MWS

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SEQUENCE VALVE DOWTY AEROSPACE HYDRAULICS Part Nos 08950YB02, 08950YB04 and 08950YB05

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

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence

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ROYAL AIR FORCE BY DGSM (RAF)

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AP100B-01, Order 0504 (RAF)

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GENERAL

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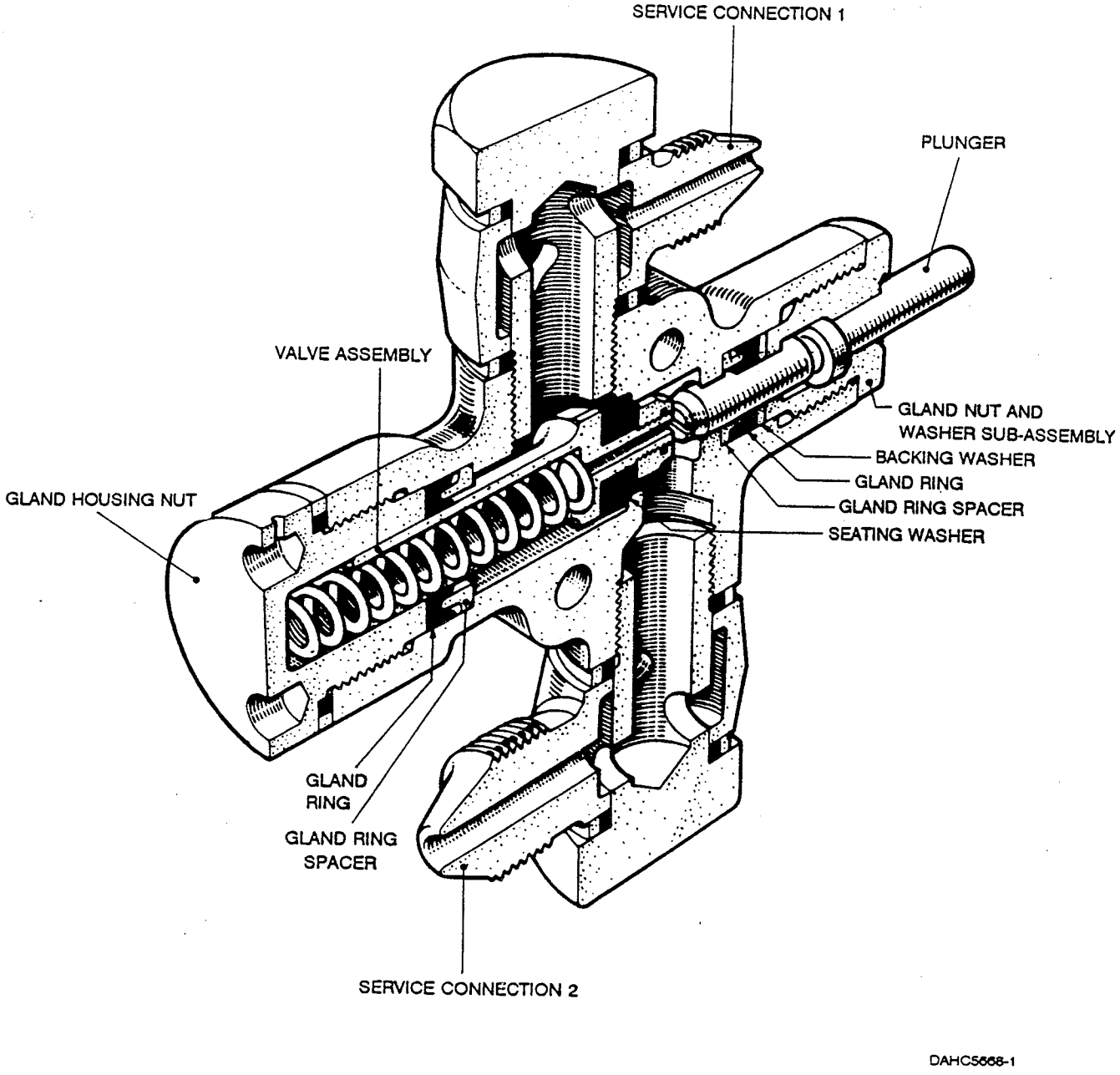

Fig 1 Sequence valve

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

3 This sequence valve is used to mechanically sequence the operation of two services in one mode of operation while permitting simultaneous operation in the reverse selection. A basic unit is described and illustrated and variants are given in the annexes.

