MWS

AP 105B-0840-13

2nd Edition January 94
(Superseding AP 105B-0840-1
and Superseding Relevant Pages
of AP 4515B Vol 3 Pt 1 Sect 2 Chap 15)

OBSOLETE

HUNTER

SEQUENCE VALVE
DOWTY AEROSPACE HYDRAULICS
Part No D7375YMKB

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

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence

Sponsored for use in the ROYAL AIR FORCE BY DGSM (RAF)

**Prepared by Dowty Aerospace Hydraulics,
Arle Court, Cheltenham, GL51 0TP, England**

Dowty Aerospace Hydraulics is a business name of Dowty Aerospace Gloucester Limited

Publications authority: DDATP (RAF)

**Service users should send their comments through
the channel prescribed for the purpose in:**

AP100B-01, Order 0504 (RAF)

CONTENTS

GENERAL

CONTENTS

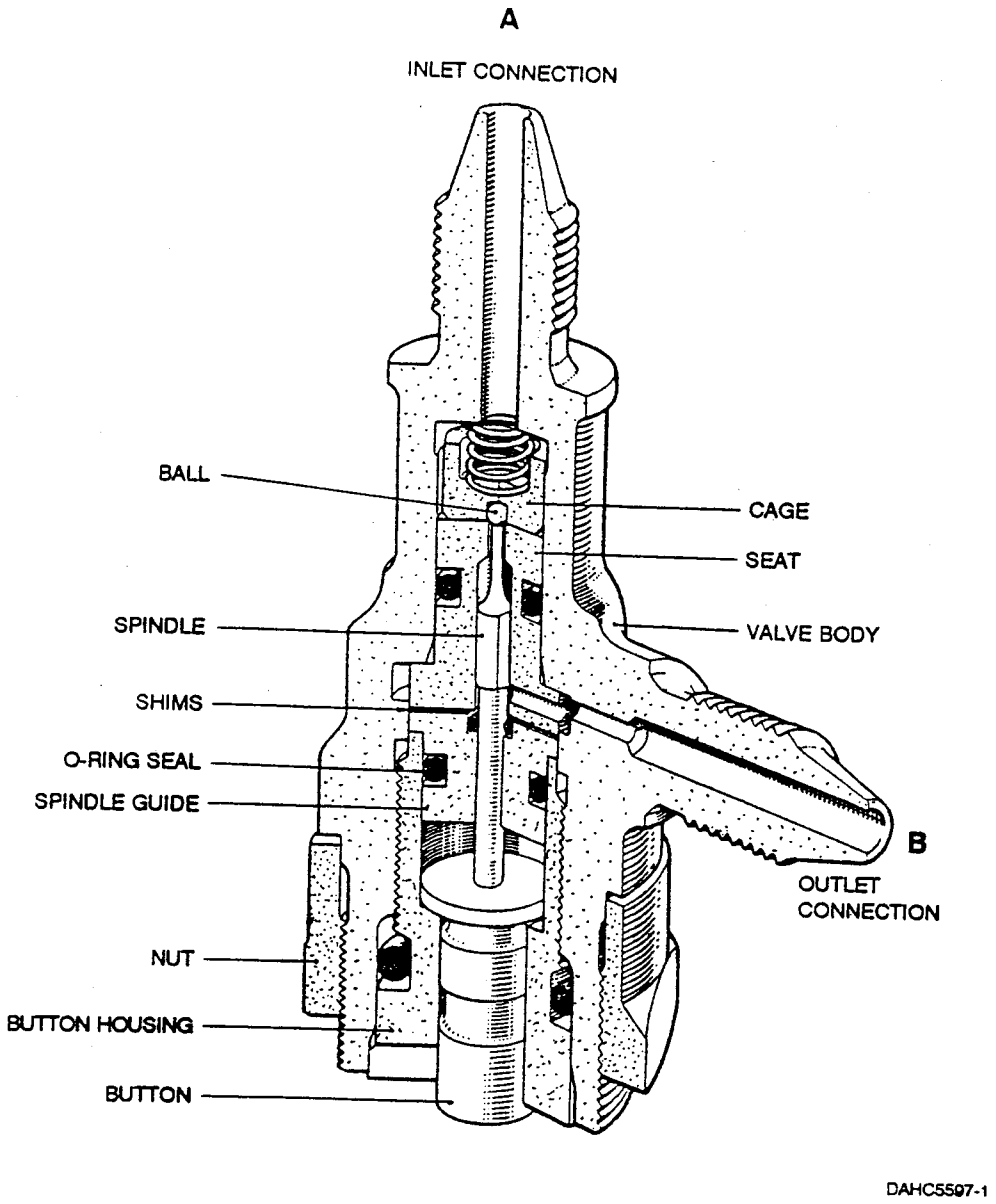


Fig 1 Sequence valve

Leading particulars

1 Leading particulars of this unit are as follows:

1.1	Test pressures:	
	Hydraulic	3000 lbf/in^2
	Gas	2000 lbf/in^2
1.2	Connections A and B	0.125 in BSP

Modification state

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

Introduction

3 This valve is fitted in a hydraulic system to ensure a correct sequence of operations in a service or alternatively to release pressure from a service.

Constructional description (Fig 1)

4 The inlet and outlet pipe connections are integral with the body which receives a button housing fitted with an O-ring seal and retains the valve details. A nut secures the sequence valve to a bulkhead or a bracket.

5 A fluted spindle is supported in a spindle guide below a seat. Shims are assembled between the seat and spindle guide for adjustment of the button housing relevant to the button, to meet installation requirements. A ball, in a spring loaded cage and ball sub-assembly, seals the central bore of the seat. Sealing is provided by O-ring seals fitted to the seat, spindle guide and button housing.

Functional description (Fig 1)

