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PRESSURE RELIEF VALVE DOWTY AEROSPACE HYDRAULICS Part Nos 100051034 and 100051035

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

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence

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AP100B-01, Order 0504 (RAF)

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GENERAL

CONTENTS

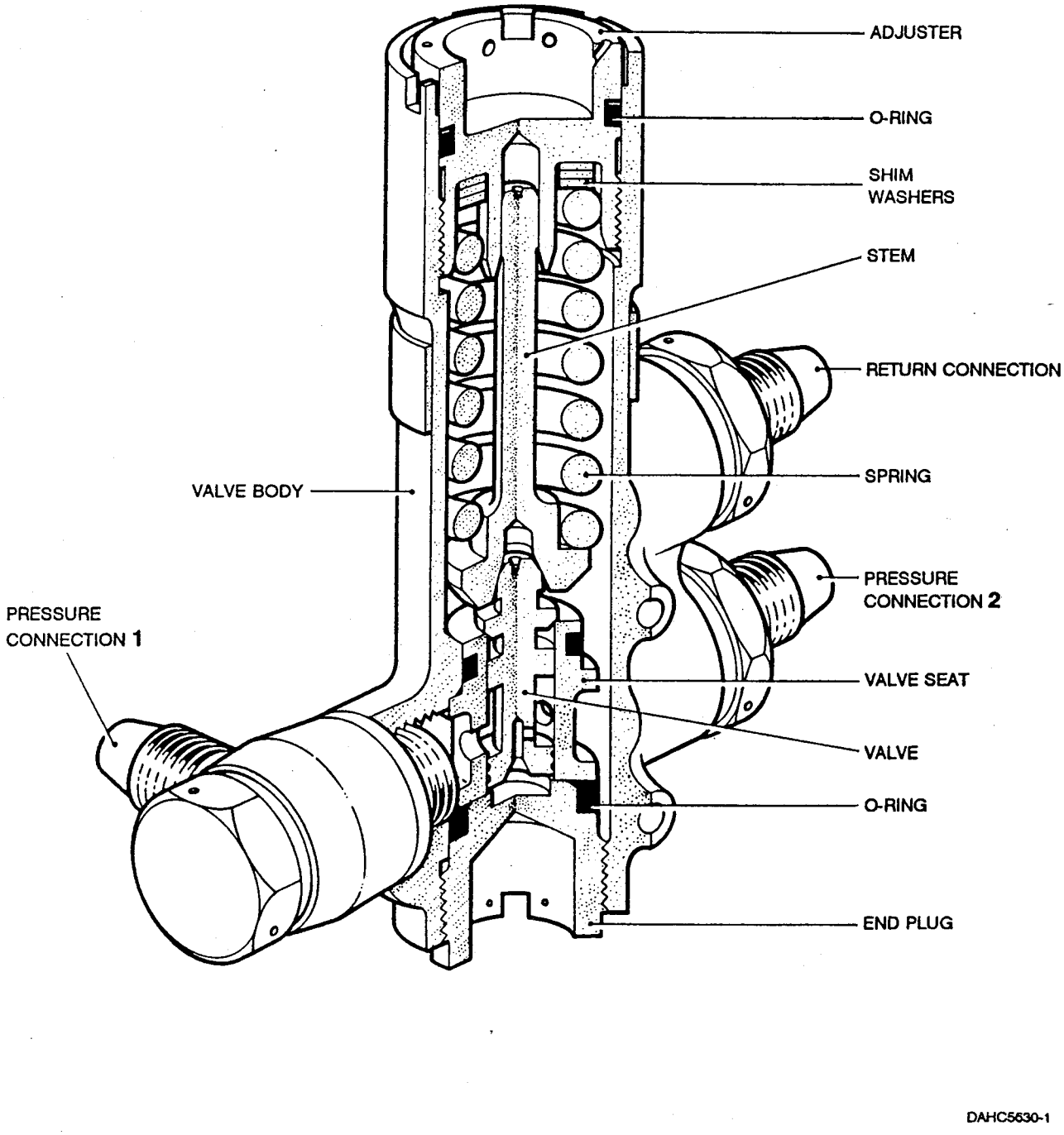

Fig 1 Pressure relief valve

Leading particulars

1 Refer to the appropriate annex for the relevant leading particulars.

Modification state

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

Introduction

3 This valve is included in the hydraulic system to permit excess pressure in the fluid supply lines to pass to the return line. A basic unit is described and illustrated in the general text with variants covered in the annexes.

