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PRESSURE RELAY VALVE DUNLOP PART Nos ACM18570, ACM18798 ACM21708 AND ACM27736.

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

BY COMMAND OF THE DEFENCE COUNCIL

Steve Whitmore.

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

AP 100B-01 Order 0504 (RAF)

CAUTIONARY NOTICE

Acid Damage

The cleaning fluid for many hydraulic components is trichloroethane or some other form of chlorinated solvent. If traces of solvents are left in components they can combine with minute amounts of water, present in hydraulic systems, to form hydrochloric acid. It is essential that when hydraulic components are cleaned with a chlorinated solvent all traces of the solvent must be removed from internal surfaces and passages, before assembly, using the air blast method or other effective means.

CONTENTS

PRESSURE RELAY VALVE

DUNLOP PART NOS.ACM18570, ACM18798, ACM21708 AND ACM27736

LIST OF MATERIALS

Nomenclature	UK Joint Service Designation	NATO Code No.	Specification
Cleaning agents			
Oil, hydraulic	OM15	H515	DEF STAN91-48/1
Oils and greases			
Silicone grease	XG 315	G394	DEF STAN91-56/1
Oil, hydraulic	OM15	H515	DEF STAN91-48/1
Miscellaneous			
Locking wire	-	-	DTD 189A

PRESSURE RELAY VALVE

DUNLOP PART NOS.ACM18570, ACM18798, ACM21708 AND ACM27736

GENERAL AND TECHNICAL INFORMATION (-1)

CONTENTS

LEADING PARTICULARS

ACM18570, ACM18798 and ACM21708

Maximum working pressure ACM18570	3000 lbf/in²
Maximum working pressure ACM18798 and ACM21708	5000 lbf/in²
Hydraulic fluid	OM15
Weight of unit	4 oz (maximum)
Dimensions	3.07 x 1.03 in.
Connections - inlet ACM18570 and ACM18798	1/8 in. BSP (olive)
Connections - inlet ACM21708	1/4 in. BSP (olive)
Connections - outlet	1/8 in. BSP (olive)

ACM27736

Maximum working pressure	344.5 bars
Hydraulic fluid	H515 (OM15)
Weight of unit	113.4 grams
Dimensions	80 x 26 mm
Connection - inlet	M12 x 1-5H
Connection - outlet	M12 x 1-4g

INTRODUCTION

1. These pressure relay valves are similar, the differences between the valves are as laid down in the leading particulars and Figures 1 and 2. The hydraulic pressure relay valve acts as a safety device in a subsiduary pipe line to prevent loss of main system fluid through leakage.

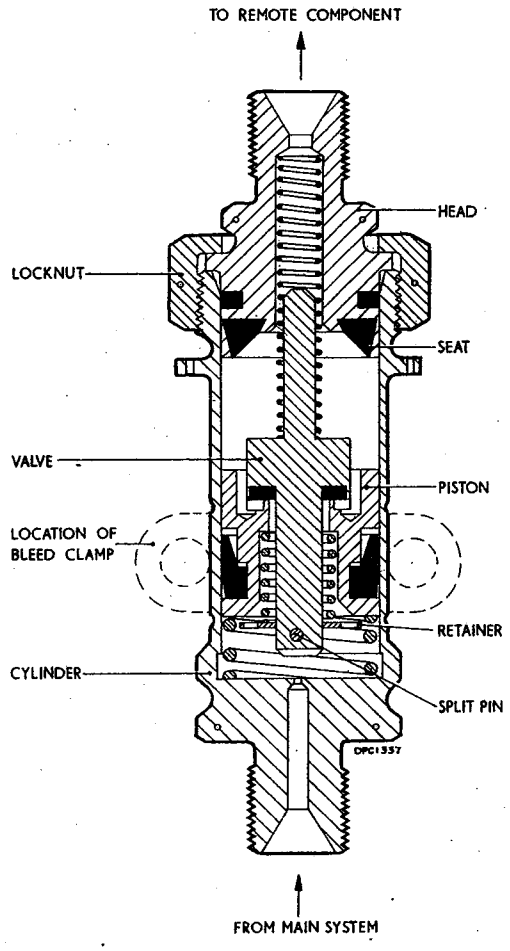


Fig.1 Sectional view of units ACM18570, ACM18798 and ACM21708

DESCRIPTION

2. The basis of the unit is a piston and valve assembly, acting as a separator, located in a cylinder bore and sealed by a leak proof head. The lower portion of the cylinder has two circumferential marks indicating the boundary inside which a special bleed clamp (refer to Figure 3) must be fitted when priming and bleeding the unit and its associated component.

