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RELEASE VALVE. DOWTY ROTOL TYPE A 49304

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RELEASE VALVE, TYPE D4930Y (DOWTY ROTOL)

BY COMMAND OF THE DEFENCE COUNCIL

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Ministry of Defence

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TABLE

ILLUSTRATIONS

Introduction

1. The release valve consists of a ball, normally held closed by fluid pressure, which is lifted from its seat by a spindle operated by a push button. It will return to the closed position automatically when the button is released.

Description

Body

2. The body has integral inlet and outlet pipe connections and a button housing, fitted with a sealing ring, retains a valve assembly. A ring nut is supplied to secure the release valve to a bulkhead.

Valve assembly

3. The valve assembly is housed in the body in the following order; a spring and a ball cage, a ball valve, a ball seat, a spacer, a second spring, a valve spindle and a button. A flat is machined on one side of the ball cage and this side is interconnected to the central drilling by a groove cut on the lower face. A sealing ring is fitted to the ball seat. The spindle is spring-loaded against the button and is positioned in the spacer and the ball seat to oppose the ball valve; shims under the spindle head facilitate adjustment.

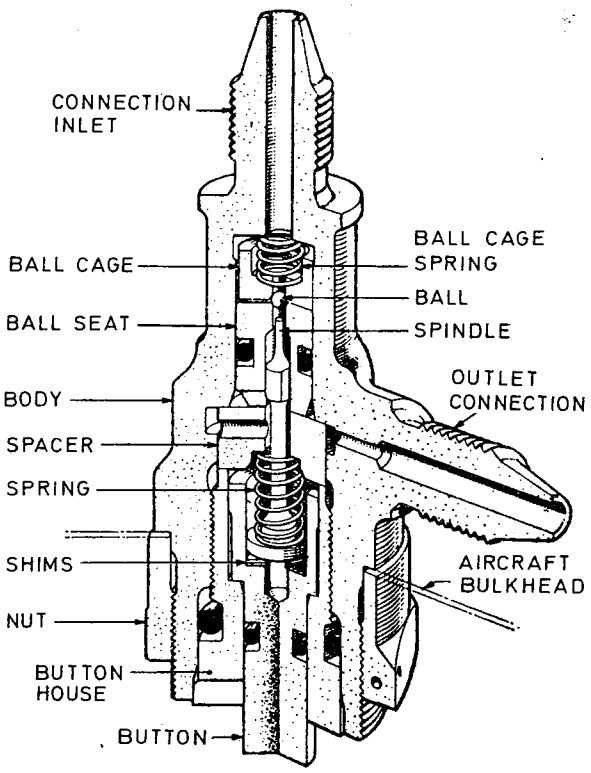

Fig.1 Release valve - cut-away view

Principle of operation

4. When the valve is closed, pressurised fluid at the inlet connection is sealed off by the ball valve retained by the spring-loaded ball cage. The spindle is held clear of the ball by the spring at the spindle head.

5. When the button is pressed the spindle lifts the ball from its seat. Fluid can now flow from the inlet connection past the flat side of the cage and the radial groove, through drillings in the ball seat and the spacer to the outlet connection.

SERVICING

Leakage

6. Faulty seals will be indicated by fluid seepage, and the seal must be renewed. Internal leakage past the ball valve will be due to a weak spring or a badly seated valve. The spring should be renewed and the ball valve and seat carefully cleaned.

Dismantling

7. (1) Remove the button housing together with the sealing ring.

(2) Withdraw the button, the shims, the valve spindle, the spring, the spacer, the ball seat, the ball valve, the ball cage and the spring.

(3) If necessary, remove the sealing rings from the button housing, the button and the ball seat.

TABLE 1
Special tools

Ref.	Part No.	Description
27Q/13602	ST1952	Assembly post for sealing ring of ball seat
27Q/13902	ST1995	Assembly post for sealing ring of button housing
27Q/13903	ST1996	Tubular key spanner for button housing
27Q/13905	ST2006	Sleeve for adjusting lift of ball valve

Assembling

8. (1) Fit the button, the shims, the spindle, the ball seat, the ball valve and the ball cage to the special tool ST2006 (fig.2).

Note...

The sealing rings and springs are omitted at this stage.

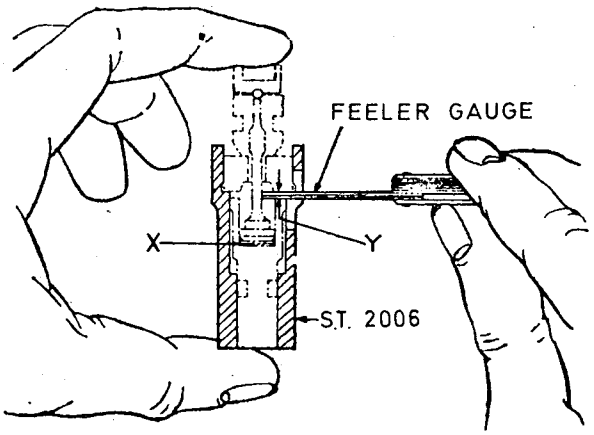

Fig.2 Use of special tool ST2006

(2) Press the assembly together and check the gap "Y" with a feeler gauge. The gap should be between 0·25 and 0·75mm (0·010 and 0·030 in.), but if excessive, estimate the number of shims to be removed. The nominal thickness of each shim is 0·38mm (0·015 in.).