Constructional description (Fig 1)

4 The connections consist of standard adapters and a banjo connection fitted with bonded sealing washers. At one end of the valve body is an adjuster and the other end is sealed with an end plug.

5 A flanged valve seat, which houses a valve, is secured in one end of the valve body by the end plug. Sealing O-rings are fitted to the end plug and the valve seat. The valve is held on the valve seat by a spring-loaded stem located in a spigot of the adjuster. The spring is backed by shim washers which are used in conjunction with the adjuster to obtain the required relief setting.

Functional description (Fig 1)

6 System pressure fluid passes through the unit between connections 1 and 2 where it acts on and around the valve and valve seat. When system pressure increases beyond a predetermined value, it lifts the valve off the valve seat, against spring pressure, and the excess pressure is released into the return circuit. When the pressure reduces to the reseat value, the spring reasserts its influence on the valve to move it back onto the valve seat and restore the integrity of the pressure system.

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
ST111/23	Tommy bar	Use with ST1988
ST1921	C-key spanner	Dismantling/Assembling
ST1988	Tubular key spanner	Dismantling/Assembling

Part No	Description	Application
ST1989	Special drift	Dismantling
ST2508	Assembly post	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

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)

WARNING

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

9 Discard the bonded seals and O-rings on removal from the unit.

9.1 Remove the pressure connections and the return connection together with the bonded seals.

9.2 Remove the split pin and, using the tubular key spanner ST1988 and tommy bar ST111/23, unscrew and remove the adjuster. Remove the O-ring from the adjuster.

9.3 Withdraw the shim washers, spring, stem and valve.

9.4 Remove the end plug using C-key spanner ST1921 and remove the O-ring.

9.5 Use the special drift ST1989 to extract the valve seat: 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.

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 04651Y025:

13.1 Number of working coils: 6.25

13.2 Wire size: 0.276 in (2 SWG)

13.3 Free length: 2.57 to 2.61 in

13.4 Check length: 2.26 in

13.5 Load at check length: 725 to 885 lbf

Fits and clearances

14 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	STEM IN ADJUSTER						
	Adjuster i/d	0.255 / 0.250	0.257	0.260	0.020 / 0.010	0.025	
	Stem o/d	0.240 / 0.235	0.232	0.230			
2	VALVE IN VALVE SEAT						
	Valve seat i/d	0.50050 / 0.49950	0.50100	0.50125	0.00175 / 0.00025	0.00250	
	Valve o/d	0.49925 / 0.49875	0.49850	0.49800			

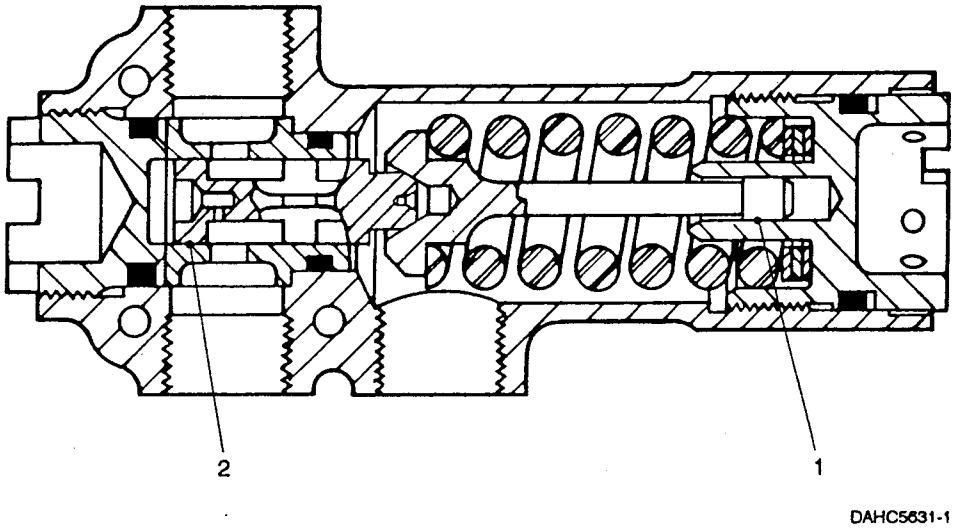

Fig 2 Fits and clearances

Assembling (Fig 1)

15 Lightly lubricate the bonded seals, O-rings and threaded parts with clean oil OM15 prior to assembly.

15.1 Assemble the O-ring to the valve seat. Insert the valve seat and the O-ring of the end plug into the valve body. Screw in the end plug using the C-key spanner ST1921.

