Chapter 17

ELECTRIC PRESSURE CONTROL UNIT (L.P.C.)

LIST OF CONTENTS

	Para.		Para.
Introduction	1	*Valve chamber*	4
Description		*Push rod and armature plate*	5
General	2	*Operation*	7
Yoke assembly	3	*Servicing*	9

LIST OF ILLUSTRATIONS

	Fig.
Electric pressure control unit	1
Arrangement of electric pressure control unit	2
Diagrammatic arrangement of L.P.C. unit	3

Introduction

1. The electric pressure control unit (L.P.C.) is designed to limit the fuel delivered to the combustion chambers of a gas turbine engine to a maximum, determined in accordance with a number of conditioning factors. Although there are several different types of this unit in use, e.g., 3/3E (*Stores Ref.* 36LL/3801) and 3/3J (*Stores Ref.* 36LL/4262), their difference lies solely in the calibration of their inlet orifice; in both electrical detail, and appearance they are identical. A typical example of this unit's use is as a spill valve in jet pipe temperature control equipment. Information on the complete units will be found in A.P.4282A, Vol. 1.

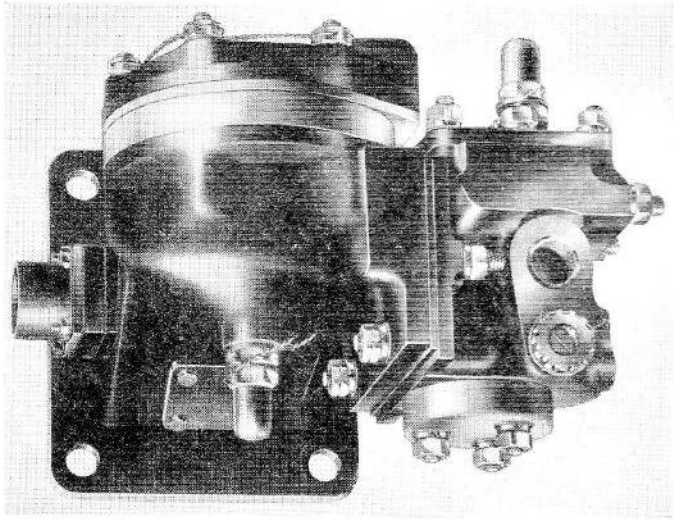

Fig. 1. Electric pressure control unit

DESCRIPTION

General

2. The unit (*fig.* 1) is essentially comprised of two cast-alloy chambers separated by a flexible pivot plate assembly carrying a rocker lever which extends into both chambers. This pivot plate also serves as a fluid-tight seal between the two chambers. The left hand chamber, which is the yoke assembly housing has a mounting bracket cast integral with it.

