

Chapter 5

HIGH PRESSURE FUEL SHUT-OFF COCK, TYPE SOC. 101

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Introduction

1. The high pressure (H.P.) fuel shut-off cock (S.O.C.) (fig. 1) is installed downstream of the H.P. fuel pump, the fuel control unit,

and the low pressure (L.P.) shaft governor; all controlled flows lead to the cock, and the primary and main fuel-spray nozzle lines are taken from it.

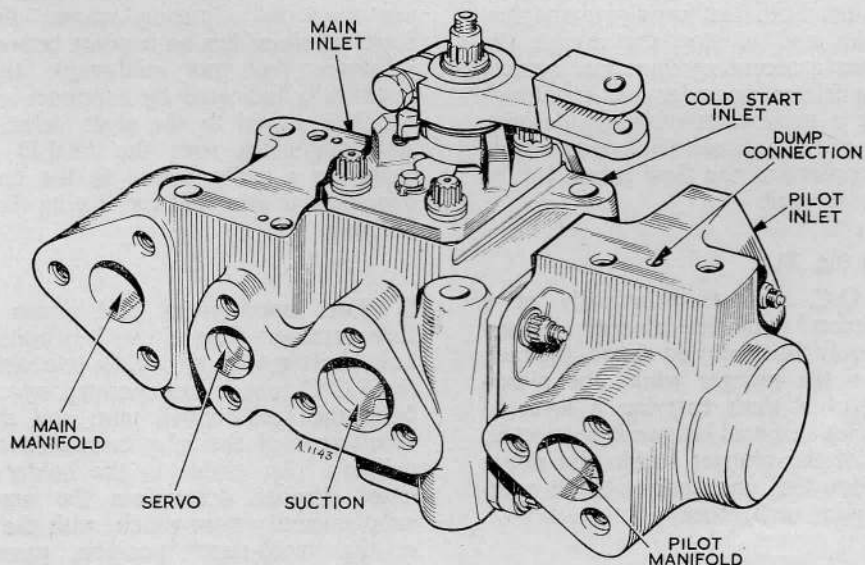


Fig. 1. External view of shut-off cock

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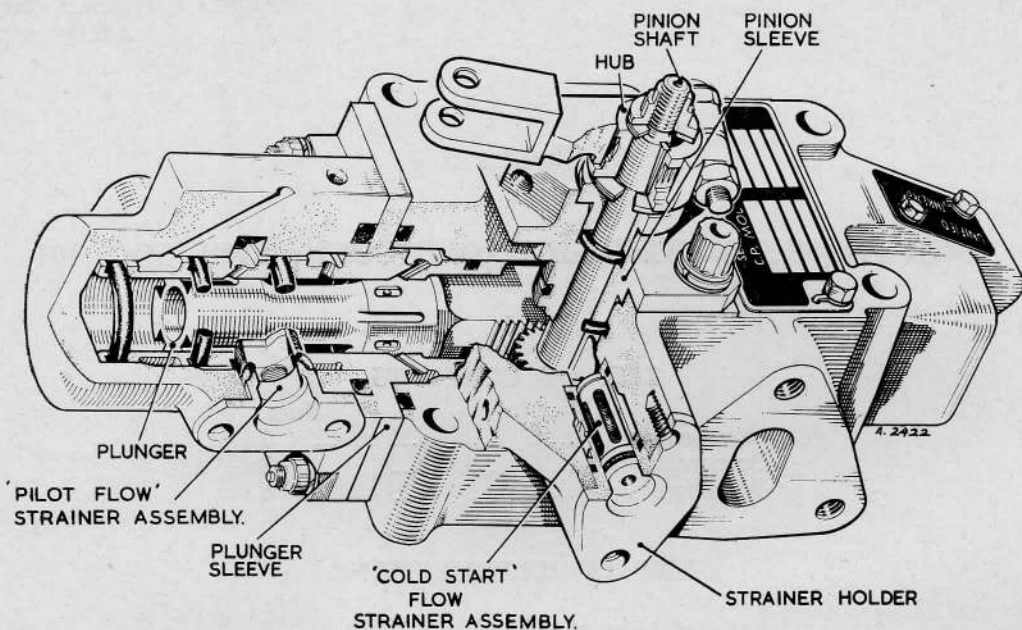


Fig. 2. Cutaway view of shut-off cock

2. As its name implies, the S.O.C. is used to shut off the H.P. fuel supply to the fuel spray nozzles and so stop the engine; the cock also has a secondary function, namely to assist engine starting under cold conditions by allowing a proportion of pump delivery to pass direct to the main fuel-spray nozzle line and supplement the flow scheduled by the fuel control unit.

Description (fig. 2)

3. The S.O.C. consists principally of a rack-and-pinion operated plunger housed within a closely fitting ported sleeve, the rack being cut in the plunger whilst the pinion forms part of a shaft carrying a lever to which the pilot's control linkage is connected. Movement of the plunger within the sleeve causes various fuel connections to be communicated with each other.

4. There are three operating positions of the plunger; these being "open", "cold start"

and "closed". The open and closed positions are fixed by adjusting screws; the "cold start" position lies on a point between these extremes (but not mid-way); the exact position is indicated by a pointer on a hub which is keyed to the shaft being brought into alignment with the COLD START mark on a plate bolted to the body (this expedient is provided for rigging the control linkage).

5. Fuel entering the unit passes through three strainers (one of which is built into the L.P. shaft governor); of the two strainers in the S.O.C., one is incorporated into the inlet from the fuel control unit, and the other forms part of the inlet connected to pump delivery. An orifice in the holder for the latter strainer determines the amount of supplementary flow which, with the plunger in the "cold-start" position, passes from pump delivery to the main fuel-spray nozzle line.