OPERATION

3.1 The fitting of either bleed clamp illustrated in Figure 3, prevents movement of the piston and allows main system fluid pressure to lift the valve and flow through the unit to the subsidiary line. On completion of priming and bleeding, the bleed clamp must be removed to permit the unit to function normally.

3.2 When the unit and subsidiary line are correctly primed, the piston and valve assembly function together as a separator, As the main system pressure is applied to the unit the pressure on the separator is transmitted to the subsidiary line.

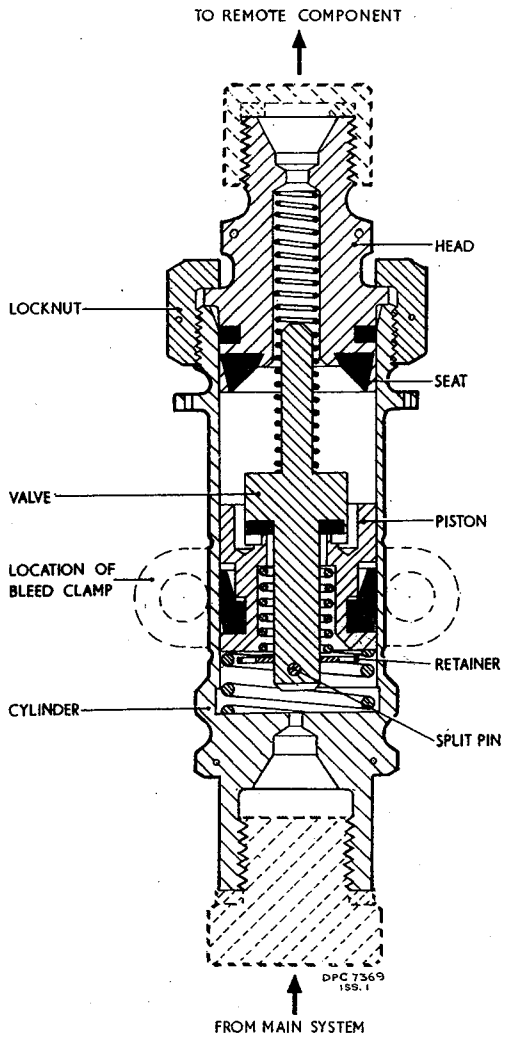


Fig.2 Sectional view of unit ACM27736

3.3 In the event of fluid loss from the subsidiary line, the main system pressure lifts the separator to the top of the cylinder and seals the valve on the rubber insert of the head to prevent loss of the main system fluid.

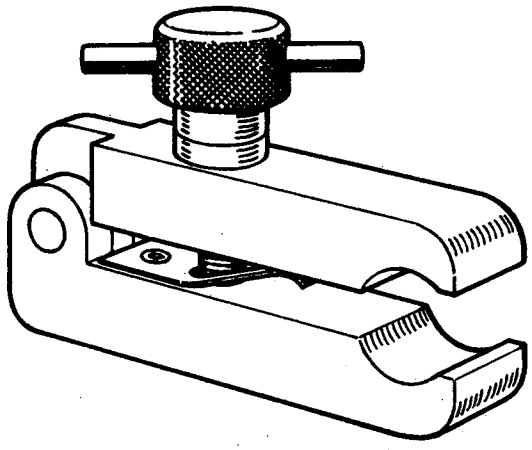
3.4 Should a negative pressure occur in the main system line, the separator moves to the bottom of the cylinder. Where a spring prevents the separation of the piston from the valve and the consequent loss of fluid from the subsidiary line to the main system line.