Constructional description (Fig 1)

4 The sequence valve has a body which houses a sequence valve assembly and a plunger and receives the service connections 1 and 2. The connections comprise banjos, which are fitted with bonded seals and secured by banjo bolts.

5 The sequence valve assembly consists of a spring-loaded valve stem fitted with a rubber seating washer secured by a self-locking nut. The valve stem is guided in the bore by a gland housing nut, which is screwed into the body against a bonded seal and retains a gland ring and a gland ring spacer.

6 The plunger, which is opposed to the valve stem, passes through a gland assembly comprising a gland ring, a gland ring spacer and a backing washer. These are held in position by a gland nut and washer sub-assembly, which acts as a guide for the plunger.

Functional description (Fig 1)

7 When supply fluid is present at the service connection 1, the valve assembly is seated and the flow is arrested until the plunger is depressed. With the reversal of the flow, the fluid pressure at the service connection 2 overcomes the pressure of the spring to lift the valve assembly.

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
ST1043	Sleeve	Assembling
ST1081	Peg spanner	Dismantling/Assembling

Part No	Description	Application
ST1328	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)

WARNING

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

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

10.1 Remove the service connections 1 and 2 comprising the banjo bolts, banjo unions and bonded seals.

10.2 Remove the gland nut and washer sub-assembly and the plunger. Withdraw the backing washer, the gland ring and the gland ring spacer.

10.3 Using the peg spanner ST1081, remove the gland housing nut and the bonded seal. Withdraw the spring and the valve assembly together with the gland ring and the gland ring spacer from the body.

10.4 Remove the gland ring and the gland ring spacer from the valve assembly. The valve assembly should not be further dismantled.

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 fits and clearances paragraph 15.

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.

Checking data

14 Spring 500Y6

14.1 Number of working coils: 22

14.2 Wire size: 0.064 in (16 SWG)

14.3 Free length: 1.98 to 2.02 in

14.4 Check length: 1.545 to 1.575 in

14.5 Load at check length: 27 to 34 lbf.

Fits and clearances

15 Check that the dimensions are within the specified limits.

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	VALVE STEM IN GLAND HOUSING NUT						
	Gland housing nut i/d	0.4395 / 0.4385	0.4415	0.4415	0.0020 / 0.0060	0.0080	
	Valve stem o/d	0.4365 / 0.4335	-	-			
2	PLUNGER IN GLAND NUT AND WASHER SUB-ASSEMBLY						
	Gland nut and washer sub-assembly i/d	0.1880 / 0.1870	0.1895	0.1895	0.0005 / 0.0045	0.0060	
	Plunger o/d	0.1865 / 0.1835	-	-			

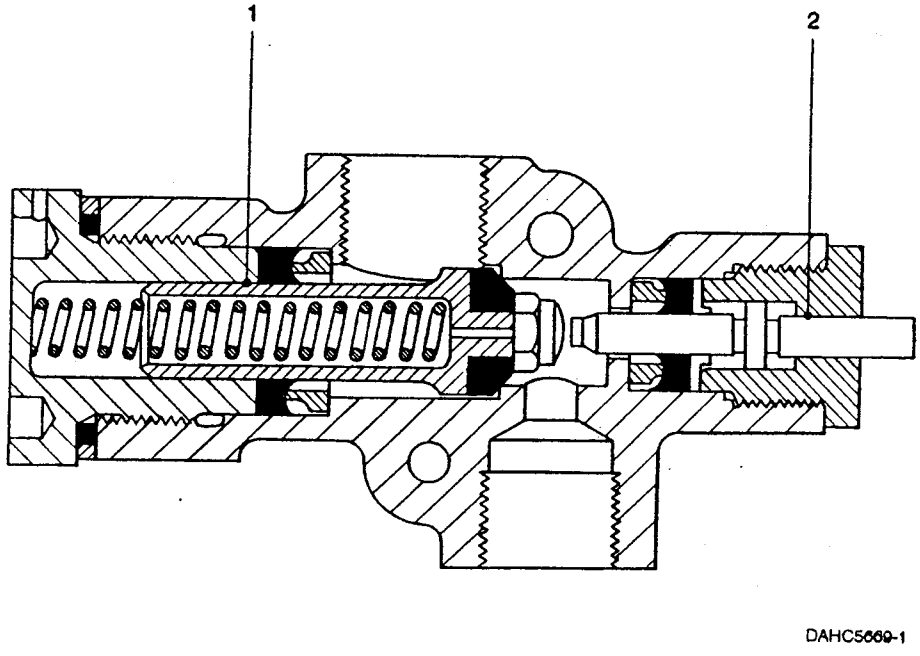

Fig 2 Fits and clearances

Assembling (Fig 1)

