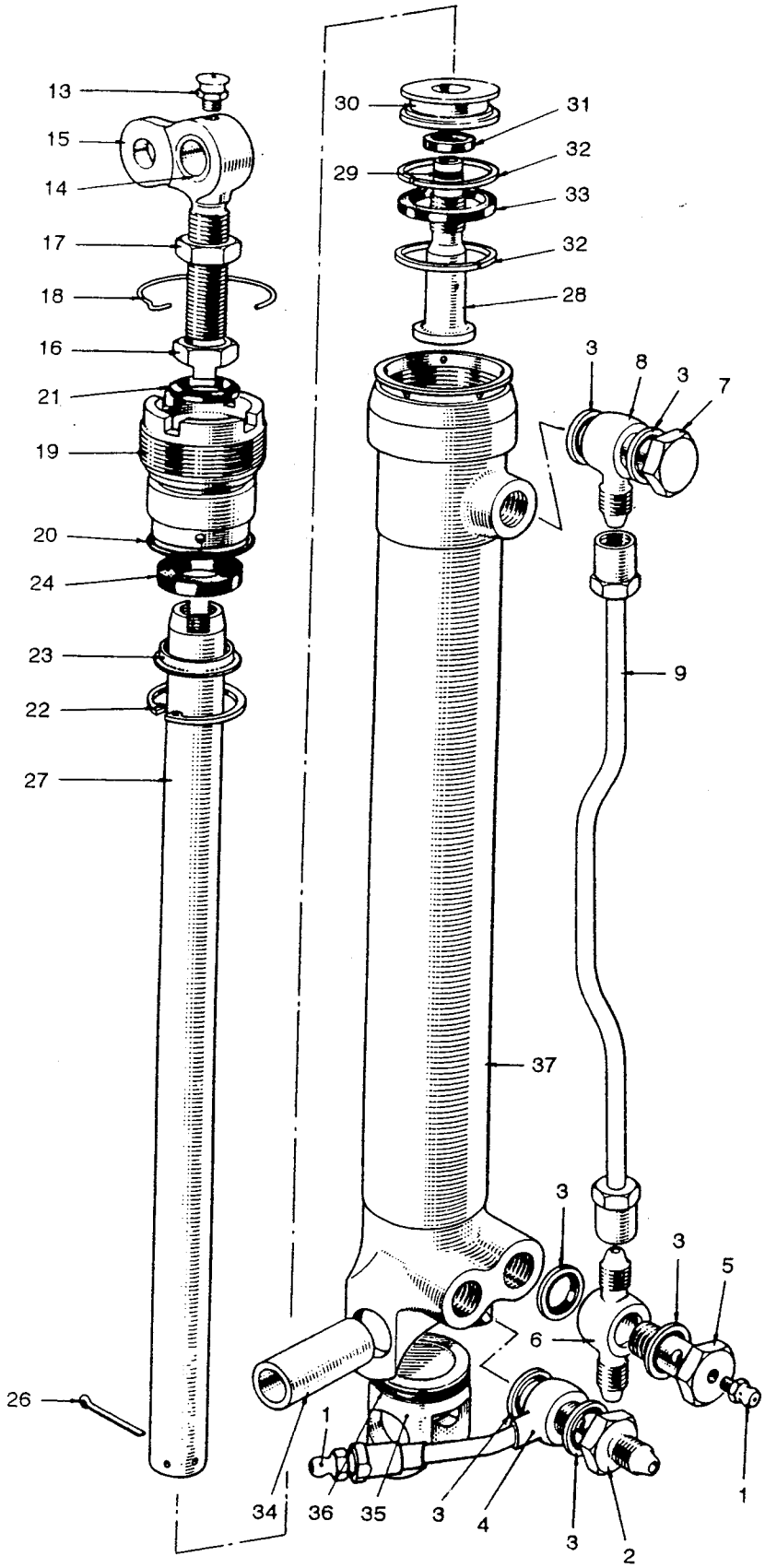

Fig 1 Nosewheel jack

NOSEWHEEL JACK

Fig/ Index No	Part No	1 2 3 4 5 6 Nomenclature	Mnfrs NATO Code	Usage Code	Units per Assy
1	103031018	Jack, nosewheel (Pre Mod AC3907 and Mod AC4074)		A	RF
1+	103020019	Jack, nosewheel (Mod AC3907 and Mod AC4074)		B	RF
1+	103021022	Jack, nosewheel (Mod AC3907 and Mod AC4074)		C	RF
1+	103030020	Jack, nosewheel (Pre Mod AC3907 and Mod AC4074)		D	RF
-1	AGS1174	. Screw, bleed			2
-2	3836Y13	. Bolt, banjo			1
-3	AGS1186B	. Seal, bonded			6
-4	D7583Y4	. Extension sub-assembly			1
-5	AGS1220B	. Bolt, banjo			1
-6	80771	. Fitting, banjo			1
-7	AGS1213B	. Bolt, banjo			1
-8	AGS1129B	. Banjo			1
-9	C3836Y11	. Pipe sub-assembly			1
-10+	2000Y135 or	. Transfer (Alternative)			1
-10A+	100002032	. Label		BCD	1
-11+	103031118	. Jack sub-assembly		A	1
-11A+	103020119	. Jack sub-assembly		B	1
-11B+	103021122	. Jack sub-assembly		C	1
-11C+	103030120	. Jack sub-assembly		D	1
-12+	04532Y016	. . Eyebolt and bush sub-assembly			1

+ Item not illustrated

NOSEWHEEL JACK

Fig/ Index No	Part No	1 2 3 4 5 6 Nomenclature	Mnfrs NATO Code	Usage Code	Units per Assy
1-13	SP21	. . Nipple, lubrication			1
-14	4532Y12	. . . Bush			1
-15	04532Y017	. . . Eyebolt			1