6 Hydraulic fluid under pressure at the inlet connection A is sealed off by the ball valve. When the button is pressed, the spindle lifts the ball from its seat and hydraulic fluid flows from the inlet connection, past the flat sides of the cage and through the seat to the outlet connection.

MAINTENANCE

Special tools and equipment

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

Part No	Description	Application
ST1952	Assembly post	Assembling
ST1995	Assembly post	Assembling

Part No	Description	Application
ST1996	Tubular key spanner	Dismantling/Assembling
-	Trichloroethane (TS367D)	Cleaning
-	White spirit (BS245)	Cleaning
-	Oil OM15 (DTD585)	Assembling
-	Corrosion preventative PX1	Preservation

Safety and maintenance notes

8 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)

9 Discard the O-ring seals after removal from the unit.

9.1 Remove the nut from the valve body.

9.2 Using the tubular key spanner ST1996, unscrew the button housing from the valve body. Remove the O-ring seal from the button housing.

9.3 Remove the button.

CAUTION

The ball is retained in the cage and ball sub-assembly by peening and must not be removed.

9.4 Using a suitable nylon rod inserted into connection A, push out the valve details. Separate the spindle guide, spindle, shim(s), seat, cage and ball sub-assembly and the spring.

9.5 Remove the O-ring seals from the spindle guide and the seat.

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.

10 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

11 Visually examine all parts for damage and corrosion. Check parts for permissible wear in accordance with fits and clearances, paragraph 14.

Superficial damage

12 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:

12.1 Not exceeding 0.500 in long.

12.2 Not exceeding 0.010 in deep.

12.3 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

13 Spring 500Y588

13.1 Number of working coils: 7

13.2 Wire size: 0.022 in (24 SWG)

13.3 Free length: 0.365 to 0.385 in

13.4 Check length: 0.250 in

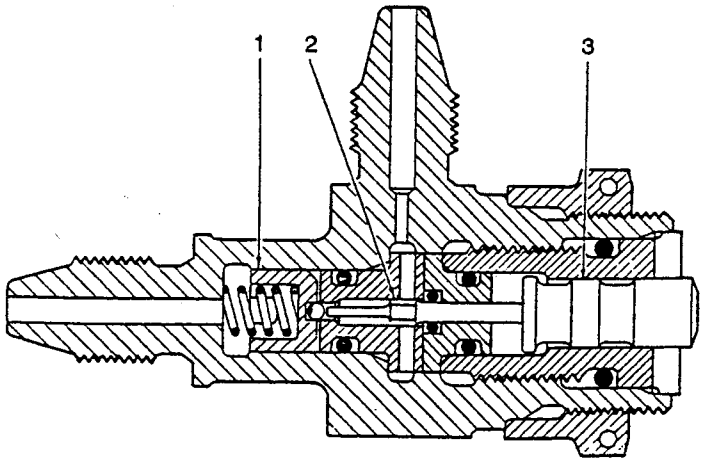
13.5 Load at check length: 1.500 to 1.600 lbf.