16 Lubricate the parts with clean oil OM15 before assembling the unit.

16.1 Insert the valve assembly in the body followed by the gland ring spacer, flange leading. Using sleeve ST1043, assemble the gland ring to the valve assembly and body.

16.2 Position the spring in the bore of the valve assembly. Fit the bonded seal to the gland housing nut and screw the gland housing nut tightly into the body over the valve assembly.

16.3 Insert the gland ring spacer, flange leading, the gland ring using sleeve ST1328 and the backing washer in the body.

16.4 Carefully insert the plunger through the gland assembly, slotted end leading. Pass the gland nut and washer sub-assembly over the plunger and screw it into the body.

16.5 Screw the gland nut and washer sub-assembly tightly into the body using peg spanner ST1081 and check that there is 0.020 to 0.120 in free movement of the plunger.

16.6 Assemble a bonded seal, a banjo and a second bonded seal to each banjo bolt. Screw the banjo bolt into the body and align the banjos connections with the valve axis and pointing to the gland housing nut end.

16.7 After satisfactory testing, the gland nut and washer sub-assembly, banjo bolts and the gland housing nut must be wirelocked to the body.

NOTE

When installing the valve in the aircraft, ensure that the plunger can be depressed by a dimension of 0.090 to 0.190 in after taking up the free movement.

TESTING

Special tools and test equipment

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

Part No	Description	Application
-	Static hydraulic test rig	Apply hydraulic pressure

Testing the unit

18 The unit and test circuits must be hydraulically full and bled free of air before commencing the test.

18.1 Connect the test rig supply line to the service connection 1 and gradually apply a pressure of 4500 lbf/in^2. Slight leakage is permissible from the service connection 2. Release the pressure.

18.2 Apply a pressure of 10 lbf/in^2 then increase it gradually to 3000 lbf/in^2. Leakage from the service connection 2 should not exceed 0.18 cm^3/min. Release the pressure by depressing the plunger.

NOTE

Plunger movement is to be smooth and must be completed in not less than three seconds.

18.3 With the plunger depressed, a free flow of fluid should be possible from the service connection 2 and the flow should cease when the plunger is released.

18.4 Repeat operation 18.3 at least three times, then repeat operation 18.2 to ensure that the leakage rate has not increased. Disconnect the supply line.

18.5 Connect the test rig supply line to the service connection 2 and apply a maximum pressure of 300 lbf/in^2. Fluid should flow in a continual trickle from the service connection 1 at this pressure. Release the pressure.

18.6 Blank off the service connection 1 and gradually apply a pressure of 4950 lbf/in^2. Leakage must not occur. Release the pressure, disconnect the supply line and remove the blanking cap.

Annex A

SEQUENCE VALVE

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

PART NUMBER 08950YB02

Leading particulars

1 Leading particulars for this unit are as follows:

1.1	Fluid	Oil OM15
1.2	Connections	0.250 in BSP

Modification state

2 The information in this annex includes all appropriate modifications up to and including issue 10.

Introduction

3 This unit is similar to that described and illustrated in the general text except that both connections are orientated towards the gland housing nut.

Annex B

SEQUENCE VALVE

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

PART NUMBER 08950YB04

Leading particulars

1 Leading particulars for this unit are as follows:

1.1	Fluid	Oil OM15
1.2	Connections	0.250 in BSP

Modification state

2 The information in this annex includes all appropriate modifications up to and including issue 10.

Introduction

3 This unit is similar to that described and illustrated in the general text except that service connection 1 is orientated as shown.