15.2 Assemble the bonded seals to the pressure connections and the return connection and screw them into their respective bosses.

15.3 Carry out the requirements of the proof pressure test; refer to testing.

15.4 Insert the valve and locate it in the valve seat.

15.5 Position the stem on the valve and insert the spring.

15.6 Assemble the O-ring to the adjuster using assembly post ST2508 and locate the shim washers over the adjuster spigot. A maximum of three shim washers only are to be fitted.

15.7 Screw in the adjuster over the end of the stem using the tubular key spanner ST1988 and tommy bar ST111/23.

15.8 After satisfactory functional testing, insert a split pin through the slot in the valve body which aligns with the hole in the adjuster. Tap the split pin in until the eye run-out enters the adjuster. Splay the ends of the split pin out to 0.13 in approximately and wirelock the split pin to the nearest hole in the adjuster.

15.9 Lead seal the ends of the locking wire of the split pin and locate the lead seal below the end of the adjuster.

15.10 Wirelock the adapters, banjo bolt and the end plug to the valve body.

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
ST1947	Test plug	Proof pressure test
-	Static hydraulic test rig (with power pump capable of delivering 0.75 gal/min at 3000 to 3100 lbf/in^2)	Apply hydraulic pressure

Testing the unit

17 Using the equipment specified in paragraph 16, carry out the following test procedures. The unit under test and the test circuit must be hydraulically full before commencing the tests and the test fluid temperature must never exceed 45°C.

Proof pressure test

18

18.1 With the pressure relief valve assembled to the stage in paragraph 15.2, assemble the test plug ST1947. Screw the plug in to lightly contact the valve seat.

18.2 Connect the hand pump supply line to one of the pressure connections and apply pressure. Fluid should flow freely from the opposite pressure connection: blank off this connection.

18.3 Gradually apply a pressure of 300 lbf/in^2 and then slowly increase it to 4950 lbf/in^2. Leakage must not occur. Release the pressure, disconnect the test rig supply line and remove the blanking cap.

18.4 Remove the test plug ST1947 and continue with the assembly procedure recommencing at paragraph 15.4.

Functional test

19

19.1 Connect the hand pump supply line to one of the pressure connections and blank off the other pressure connection with a gauge. Operate the pump to a gradually increasing pressure. Fluid should flow from the return connection at a pressure of between 3000 and 3100 lbf/in^2. This pressure will be obtained by the adjuster and the shim washers. The minimum reseating pressure should be 2800 lbf/in^2 when fluid should cease to flow from the return connection. Release the pressure and disconnect the hand pump supply line.

NOTE

To vary the spring load, screw the adjuster in or out and reduce the number of shim washers behind the spring if necessary. There must, however, be at least one shim washer fitted, and the end face of the adjuster must not protrude more than 0.12 in beyond the end of the valve body.

19.2 Connect the valve to the power pump and by means of the rig selector valve, operate the unit for a minimum of 20 cycles. One cycle consists of operating the valve to the relief pressure and then releasing the pressure. Disconnect the power pump supply line.

19.3 Connect the hand pump supply line to the pressure connection and adjust the relief pressure to within the limits of 3000 and 3100 lbf/in^2. Disconnect the hand pump supply line.

19.4 Connect the valve to the power pump. Operate the pump and apply pressure gradually until the valve just opens and fluid emerges from the return connection in a continuous trickle. The pressure must be within the limits detailed in paragraph 19.3. If required, adjust the valve and recheck the pressure at least three times before finally locking the adjuster. Ensure that on final adjustment, one of the holes in the adjuster is aligned with a slot in the body, and that the dimension quoted in the note following paragraph 19.1 is not exceeded.