Fits and clearances (Fig 2)

14 Check that dimensions are within 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	CAGE IN VALVE BODY						
	Valve body bore	0.313 / 0.312	0.3135	0.3140	0.005 / 0.003	0.006	
	Cage o/d	0.309 / 0.308	0.3075	0.3070			
2	SPINDLE IN SEAT						
	Seat bore	0.09425 / 0.09325	0.0955	0.09700	0.00425 / 0.00225	0.007	
	Spindle o/d	0.09100 / 0.09000	0.0885	0.08725			
3	BUTTON IN BUTTON HOUSING						
	Button housing bore	0.2505 / 0.2495	0.2515	0.253	0.0045 / 0.0025	0.007	
	Button o/d	0.2470 / 0.2460	0.2445	0.2435			



DAHC5593-1

Fig 2 Fits and clearances

Assembling (Fig 1)

15 Lightly lubricate all O-ring seals with clean oil OM15 before assembling into the unit.

15.1 Assemble in a suitable fixture, the cage and ball sub-assembly, the seat, spindle and spindle guide, the button and the button housing. The button, spindle and ball must abut one another.

15.2 Measure the protrusion of the button from the face of the button housing. Calculate the thickness of shim(s) required between the seat and the spindle guide to produce a button protrusion of 0.040 to 0.060 in. A maximum of two shims may be installed.

15.3 Insert the calculated thickness of shim(s) into the assembled details between the seat and the spindle guide. Check that the button protrusion is between 0.040 and 0.060 in. Separate the assembled details.

15.4 Locate the spring in the cage and ball sub-assembly and insert into the valve body, spring leading.

15.5 Assemble the O-ring seal to the seat using assembly post ST1952 and insert the seat into the valve body, flange trailing.

15.6 Locate the spindle in the seat, fluted end leading. Place the shim(s), if any, over the spindle onto the seat.

15.7 Assemble the O-ring seals to the spindle guide using the assembly post ST1952 for the external O-ring seal. Locate the spindle guide in the valve body over the spindle, flange leading.

15.8 Use the assembly post ST1995 to assemble the O-ring seal to the button housing and insert the button, flange trailing, into the button housing.

15.9 Carefully screw the button housing into the valve body to engage the spindle guide. Use the tubular key spanner ST1996 to tighten the button housing.

15.10 Test the sequence valve as detailed in paragraph 17.

15.11 Screw the nut onto the valve body.

15.12 Peen the adjacent metal of the valve body into the slot of the button housing to lock.

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 (Oil OM15 (DTD585))	Apply hydraulic pressure

Testing the unit (Fig 1)

17 Using the equipment specified in paragraph 16, carry out the following test procedure. During the tests using hydraulic fluid, the unit under test and the test circuit must be hydraulically full.

17.1 Connect the hand pump supply line of the hydraulic test rig to the inlet connection A and apply a pressure of 68.9 bar (1000 lbf/in^2). Check the dimension between the end of the button and the button housing at this pressure. This should be within the limits of 1.020 to 1.520 mm (0.040 to 0.060 in).

17.2 Reduce the pressure to 20.7 bar (300 lbf/in^2). Press the button and the pressure should be released from the outlet connection. It must be possible to pass fluid freely from the inlet connection to the outlet connection. Release the button and the flow should cease. Release the pressure.

17.3 Gradually apply and maintain a pressure of 341.3 bar (4950 lbf/in^2). Leakage must not occur. Release the pressure and remove the blanking cap. Release the pressure.

17.4 Blank off the outlet connection and press the button. With the button pressed, gradually apply a pressure of 341.3 bar (4950 lbf/in^2). Allow one minute to elapse and then calibrate any leakage from the unit. This must not exceed 10 drops per minute. Release the button.

17.5 Apply a pressure of 34.5 bar (500 lbf/in^2) and check that the ball is seating satisfactorily. Release the pressure, disconnect the supply line and drain the unit.