SERVICING

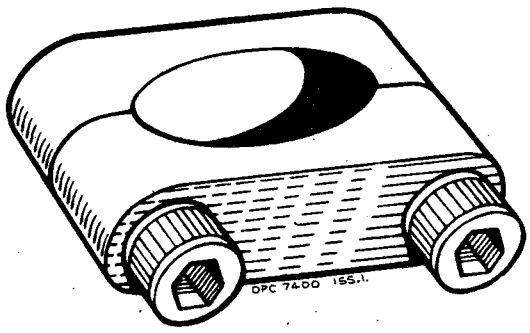
SPECIAL TOOLS

4. The following special tools are required for priming and bleeding.

AO101237	Bleed clamp	
ACO5928	Bleed clamp	Alternative to AO101237



A



B

Fig.3 Bleed clamps AO101237 and ACO5928

DISMANTLING

5. Dismantle the unit as follows:-

5.1 Unscrew and remove the locknut from the cylinder, withdraw the head and the upper spring. Remove the sealing ring from the head.

5.2 Withdraw the valve and piston assembly from the cylinder. Remove the spring from the base of the cylinder.

5.3 Remove the split pin from the valve stem, this will release the retainer and spring. Separate the valve and the piston, remove the seal from the piston.

CLEANING

6. If chemical grease solvents are used for cleaning, ensure that they do not come into contact with the rubber components. Thoroughly clean and dry all metallic components.

EXAMINATION

7. Examine the unit as follows:-

7.1 Examine the cylinder for damage to the wall and the connection threads; and for excessive scoring within the bore. Renew the cylinder if found defective.

7.2 Examine the piston for excessive scoring and damage to the surface deposit. Examine the valve seat for damage and check that the sealing face is perfectly smooth. Renew the piston if found defective.

7.3 Examine the rubber seats of the valve and the head for damage, deterioration, security and embedded foreign matter. Check that the head connection threads are in good condition. Renew the valve or the head if found defective.

7.4 If the head sealing ring has not been removed from its groove, examine it 'in situ' for damage, deterioration and embedded foreign matter. Renew the sealing ring if found defective. The sealing ring must be renewed if it has been removed from its groove.

7.5 Examine the springs for damage, corrosion and distortion and subject each spring to a load deflection test in accordance with Table 1. Under the relevant load the spring must compress to the relevant length. Springs which fail to confirm to these requirements must be renewed.

TABLE 1 LOAD DEFLECTION TEST

Units ACM18570, ACM18793 and ACM21708	Load	Length
Upper spring	4 to 5 ozf.	1.22 in.
Valve spring	8 to 9½ ozf.	0.375 in.
Piston spring	3 lbf. to 3 lbf. 5 ozf.	0.165 in.
Unit ACM27736		
Upper spring	0.127 kgf.	31 mm
Valve spring	0.249 kgf.	9.5 mm
Piston spring	1.422 kgf.	4.2 mm

ASSEMBLING

Lubricants

8. Assembly lubricants must be smeared sparingly on the relevant components and the residue wiped off to leave only a fine surface film. The amount of lubricant used must be such that there is no surplus to exude into the unit.

Assembly procedure

9. Assemble the unit in accordance with the following:-

9.1 Position the valve in the piston, fit the valve spring and the retainer, secure them with the split pin. Fit the piston seal to the piston.

9.2 Place the piston spring at the bottom of the cylinder bore and insert the valve and piston assembly.

9.3 Position the upper spring around the valve stem.

9.4 Fit the sealing ring to the head and fit the head to the cylinder.

9.5 Test the unit as detailed in paras.10 and 11.

9.6 After satisfactory completion of testing of the unit, wirelock the lock-nut to the cylinder.

TESTING

Priming and bleeding the unit

10. Prime and bleed the unit as follows:-

10.1 Assemble the unit to the test rig as shown in Figure 4.

10.2 Fit the bleed clamp between the two circumferential lines marked on the cylinder and tighten the bleed clamp securing screw.

Note ...

Avoid excessive tightening of the bleed clamp securing screw.