-16	4532Y5	. . Grip, spanner			1
-17	3654Y15	. . Locknut			1
-18	SP820-10C	. . Ring, wire locking			1
-19	C3654Y3	. . Nut, gland			1
-20	SP900-22	. . O-ring			1
	or	(Alternative)			
-20A+	750060122	. . O-ring			1
-21	SP818-5	. . Ring, wiper			1
-22	SP266-19	. . Circlip			1
-23	3654Y4	. . Spacer			1
-24	5400389	. . Ring, gland			1
-25+	C7583Y5	. . Piston rod sub-assembly		AB	1
-25A+	C8264Y4	. . Piston rod sub-assembly		CD	1
-26	SP9E10	. . . Pin, split			1
-27	C8264Y5	. . . Rod, piston			1
-28	3654Y5	. . . Stop, piston		AB	1
-28A+	C8264Y3	. . . Stop, piston		CD	1
-29	SP597-87	. . . Ring, sealing			1
-30	3654Y10	. . . Head, piston			1
-31	SP597-88	. . . Ring, sealing			1
-32	SP836-2	. . Ring, piston			2

+ Item not illustrated

NOSEWHEEL JACK

Fig/ Index No	Part No	1 2 3 4 5 6 Nomenclature	Mnfrs NATO Code	Usage Code	Units per Assy
1-33	SP584-92	. . Ring, sealing			1
-34	4532Y8	. . Bush			1
-35	3836Y16	. . Plug, end			1
-36	SP900-21 or	. . O-ring (Alternative)			1
-36A+	750060121	. . O-ring			1
-37	C7583Y2	. . Cylinder (Pre Mod AC3907)		AD	1
-37A+	07583Y007	. . Cylinder (Mod AC3907)		BC	1
-38+	AGS596A	. Cap, dust (Storage and transit)			2
-39+	GD1218-1	. Washer, sealing (Storage and transit)			2

+ Item not illustrated