Chapter 4

AIR/FUEL CONTROL AND METERING VALVE, TYPE AA.1/1A

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LIST OF ILLUSTRATIONS

Air/fuel ratio control unit

Description

1. The air/fuel ratio control, together with the metering valve, ensures that the fuel supply to the burners is proportional to engine compressor pressure.

2. The unit is divided by a plate into two chambers, one containing a valve and the other a capsule. The plate also supports a pivoted rocker lever, and one end of the lever extends into the valve chamber and carries a half-ball valve; this valve is spring-loaded and has an adjusting screw in the chamber cover. The rocker lever is influenced, through a push rod, by a diaphragm which is situated in the base of the valve chamber. The push rod, which is fitted with a rubber seal, has one end resting on the centre of the diaphragm and the other operating against an adjusting screw in the rocker lever.

3. The other end of the rocker lever extends into the capsule chamber and is connected to a diaphragm and to an evacuated capsule. Above the diaphragm, the chamber is open to air-intake pressure, whilst the underside of the diaphragm is subjected to compressor pressure.

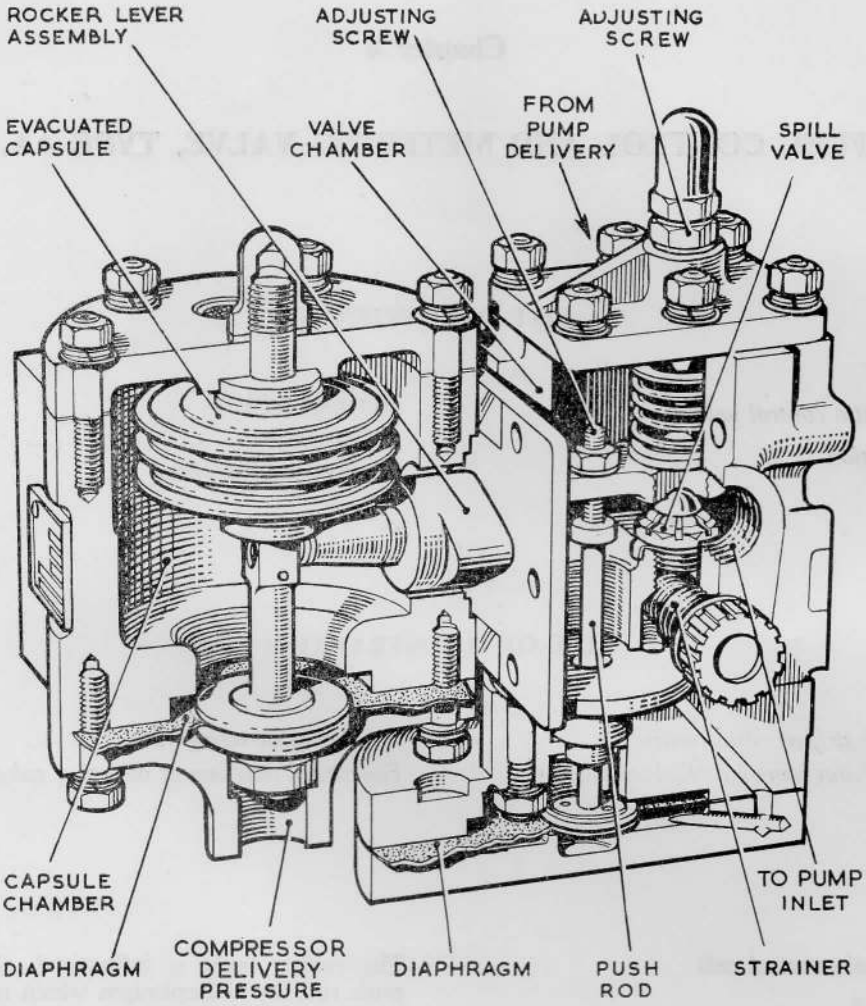

Fig. 1. Interior of air/fuel ratio control

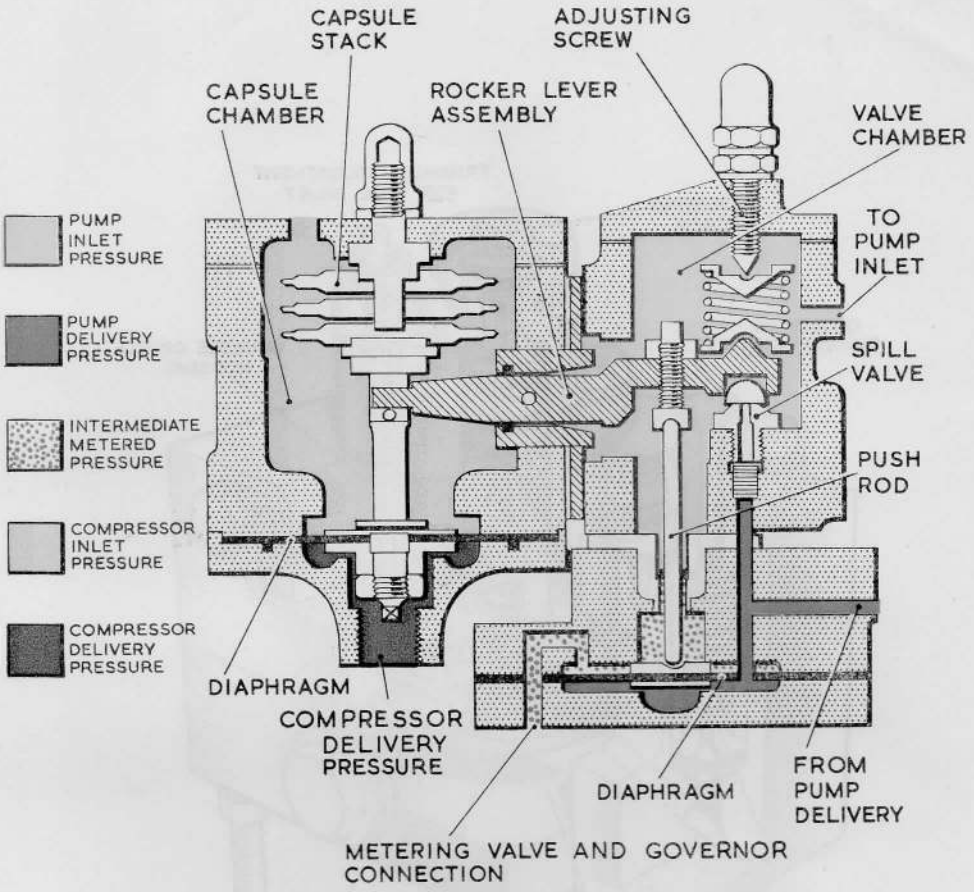

Fig. 2. Functional diagram of air/fuel ratio control

4. The movement of the rocker lever is therefore dependent on the value of compressor pressure balancing the pressure drop across the other diaphragm in the valve chamber. An excessive fuel flow will cause this pressure drop and allow the half-ball valve to open. Fuel will then escape into the valve chamber and so to the inlet side of the fuel pump. This drop in pressure is then transmitted to the metering valve.

Metering valve

Description

5. The metering valve prevents the engine being overfuelled during acceleration periods. Also included in the unit is a pressurizing valve which maintains sufficient pressure in the system at high altitudes to allow fuel to be spilled from the control units.

6. The metering valve is a spring-loaded orifice which is located on a diaphragm and is allowed to move along a fixed tapered needle valve to vary the flow through the orifice. The spring tension on the diaphragm and orifice is set by an adjusting screw on the top of the unit.