19.5 Operate the rig to pass the full delivery of the pump through the valve. Gradually reduce the pressure until fluid ceases to flow from the return connection and leakage does not exceed 0.37 cm^3/min. The pressure, when this occurs, should not be less than 2800 lbf/in^2. Release the pressure, remove the pressure gauge from the pressure connection and disconnect the power pump supply line.

19.6 Connect the hand pump supply line to one of the pressure connections, blank off the other and fit a pressure gauge to the return connection. Operate the pump slowly until a pressure of 100 lbf/in^2 is registered on the gauge at the return connection, then gradually increase the pressure to 300 lbf/in^2. Leakage must not occur. Release the pressure at the return connection by slackening the pipe to the pressure gauge, and then release the pressure at the hand pump. Disconnect the hand pump supply line and remove the blanking cap from the relevant pressure connection.

19.7 Repeat the operations in paragraphs 19.4 and 19.5 and readjust if necessary.

Annex A

PRESSURE RELIEF VALVE

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

PART NUMBER 100051034

Leading particulars

1 The leading particulars of this unit are as follows:

1.1	System fluid	Oil OM15 (DTD585)
1.2	Relief pressure	3000 to 3100 lbf/in^2
1.3	Reseat pressure	2800 lbf/in^2
1.4	Connections	0.375 in BSP

Modification state

2 The information in the annex includes all appropriate modifications up to and including issue 11.

Introduction

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

Annex B

PRESSURE RELIEF VALVE

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

PART NUMBER 100051035

Leading particulars

1 The leading particulars of this unit are as follows:

1.1	System fluid	Oil OM15 (DTD585)
1.2	Relief pressure	3350 to 3450 lbf/in^2
1.3	Reseat pressure	2800 lbf/in^2
1.4	Connections: Pressure	0.50 in BSP
	Return	0.375 in BSP

Modification state

2 The information in the annex includes all appropriate modifications up to and including issue 14.

Introduction

3 This unit is similar to the type described and illustrated in the general text but connections 1 and 2 are 0.50 in BSP and it has variations in the operating pressures. A standard adapter replaces the banjo at connection 1.

Testing

4 Substitute the following functional test for that described in the general text.

Functional test

5

5.1 Connect the hand pump supply line to one of the pressure connections and blank off the other pressure connection with a gauge. Operate the pump to a gradually increasing pressure. Fluid should flow from the return connection at a pressure of between 3350 and 3450 lbf/in^2. This pressure will be obtained by the adjuster and the shim washers. The minimum reseating pressure should be 2800 lbf/in^2 when fluid should cease to flow from the return connection. Release the pressure and disconnect the hand pump supply line.

NOTE

To vary the spring load, screw the adjuster in or out and reduce the number of shim washers behind the spring if necessary. There must, however, be at least one shim washer fitted, and the end face of the adjuster must not protrude more than 0.15 in beyond the end of the valve body.

5.2 Connect the power pump supply line to the pressure connection and by means of the rig selector valve, operate the unit for a minimum of 20 cycles. One cycle consists of operating the valve to the relief pressure and then releasing the pressure. Disconnect the power pump supply line.

5.3 Connect the hand pump supply line to the pressure connection and adjust the relief pressure to within the limits of 3350 and 3450 lbf/in^2. Disconnect the hand pump supply line.

5.4 Connect the valve to the power pump. Operate the pump and apply pressure gradually until the valve just opens and fluid emerges from the return connection in a continuous trickle. The pressure must be within the limits detailed in paragraph 5.3. If required, adjust the valve and recheck the pressure at least three times before finally locking the adjuster. Ensure that on final adjustment, one of the holes in the adjuster is aligned with a slot in the body, and that the dimension quoted in the note following paragraph 5.1 is not exceeded.

5.5 Operate the rig to pass the full delivery of the pump through the valve. Gradually reduce the pressure until fluid ceases to flow from the return connection and leakage does not exceed 0.37 cm^3/min. The pressure, when this occurs, should not be less than 2800 lbf/in^2. Release the pressure and stop the power pump. Remove the gauge from the pressure connection and disconnect the power pump supply line.