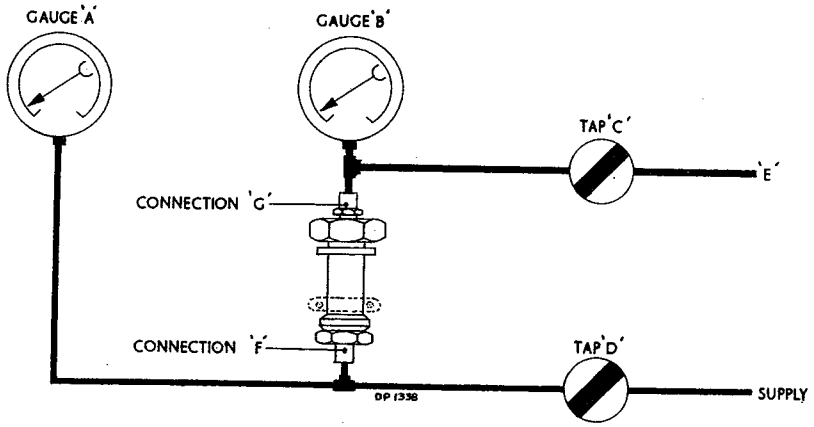


Fig.4 Test rig

10.3 Open tap 'D' and admit fluid at low pressure to the unit. Partly open tap 'C' and slacken the connections at gauges 'A' and 'B'. When the discharging fluid is free of air close tap 'C' and connections at gauges 'A' and 'B'.

10.4 Release the supply pressure and remove the bleed clamp.

Functional test

11. Carry out functional tests in accordance with the following and the test data in Table 2.

11.1 Open tap D, apply supply pressure in increments of H until J is reached and check that gauges A and B give identical readings throughout the pressure range. With the supply pressure at J close tap D and check that there is no internal leakage by noting that this pressure is maintained on gauges A and B. Check the unit for external leakage.

11.2 Open tap D with supply pressure of J applied. Slowly open tap C and check that after a slight discharge of fluid from point E, the leakage ceases and gauge 'B' reads zero.

▶ Note ...

On unit ACM27736, only para.11.2 is revised to read "Slowly open tap C the fluid loss from point E is not to exceed 20 cc.s before shut off and gauge B reads zero".

◀

11.3 Release the supply pressure and remove the unit from the test rig. Check that the piston has returned to the bottom of the cylinder.

11.4 Substitute a low pressure gauge for gauge 'B' and connect point E to a hand pump. With the unit inverted, connect gauge 'B' and the associated hand pump supply line to connection G; leave the remaining uppermost connection F open.

11.5 Open tap C and operate the hand pump until all air has been discharged through the open connection.

11.6 Operate the hand pump slowly and check the pressure at which the unit relieves through the open connection, this pressure must not be in excess of K. Quickly close tap C and check the pressure at which the unit re-seats. The unit must remain in this condition for two minutes and the re-seat pressure, shown when the leakage ceases from the open connection, must not be less than L.

11.7 Repeat the test detailed in sub-para.11.6 six times to ensure that the operation of the unit is consistent.

11.8 Release the hand pump pressure and remove the unit. Fit a sealing ring and the blanking plug to the cylinder. Fit a sealing ring and blanking plug to the head.

TABLE 2 TEST DATA

Pressure lbf/in^2	H	J	K	L
Unit ACM18570	500	3000	25	10
Units ACM18798 and ACM21708	500	5000	35	10

Pressure bars	H	J	K	L
Unit ACM27736	34.45	344.5	2.412	0.68

INSTALLATION

12. The unit must be installed in a vertical position and be supported only by its pipe connections. Allow adequate clearance around the unit for fitting the special bleed clamp to facilitate priming and bleeding.

12.1 After installation, or after servicing operations on the associated component, bleed the unit as follows:-

12.1.2 Release all associated system pressure. Fit the bleed clamp between the two circumferential lines marked on the cylinder and tighten the bleed clamp securing screw.

Note ...

Avoid excessive tightening of the bleed clamp securing screw.

12.1.2 Apply low system pressure to the unit and bleed the appropriate point(s) of the associated delivery line. Close the bleed point (s) when the discharging fluid is free from air.

12.1.3 Release the pressure and remove the bleed clamp.

CAUTION ...

Failure to remove the bleed clamp will result in the unit failing to operate.