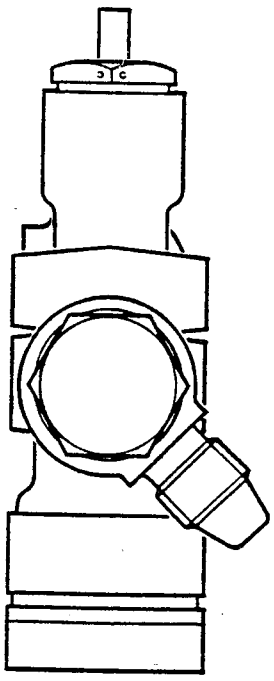

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Fig 1 Connection orientation

Annex C

SEQUENCE VALVE

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

PART NUMBER 08950YB05

Leading particulars

1 Leading particulars for this unit are as follows:

1.1	Fluid	Oil OM15
1.2	Connections	0.125 in BSP

Modification state

2 The information in this annex includes all appropriate modifications up to and including issue 7.

Introduction

3 This unit is similar to that described and illustrated in the general text except that the banjo connections are smaller and are both orientated towards the plunger end of the unit.

PARTS CATALOGUE AND RELATED INFORMATION

FOR

SEQUENCE VALVE

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

Part Nos 08950YB02, 08950YB04 and 08950YB05

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
AC4394	*										

* 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
AGS1186C	28F	5330-99-1358971 OR 7703505	DL1 1-2	C	
AGS1186E			1-16	C	
AGS1213C	28F	4730-99-9140977	1-1	C	
AGS596A	28N	5340-99-9128964	1-22	C	
AGS596B	28N	5340-99-9143884	1-22A	C	
C3942Y2			1-21		
SP880A			1-23		
SP880B			1-23A		
08950YB01			1-4		
08950YB02	27QM	4820-99-4117681	1	P	
08950YB04	27QM	4820-99-4117688	1	P	
08950YB05	27QM	4820-99-4117685	1	P	
08950Y008			1-10		
08950Y009			1-9		
08950Y010	27Q	4820-99-4117674	PA1 1-8	C	
08950Y021			1-7		
2000Y15		5340-99-4170071	1-5	C	
2000Y36			1-6		
2228Y5	27Q	5365-99-4117667	FL4 1-14	C	
400Y2	27Q	4730-99-4117684	1-3A	C	
401Y1	27Q	4730-99-4117659	1-3	C	
402Y6	27Q	5365-99-4117668	1-19	C	
402Y8	27Q	5365-99-4117662	FC6 1-15	C	
402Y9	27Q	4820-99-4117671	FA5 1-20	C	
500Y6		5360-99-4143188	FB2 1-17		
5400155	27Q	5330-99-4117664	PE3 1-18	C	
5400382	27Q	5330-99-4117665	FL6 1-13	C	
8950Y3	27Q	5365-99-4117676	FC2 1-12	C	
8950Y4	27Q	4820-99-4117675	FD5 1-11	C	