Yoke assembly

3. The yoke assembly (*fig.* 2) consists of the solenoid winding

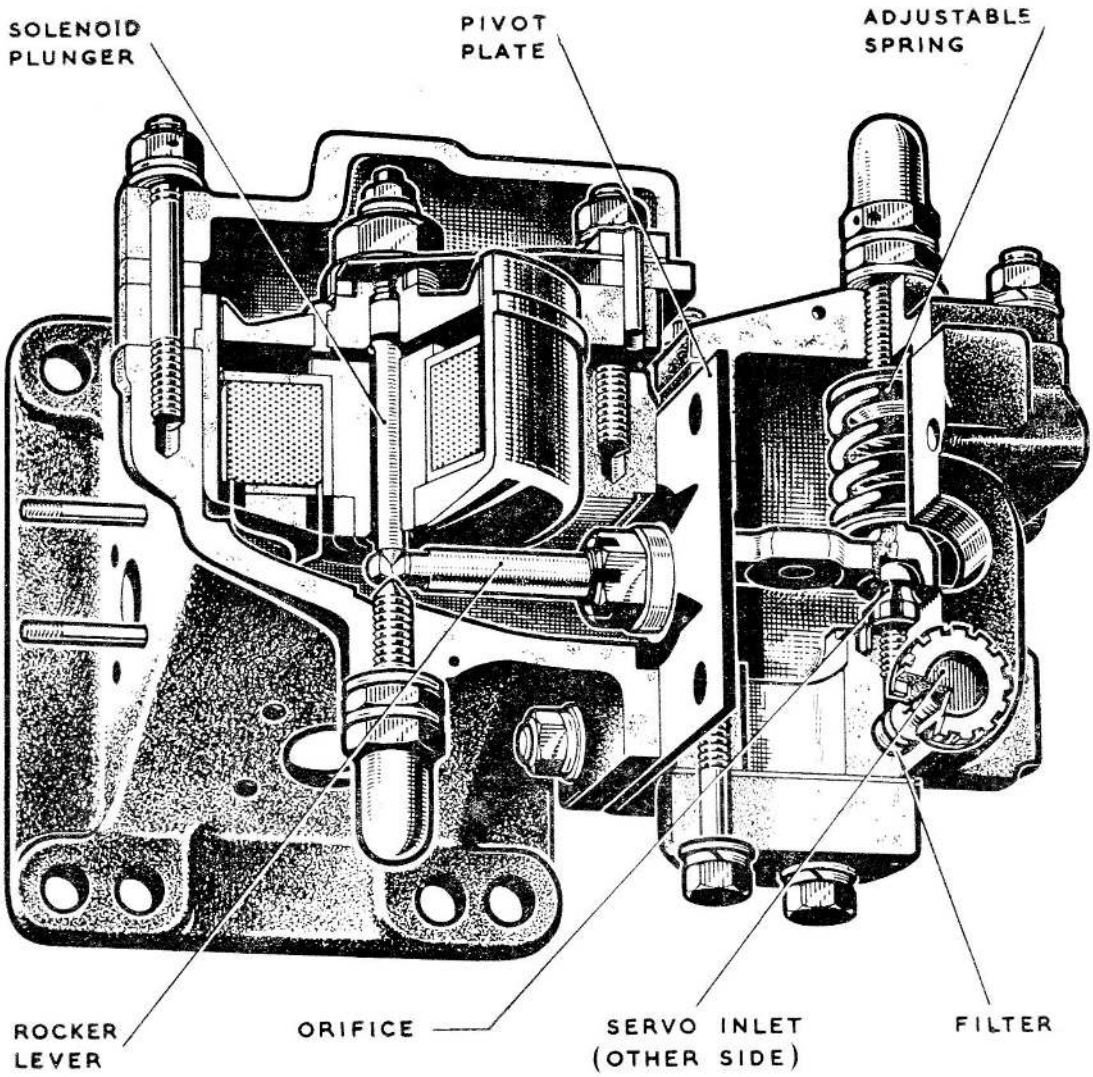

Fig. 2. Arrangement of electric pressure control unit

and soft iron core pressed into the yoke. The winding has 1,400 ± 25 turns and a resistance of 29 ± 2 ohms. The small end of the core locates in a hole in the bottom of the yoke and is peened over to secure it in position. Additional holes in the yoke permit the ends of the coil to be connected to a 2-pole breeze plug. A clamping ring and plate secure the yoke assembly in the solenoid bowl of the unit. In the latest L.P.C. units the coil, core and leads are sealed into the yoke with Araldite.

Valve chamber

4. The valve chamber (*fig.* 2) contains the calibrated orifice, with the half-ball restrictor carried on the end of the rocker lever. In addition there is a filter on the inlet orifice and an adjusting screw which varies the spring loading and thereby adjusts the actual spill flow for a given signal.

Push rod and armature plate

5. A push rod passes through a central bore in the solenoid core, and a circular armature plate is screwed to the upper end of the rod. Three brass rivets are positioned so that they make contact with the flange of the solenoid core when the solenoid is energized. The air gap between the rivets and the face of the core is 0·03 in., and is adjusted by screwing the plate along the push rod. The

other end of the push rod locates with the end of the rocker lever, which transmits the movement of the push rod to the mechanical side of the unit.

6. To assist the return of the push rod, when the valve is de-energized, a leaf spring is fitted between the armature end of the rod and the main casting.

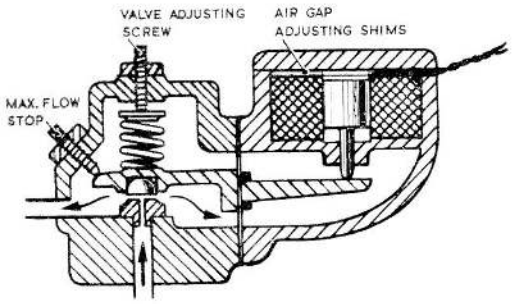

Fig. 3. Diagrammatic arrangement of L.P.C. unit

OPERATION

7. The valve is normally in its unoperated position with the calibrated orifice closed by the half-ball on the end of the rocker lever. It is maintained in this position by an adjustable spring assembly.

8. When the control sensing mechanism produces an out-of-balance E.M.F., due to a speed or temperature in excess of the predetermined maximum, an amplified signal is applied to the solenoid winding. The armature plate is attracted to the solenoid core, and the push rod moves downwards and operates the lever at its end ; this lifts the half-ball from the orifice.

SERVICING

9. Check the resistance of the coil ; this should be between 27 and 31 ohms.

10. Using a 250V insulation resistance tester, check the insulation resistance between each pole of the Breeze plug and the casing of the unit. A reading of not less than 1 megohm must be obtained from each test for the valve to be fit for service.

11. Examine the electrical connections of the valve for security and rectify as necessary.

12. Tests to be applied to the complete units for checking the solenoid currents and corresponding fuel flow are described in A.P.4282A, Vol. 1.

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