TABLE 3 FAULT DIAGNOSIS AND RECTIFICATION

Fault	Cause	Rectification
Unit fails to relieve and reset within the stated pressure range detailed in Testing	Piston sticking due to damaged cylinder wall	Dismantle and renew the cylinder
Piston fails to return to bottom of cylinder when unit is removed from the test rig	Piston sticking due to damaged cylinder wall	Dismantle and renew the cylinder
Leakage from the delivery connection and/or locknut with the unit pressurized	(1) Faulty head sealing ring	(1) and (2) Dismantle and renew the head and/or sealing ring
	(2) Faulty head seal	
	(3) Faulty valve seal	(3) Dismantle and renew the valve
Loss of main system pressure through internal leakage	Faulty valve seal	Dismantle and renew the valve seal

BPCC/0001/8271522/ DEC 86 /2630

PARTS CATALOGUE AND RELATED INFORMATION (-3)

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
Amdt 26354	*										
Amdt 27700	*										
Amdt 28851	*										
Amdt 29214	*										
2748	*										
3870	*										

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

PREFACE

Demands

1 Requirements for demands are:

1.1 The demand must quote the appropriate Vocabulary Section and Reference/Stock Number for each item. Unreferenced parts are not normally provisioned as spares and demands for such items must quote the Vocabulary Section, 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, e.g. (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.

Condition of Supply (Interchangeability Code)

6 Condition of Supply 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 Nomenclature. Modifications incorporated in the catalogue are listed in the Modification Record.

Usage code

9 The usage code indicates the applicability of an assembly item to other assemblies. Where no code is detailed against an item, that item is applicable to all the main assemblies. The code used in this publication is:-

Fig.1 A - Valve, pressure relay, assembly ACM 18570

B - Valve, pressure relay, assembly ACM 18798

C - Valve, pressure relay, assembly ACM 21708

INDEX OF NATO STOCK NUMBERS

Vocab Sect.	NATO Stock No.	Part Number	Chap. No.	Fig/ Index No.	ICY MR	C of S
28F	4730-99-101-1814	AGS 1140/A		1/17		C
28P	5315-99-102-1104	SP 90-C3		1/14		C
27VA	5330-99-104-2699	ACO 5862		1/4		C
27VA	1650-99-104-6537	ACM 21708		1/-		P
27VA	5340-99-104-7734	ACO 22340		1/7		C
27VA	1650-99-104-7775	ACO 5928		1/22		C
27VA	5310-99-149-5003	ACO 38450		2/4		C
27VA	4820-99-149-5004	ACO 38447		2/11		C
27VA	5330-99-149-5005	ACO 38448		2/7		C
27VA	4730-99-461-9845	ACO 5856		1/2		C
27VA	5360-99-461-9847	ACO 5860		1/5		C
				2/5		C
27VA	5360-99-461-9848	ACO 5861		1/10		C
				2/10		C
27VA	1630-99-461-9849	ACO 5858		1/11		C
27VA	1630-99-461-9866	ACO 6698		1/3		C
27VA	1630-99-462-5928	ACM 18570		1/-		P
27VA	1680-99-462-5939	AO 101237		1/22		L
27VA	1630-99-462-5942	ACO 22341		1/9		C
				2/9		C
27VA	5360-99-462-5943	ACO 22342		1/12		C
				2/12		C
27VA	1630-99-462-5951	ACM 18798		1/-		P
27VA	1630-99-462-6135	ACO 22338		1/6		C
				2/6		C
27VA	1650-99-611-5625	ACM 27736		2/-		C
27G	5340-99-617-9613	DAS 2425-02AA		2/14		C
28F	5310-99-912-8936	AGS 904/A		1/18		C
30A	9505-99-943-7135	DTD 189A		1/1		C
				2/1		C
28F	4730-99-944-0887	AGS 2111		1/19		C
28P	5315-99-948-6478	SP 90-C5		1/16		C
28P	5315-99-951-7006	SP 90-B3		1/8		C
				2/8		C
28P	5315-99-971-0567	SP 90-C4		1/15		C