DETAILED PARTS LIST

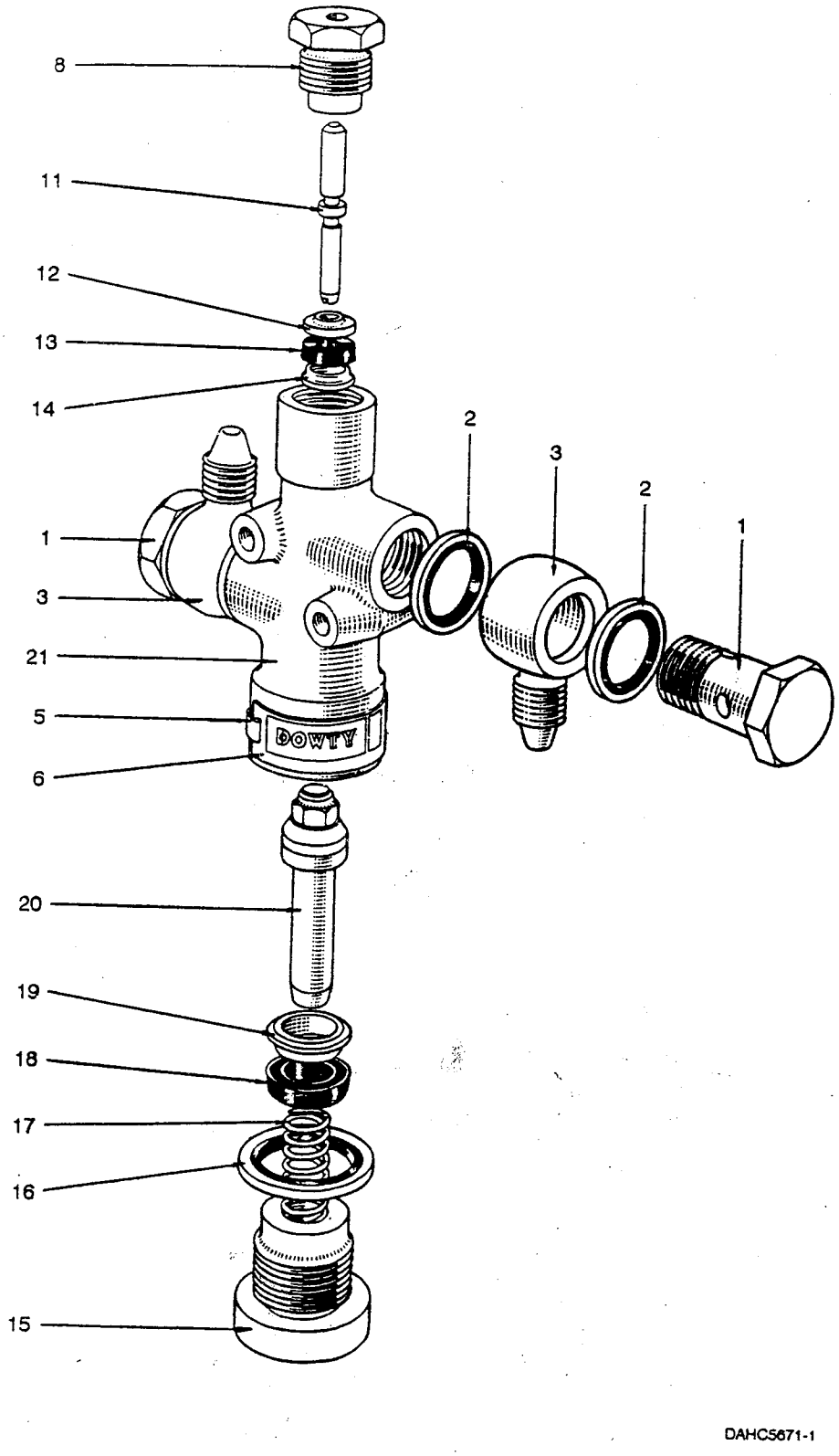

Fig 1 Sequence valve

SEQUENCE VALVE

Fig/ Index No	Part No	1 2 3 4 5 6 Nomenclature	Mnfrs NATO Code	Usage Code	Units per Assy
1	08950YB02	Valve, sequence (Mod AC4394)		A	RF
1+	08950YB04	Valve, sequence (Mod AC4394)		B	RF
1+	08950YB05	Valve, sequence (Mod AC4394)		C	RF
-1	AGS1213C	. Bolt, banjo			2
-2	AGS1186C	. Seal, bonded			4
-3	401Y1	. Banjo		AB	2
-3A+	400Y2	. Banjo		C	2
-4+	08950YB01	. Valve unit, sequence			1
-5	2000Y15	. . Strap			1
-6	2000Y36	. . Nameplate			1
-7+	08950Y021	. . Valve assembly, sequence			1
-8	08950Y010	. . . Gland nut and washer assembly			1
-9+	08950Y009	. . . . Washer			1
-10+	08950Y008	. . . . Nut			1
-11	8950Y4	. . . Plunger			1
-12	8950Y3	. . . Washer, backing			1
-13	5400382	. . . Ring, gland			1
-14	2228Y5	. . . Spacer, gland ring			1
-15	402Y8	. . . Nut, gland housing			1
-16	AGS1186E	. . . Seal, bonded			1
-17	500Y6	. . . Spring			1

+ Item not illustrated

SEQUENCE VALVE

Fig/ Index No	Part No	1 2 3 4 5 6 Nomenclature	Mnfrs NATO Code	Usage Code	Units per Assy
1-18	5400155	. . . Ring, gland			1
-19	402Y6	. . . Spacer, gland ring			1
-20	402Y9	. . . Valve sub-assembly			1
-21	C3942Y2	. . . Body			1
-22+	AGS596A	. Cap, dust (Storage and transit)		C	2
-22A+	AGS596B	. Cap, dust (Storage and transit)		C	2
-23+	SP880A	. Washer, sealing (Storage and transit)		AB	2
-23A+	SP880B	. Washer, sealing (Storage and transit)		AB	2

+ Item not illustrated