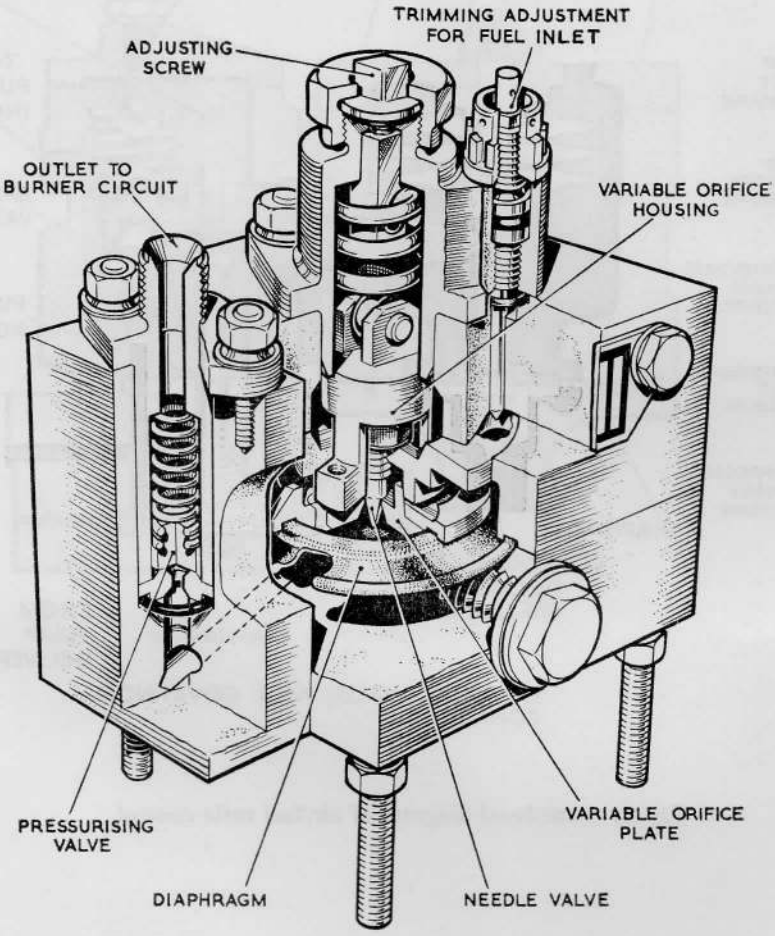

Fig. 3. Interior of metering valve

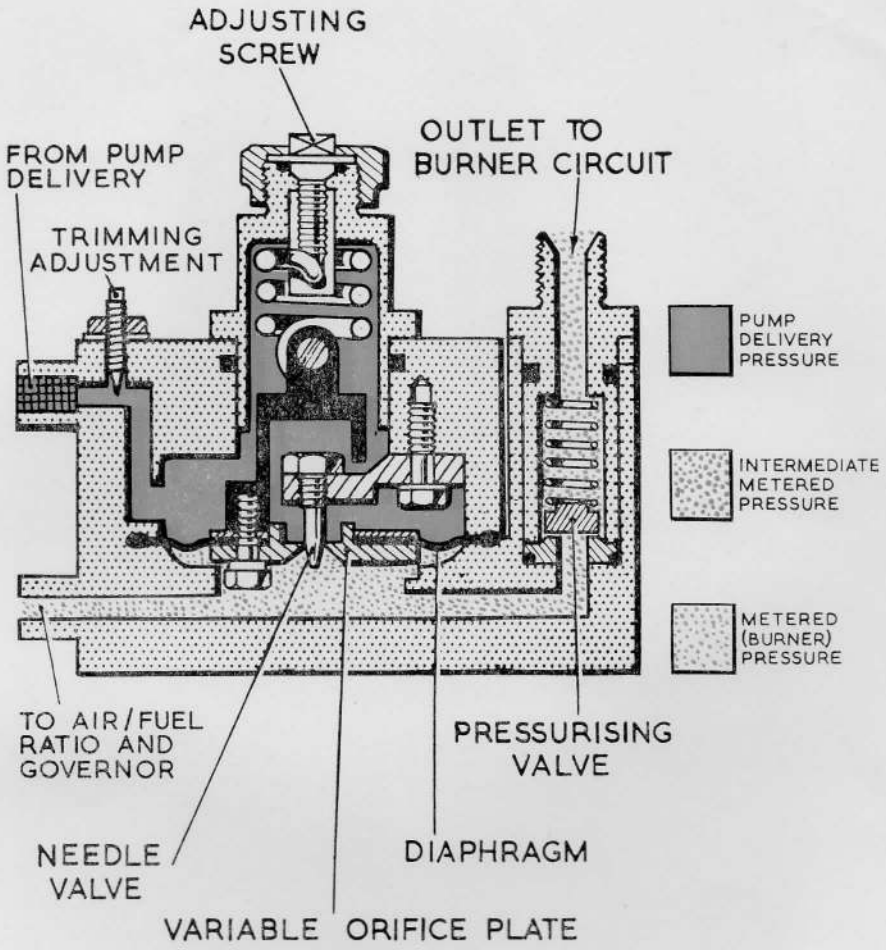

Fig. 4. Functional diagram of metering valve

7. Fuel, at pump delivery pressure, enters the unit through a strainer and then passes through a fixed orifice which acts as a trimming device for calibration purposes.

8. When a pressure drop occurs in the air/fuel ratio control it is transmitted to the metering valve. This overcomes the spring load on the diaphragm and moves the orifice along the tapered valve to control the fuel supply to the burners.

Installing and servicing

9. The air/fuel ratio control unit is attached to the engine by eight studs, four on each side of the capsule chamber. Connections are made to the compressor delivery, pump delivery, pump inlet, and to the metering valve. A strainer is fitted in the fuel inlet pipe.

10. The metering valve is secured to the engine by four studs. Unions are provided for connections to the pump inlet, the air/fuel ratio control and to the governor and burners.

11. Apart from an examination of the connections and unit attachment nuts for security, no servicing is necessary.

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