5.6 Connect the hand pump supply line to one of the pressure connections, blank off the other and connect a pressure gauge to the return connection. Operate the pump slowly until a pressure of 100 lbf/in^2 is registered on the gauge at the return connection, then gradually increase the pressure to 300 lbf/in^2. Leakage must not occur. Release the pressure at the return connection by slackening the pipe to the pressure gauge, and then release the pressure at the hand pump. Disconnect the hand pump supply line and remove the blanking cap from the relevant pressure connection.

5.7 Repeat the operations in paragraphs 5.4 and 5.5 and readjust if necessary.

PARTS CATALOGUE AND RELATED INFORMATION

FOR

PRESSURE RELIEF VALVE

DOWTY AEROSPACE HYDRAULICS - CHELTENHAM

Part Nos 100051034 and 100051035

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
AC4211	*										
AC4821	*										

* 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
LEAD SEAL, 1/4 IN DIA X 1/8 IN THICK			1-6		
AGS1104D	28F	4730-99-8011808	1-4	C	
AGS1186D	28F	5330-99-2077439	1-2 1-2A	C	
AGS1213D	28F	4730-99-9717151	1-5	C	
AGS596C			1-22 1-22A		
AGS596D			1-23		
C4651Y2			1-21		
SP758D	27Q	4730-99-4117814	1-1 1-1A	C	
SP880C			1-24 1-24A		
SP880D			1-25		
SP9H8			1-10		
SP900-13	27QA	5330-99-1013063	1-20	C	
SP900-16	27QA	5330-99-9431639	1-18	C	
SP900-21	27QA	5330-99-1011353	1-12	C	
04651Y025	27Q	5360-99-4447562	1-14	C	
100051034	27QM	4820-99-4117556	1	P	
100051035	27QM	4820-99-4117566	1	P	
100051106			1-9		
2000Y15		5340-99-4170071	1-7	C	
2000Y46			1-8	MR	
4651Y11			1-13		
4651Y4MKA	27Q	4820-99-4117524	1-16	C	
4651Y5	27Q	4820-99-4117518	1-19	C	
4651Y6	27Q	5365-99-4117511	1-17	C	
4651Y7			1-11		
4651Y9	27Q	4820-99-9009222	1-15	C	
750060113			1-20A		
750060116			1-18A		
750060121			1-12A		
99793			1-3		