INDEX OF PART NUMBERS

Part Number	Vocab Sect.	NATO Stock No., Ref. No. or LM	Chap. No.	Fig./ Index No.
ACM 18570	27VA	1630-99-462-5928		1/-
ACM 18798	27VA	1630-99-462-5951		1/-
ACM 21708	27VA	1650-99-104-6537		1/-
ACM 27736	27VA	1650-99-611-5625		2/-
ACM 27950				2/13
ACO 22338	27VA	1630-99-462-6135		1/6
				2/6
ACO 22339				1/13
ACO 22340	27VA	5340-99-104-7734		1/7
ACO 22341	27VA	1630-99-462-5942		1/9
				2/9
ACO 22342	27VA	5360-99-462-5943		1/12
				2/12
ACO 22920				1/13
ACO 29172				1/13
ACO 38447	27VA	4820-99-149-5004		2/11
ACO 38448	27VA	5330-99-149-5005		2/7
ACO 38450	27VA	5310-99-149-5003		2/4
ACO 41900				2/3
ACO 41901				2/2
ACO 5856	27VA	4730-99-461-9845		1/2
ACO 5858	27VA	1630-99-461-9849		1/11
ACO 5860	27VA	5360-99-461-9847		1/5
				2/5
ACO 5861	27VA	5360-99-461-9848		1/10
				2/10
ACO 5862	27VA	5310-99-104-2699		1/4
ACO 5928	27VA	1650-99-104-7775		1/22
ACO 6698	27VA	1630-99-461-9866		1/3
AGS 1140/A	28F	4730-99-101-1814		1/17
AGS 1236/A	28F	4730-99-944-1095		1/20
AGS 1236/B	28F	4730-99-101-3959		1/21
AGS 2111	28F	4730-99-944-0887		1/19
AGS 904/A	28F	4730-99-912-8936		1/18
AO 101237	27VA	1680-99-462-5939		1/22
DAS 2425-02AA	27G	5340-99-617-9613		2/14
DAS 2426-02AA				2/15
DSR 231-2	28P	5315-99-951-7006		1/8
				2/8
DTD 189A	30A	9505-99-943-7135		1/1
				2/1
SP 90-B3	28P	5315-99-951-7006		1/8
				2/8
SP 90-C3	28P	5315-99-102-1104		1/14
SP 90-C4	28P	5315-99-971-0567		1/15
SP 90-C5	28P	5315-99-948-6478		1/16

DETAILED PARTS LISTS

CONTENTS

Pressure relay valve ACM 18570, ACM 18798 and ACM 21708
Pressure relay valve ACM 27736