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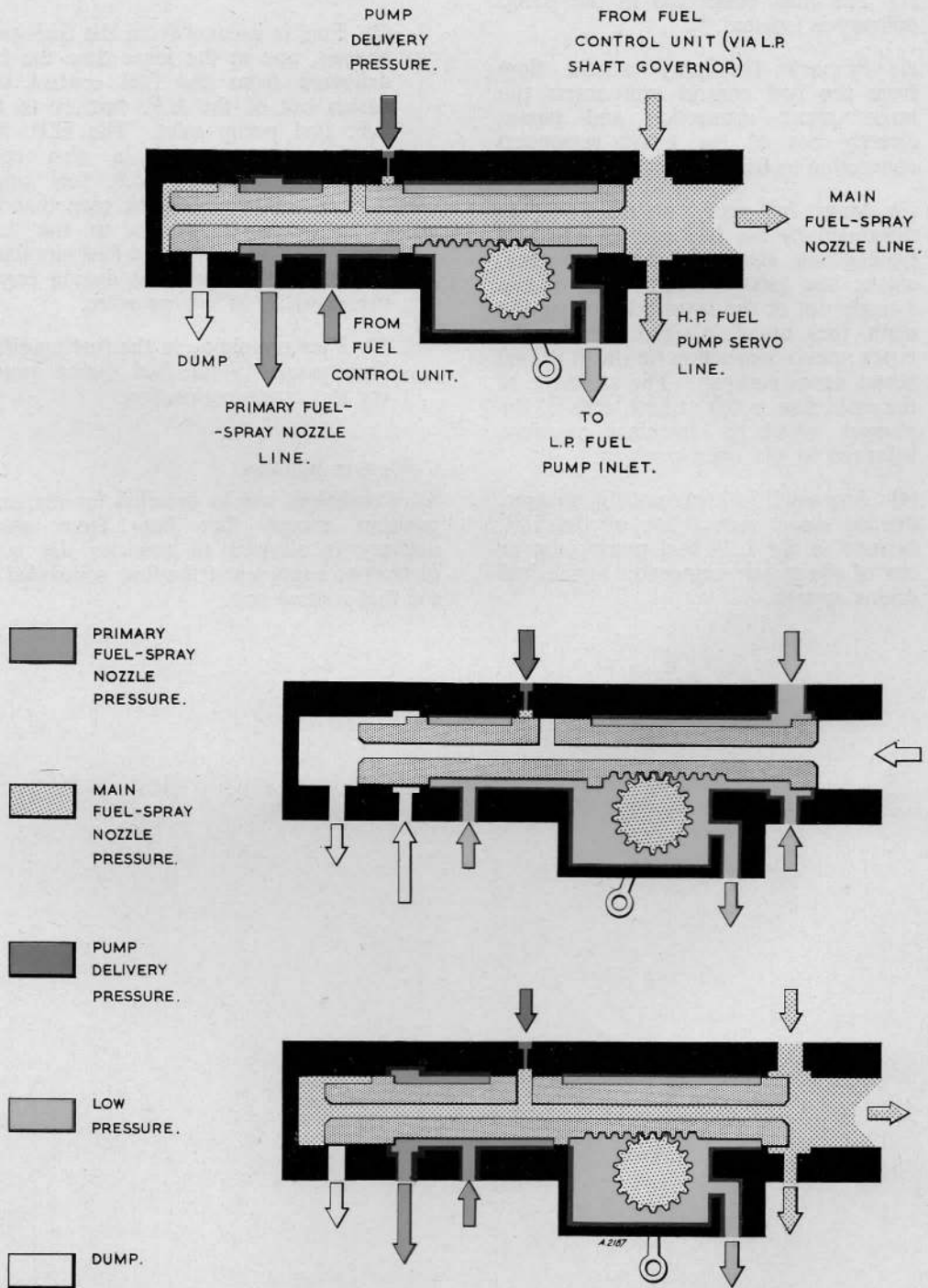


Fig. 3. Functional diagram of shut-off cock

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Operation (fig. 3)

Open position

6. (1) The inlet connected to the pump delivery is isolated.
- (2) Primary fuel-spray nozzle flow from the fuel control unit enters the PILOT INLET connection and passes directly out of the PILOT MANIFOLD connection to the primary fuel manifold.
- (3) Main fuel-spray nozzle flow, as scheduled by the fuel control unit and passing via the L.P. shaft governor, enters the MAIN INLET and passes directly out of the MAIN OUTLET (to the main fuel manifold) and out of the PUMP SERVO connection (to the H.P. fuel pump servo control). The pressure of the main flow is felt at both ends of the plunger which is therefore pressure balanced in the open position.
- (4) Any small leakage past the plunger, due to wear, passes out of the L.P. OUTLET to the L.P. fuel pump inlet or out of the DUMP connection to the fuel drains system.

Closed position

7. (1) The inlet connected to the pump delivery is isolated.
- (2) Fuel is isolated from the fuel-spray nozzles, and at the same time the fuel delivered from the fuel control unit passes out of the L.P. OUTLET to the L.P. fuel pump inlet. The H.P. fuel pump servo control is also communicated with the L.P. fuel pump inlet; it will therefore be seen that the servo pressure reduces to the L.P. pump inlet pressure; and fuel circulated by the fuel control unit during engine run down is at low pressure.
- (3) Fuel remaining in the fuel manifold lines passes to the fuel drains system via the DUMP connection.

Cold-start position

8. Conditions are as detailed for the open position except that flow from pump delivery is allowed to pass to the MAIN OUTLET to supplement the flow scheduled by the fuel control unit.



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