DETAILED PARTS LIST

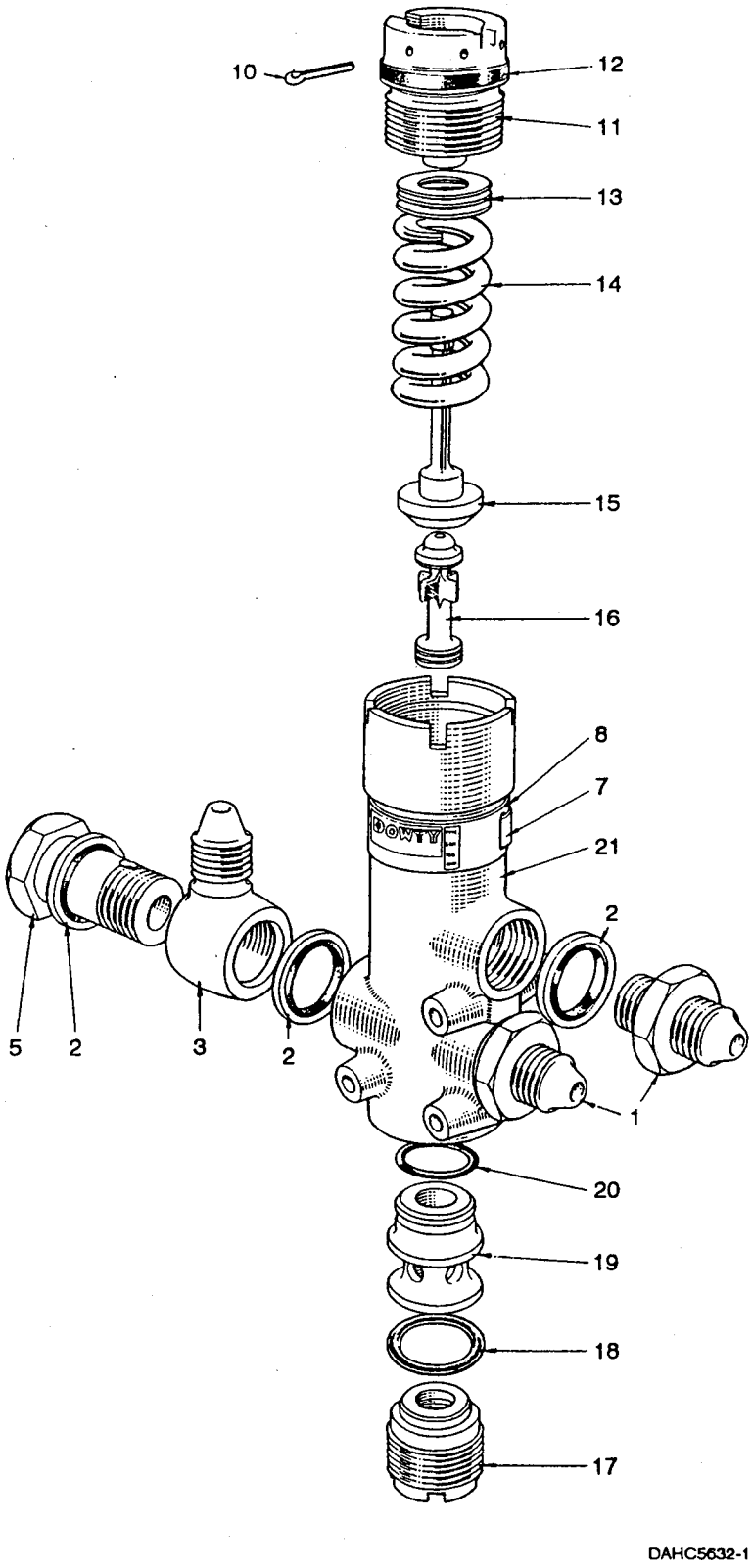

Fig 1 Pressure relief valve

PRESSURE RELIEF VALVE

Fig/ Index No	Part No	1 2 3 4 5 6 Nomenclature	Mnfrs NATO Code	Usage Code	Units per Assy
1	100051034	Valve, pressure relief (Mod AC4211)		A	RF
1+	100051035	Valve, pressure relief (Mod AC4211)		B	RF
-1	SP758D	. Union		A	2
-1A+	SP758D	. Union		B	1
-2	AGS1186D	. Seal, bonded		A	4
-2A+	AGS1186D	. Seal, bonded		B	3
-3	99793	. Banjo		A	1
-4+	AGS1104D	. Adapter cone		B	2
-5	AGS1213D	. Bolt, banjo		A	1
-6+	ND	. Seal, lead, 1/4 in dia x 1/8 in thick			1
-7	2000Y15	. Strap			1
-8	2000Y46	. Nameplate			1
-9+	100051106	. Valve sub-assembly, pressure relief (Mod AC4821)			1
-10	SP9H8	. . Pin, split			1
-11	4651Y7	. . Adjuster			1
-12	SP900-21 or	. . O-ring (Alternative)			1
-12A+	750060121	. . O-ring			1
-13	4651Y11	. . Washer, shim			3 (max)
-14	04651Y025	. . Spring (Mod AC4211)			1
-15	4651Y9	. . Stem			1
-16	4651Y4MKA	. . Valve			1

+ Item not illustrated

PRESSURE RELIEF VALVE

Fig/ Index No	Part No	1 2 3 4 5 6 Nomenclature	Mnfrs NATO Code	Usage Code	Units per Assy
1-17	4651Y6	. . Plug, end			1
-18	SP900-16	. . O-ring			1
	or	(Alternative)			
-18A+	750060116	. . O-ring			1
-19	4651Y5	. . Seat, valve			1
-20	SP900-13	. . O-ring			1
	or	(Alternative)			
-20A+	750060113	. . O-ring			1
-21	C4651Y2	. . Body, valve			1
-22+	AGS596C	. Cap, dust (Storage and transit)		A	3
-22A+	AGS596C	. Cap, dust (Storage and transit)		B	1
-23+	AGS596D	. Cap, dust (Storage and transit)		B	2
-24+	SP880C	. Washer (Storage and transit)		A	3
-24A+	SP880C	. Washer (Storage and transit)		B	1
-25+	SP880D	. Washer (Storage and transit)		B	2

+ Item not illustrated