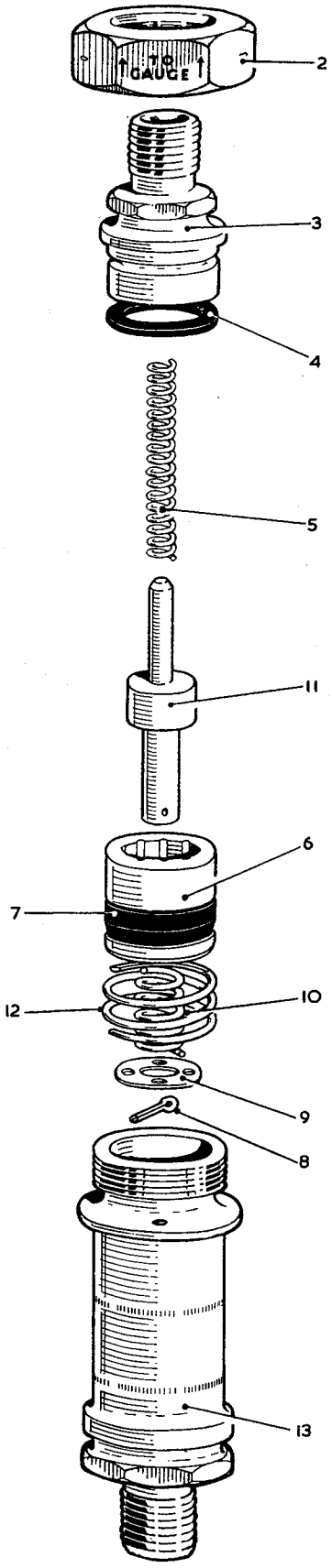


Fig 1 Pressure relay valve, ACM 18570, ACM 18798 and ACM 21708

DETAILED PARTS LIST

PRESSURE RELAY VALVE

Fig./ Index No.	Part No.	Nomenclature 1 2 3 4 5 6	Usage Code	Units per Assy.
1-	ACM 18570	Valve, pressure relay, assembly (Dunlop Mod.2748)	A	
	ACM 18798	Valve, pressure relay, assembly (Dunlop Mod.2748)	B	
	ACM 21708	Valve, pressure relay, assembly	C	
-1+	DTD 189A	. Wire, locking, 22 s.w.g.		AR
-2	ACO 5856	. Nut, locking		1
-3	ACO 6698	. Head		1
-4	ACO 5862	. Ring, sealing		1
-5	ACO 5860	. Spring, valve, upper		1
-6	ACO 22338	. Piston		1
-7	ACO 22340	. Seal, piston		1
-8	SP 90-B3	. Pin, split (DSR 231-2)		1
-9	ACO 22341	. Retainer		1
-10	ACO 5861	. Spring, valve, lower		1
-11	ACO 5858	. Valve		1
-12	ACO 22342	. Spring, return, piston		1
-13	ACO 22339	. Cylinder	A	1
	ACO 22920	. Cylinder	B	1
	ACO 29172	. Cylinder	C	1
		TRANSPORTATION AND STORAGE		
-14+	SP 90-C3	. Pin, split (DSR 232-2)	C	1
-15+	SP 90-C4	. Pin, split (DSR 232-3)	A,B	2
-16+	SP 90-C5	. Pin, split (DSR 232-4)	C	1
-17+	AGS 1140/A	. Plug, nipple	A,B	2
-18+	AGS 904/A	. Sleeve, outer	A,B	2
	AGS 904/A	. Sleeve, outer	C	1
-19+	AGS 2111	. Sleeve, outer	C	1
-20+	AGS 1236/A	. Cap, cone	C	1
-21+	AGS 1236/B	. Cap, cone	C	1
		SPECIAL TOOLS		
-22+	ACO 5928 or AO 101237	Clamp, bleed		1

+ Item not illustrated

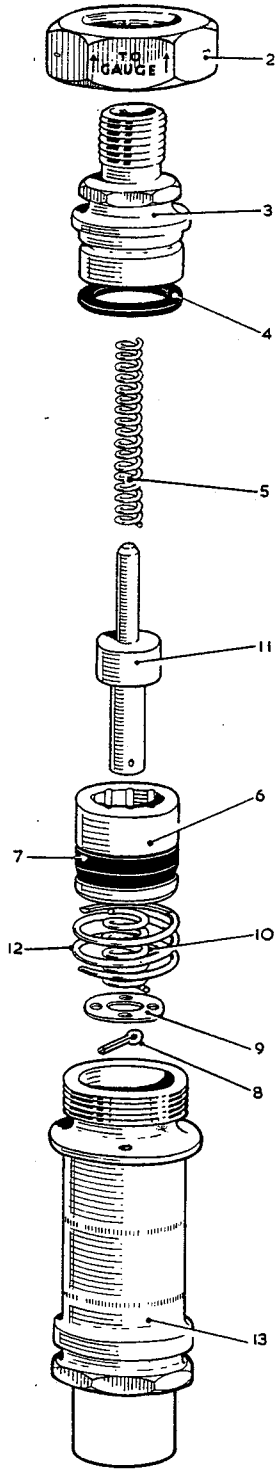


Fig.2 Pressure Relay Valve, ACM27736

DETAILED PARTS LIST

PRESSURE RELAY VALVE

Fig./ Index No.	Part No.	Nomenclature 1 2 3 4 5 6	Usage Code	Units per Assy.
2-	ACM 27736	Valve, pressure relay, assembly		
-1+	DTD 189A	. Wire, locking, 22 s.w.g.		AR
-2	ACO 41901	. Nut, locking		1
-3	ACO 41900	. Head		1
-4	ACO 38450	. Ring, sealing		1
-5	ACO 5860	. Spring, valve, upper		1
-6	ACO 22338	. Piston		1
-7	ACO 38448	. Seal, piston		1
-8	SP 90-B3	. Pin, split (DSR 231-2)		1
-9	ACO 22341	. Retainer		1
-10	ACO 5861	. Spring, valve, lower		1
-11	ACO 38447	. Valve		1
-12	ACO 22342	. Spring, return, piston		1
-13	ACM 27950	. Cylinder		1
		TRANSPORTATION AND STORAGE		
-14+	DAS 2425-02AA	. Cap, protection		1
-15+	DAS 2426-02AA	. Plug, protection		1

+ Item not illustrated

BPCC/22765/8271522/SEPT.86/2630