(3) Remove the parts from the special tool.

(4) Fit sealing rings to the ball seat, the button and the button housing.

(5) Insert the ball cage spring, the ball cage, the ball valve, the ball seat and the spacer in the bore of the body.

(6) Locate the spring on the spindle and insert the spindle in the button, fitting shims determined in (2).

(7) Position the button assembly in the body and secure it with the button housing. Peen the adjacent metal of the body into the slot of the button housing to lock

(8) Screw the ring nut on the body in preparation for securing the valve to the aircraft bulkhead.

TESTING

9. Two static hydraulic test rigs will be required when testing the unit.

(1) Connect the test rig coupling to the inlet connection and operate the rig to a pressure of 20·685 bar (300 lbf/in^2).

(2) Fully depress the button. Fluid should flow freely from the outlet connection. Release the button and fluid should cease to flow. Release the fluid pressure.

(3) Operate the rig to a pressure of 20·685 bar (300 lbf/in^2) and then gradually increase it to 413·7 bar (~~6000~~ 4500 lbf/in^2). Leakage should not occur. Release the pressure.

(4) Connect the coupling of the second test rig to the outlet connection. Operate the test rig at the inlet connection to a pressure between 68·95 to 103·425 bar (1000 and 1500 lbf/in^2). Operate the test rig at the outlet connection gradually to a pressure of 34·475 bar (500 lbf/in^2). Leakage should not occur.

(5) Release the pressure at the outlet connection and then at the inlet connection. Disconnect the test rig couplings.

Note...

Alternatively, the test at (4) may be applied by connecting a branch line to the outlet connection and applying a pressure of 34·475 bar (500 lbf/in^2) to both the inlet and outlet connections simultaneously.

Repair Scheme R.298 Diag. 1

SCHEDULE OF FITS AND CLEARANCES

Ref. No. on fig. 3	Parts and Description			Dimension New	Permissible Worn Dimension		Permissible Clearance		Remarks
					Inter-changeable Assembly	Selective Assembly	New	Worn	
1	BALL CAGE/SEAT IN VALVE BODY	Valve body	bore	0·3130 / 0·3120	0·3145	0·3155	0·0025 / 0·0005	0·005	
		Ball cage seat	o/d	0·3115 / 0·3105	0·3095	0·308			
2	SPINDLE IN SEAT	Seat	bore	0·09425 / 0·09325	0·095	0·096	0·00325 / 0·00125	0·005	
		Spindle	o/d	0·09200 / 0·09100	0·090	0·08925			
3	BUTTON IN BUTTON HOUSING	Button housing	bore	0·2505 / 0·2495	0·252	0·253	0·0045 / 0·0015	0·007	
		Button	o/d	0·2480 / 0·2460	0·245	0·2435			

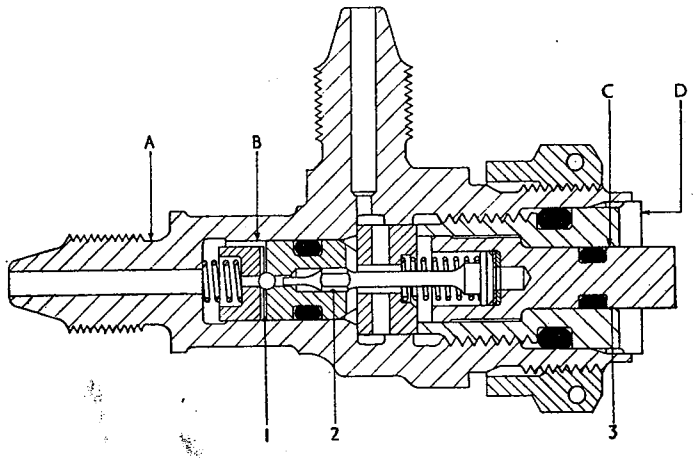

Fig.3 Release valve - sectional view

INSTRUCTIONS FOR REPAIR (References are to fig.3)

Ref.A. Release valve assy

External damage. Smooth dents free from cracks and not more than 0·50 in. long and 0·05 in. deep may be ignored provided any such damage has not affected the internal dimensions and is at least 0·25 in. from the edge of any hole. Burred edges are to be blended out and surface scratches may be ignored.

Ref.B. Release valve assy - 5/16 in. dia. bore

Scores in the bore. A standard repair. Surface finish is to be smooth and free from toolmarks.

Ref.C. Release valve assy - ¼ in. dia. bore

Scores in the bore. A standard repair. Surface finish to be smooth and free from toolmarks.

Ref.D. Release valve assy - Button housing slots

Damage or wear. Cut two new slots diametrically opposite 1/16 in. wide x 0·093/0·103 in. deep at 90 degrees to existing slots.