17.6 Continue with the assembly procedure recommencing at sub-para 15.11.

PARTS CATALOGUE AND RELATED INFORMATION

FOR

SEQUENCE VALVE

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

Part No D7375YMKB

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
AC3820	*										
AC4324	*										

* 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

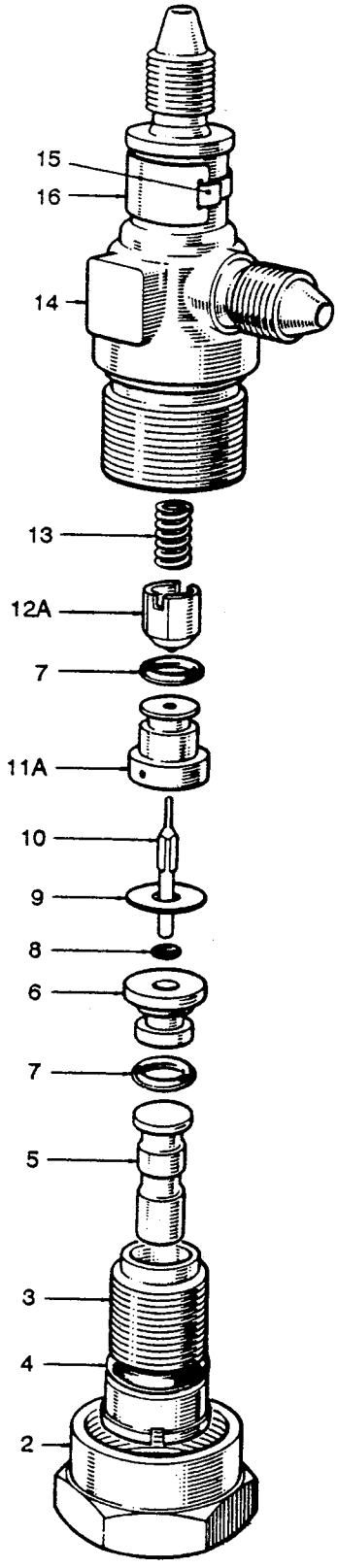
Usage code

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
AGS596A	28N	5340-99-9128964	1-17		
D7375YMKB			1		
D7375Y1MKB			1-1		
D7375Y10			1-12		
SP880A	27QA	5330-99-1029282	1-18		
SP900-1-2	27QA	5330-99-4117699	1-8		
SP900-3	27QA	5330-99-9440406	1-7		
SP900-8	27QA	5330-99-9439918	1-4		
07375Y013	27Q	4820-99-4117695	1-12A		
2000Y15		5340-99-4170071	1-15		
2000Y168		9905-99-4140173	1-16		
3300Y2074		1650-99-4140174	1-11A		
4930Y10			1-14		
4930Y11			1-14A		
4930Y7	27Q	5310-99-4117648	1-2		
500Y588		5360-99-4140177	1-13		
7375Y3		4820-99-4117702	1-11		
7375Y4	27Q	1650-99-4140171	1-6		
7375Y5		1650-99-4140176	1-10		
7375Y6		1650-99-4140170	1-5		
7375Y7	27Q	1650-99-4140172	1-3		
7375Y8	27Q	5365-99-4117703	1-9		
750060103	27QA	5330-99-9440406	1-7A		
750060108	27QA	5330-99-9439918	1-4A		
750060606			1-8A		

DETAILED PARTS LIST



DAHC6013-1

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	D7375YMKB	Valve, sequence			RF
-1+	D7375Y1MKB	. Valve assembly, sequence			1
-2	4930Y7	. . Nut			1
-3	7375Y7	. . Housing, button			1
-4	SP900-8	. . Seal, O-ring			1
	or	(Alternative)			
-4A+	750060108	. . Seal, O-ring			1
-5	7375Y6	. . Button			1
-6	7375Y4	. . Guide, spindle			1
-7	SP900-3	. . Seal, O-ring			2
	or	(Alternative)			
-7A+	750060103	. . Seal, O-ring			2
-8	SP900-1-2	. . Seal, O-ring			1
	or	(Alternative)			
-8A+	750060606	. . Seal, O-ring			1
-9	7375Y8	. . Shim			2 max
-10	7375Y5	. . Spindle			1
-11+	7375Y3	. . Seat (Pre Mod AC3820)			1
-11A	3300Y2074	. . Seat (Mod AC3820)			1
-12+	D7375Y10	. . Cage and ball sub-assembly (Pre Mod AC4324)			1
-12A	07375Y013	. . Cage and ball sub-assembly (Mod AC4324)			1
-13	500Y588	. . Spring			1
-14	4930Y10	. . Body, valve			1
	or	(Alternative)			
-14A+	4930Y11	. . Body, valve			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
1-15	2000Y15	. Strap, nameplate			AR
-16	2000Y168	. Nameplate			1
-17+	AGS596A	. Cap, dust (Storage and transit)			2
-18+	SP880A	. Washer, sealing (Storage and transit)			2

+ Item not illustrated