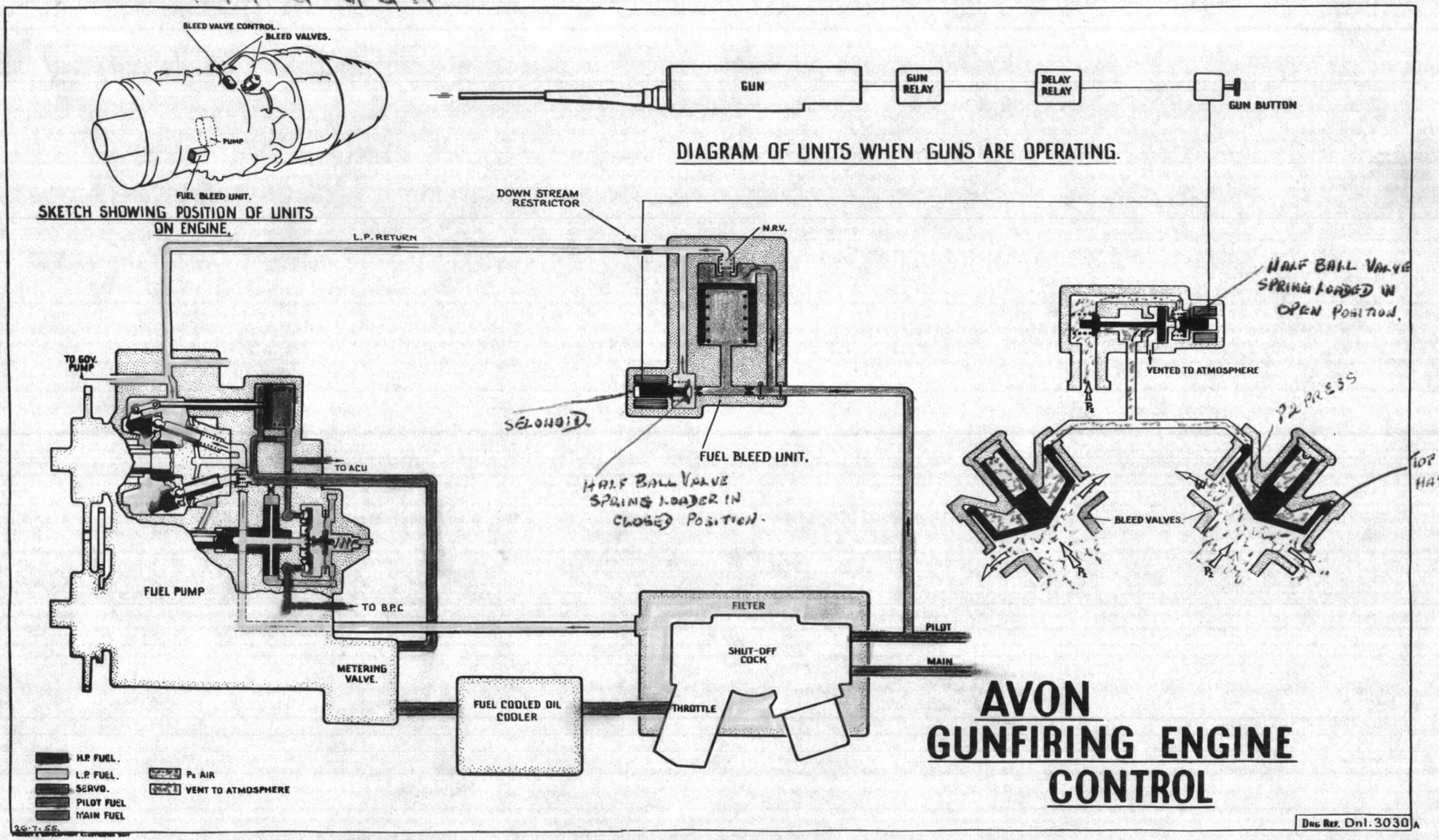
TEST.
1. UNLOAD GUNS.
2. SWITCH AT BUTT TEST
3. RUN ENG
RUN TO 7600.
4. OPERATE GUN FIRING BUTTON
5. REV LOSE 300
6. RELEASE G F B
7. ENSURE REV COME BACK TO NORMAL



AVON.

GUN FIRING - ENGINE CONTROL.

GENERAL.

The object of the system is to create engine conditions which, whilst firing, make the products of gun firing acceptable to the engine.

All axial engines in current fighters are prone to surge during gun firing, due to the products of firing in the form of burnt, unburnt gases and disturbed air entering the intake. These are unacceptable to the engine and surge may result. The seriousness of the problem depends on the position of the guns on particular installations and the margin between the working and the surge lines of the engines concerned.

The control system for Hunter aircraft is operated automatically from the gun button and consists of:-

1. A Fuel Bleed unit to bleed fuel from the pilot burner line.

2. An Air Bleed unit to bleed air from the compressor outlet casing.

The combined effect of these bleeds is to produce an underfuelling condition and thus increase the margin between the engine working and surge lines.

The two units are solenoid controlled from the pilots gun button to operate immediately the button is depressed, and cease to operate when the button is released.

The modifications to improve the engine performance during gun-firing are Mod.1020 (Avon Mk.113) and Mod.1022 (Avon Mk.115). These modifications alter the engine mark numbers to Avon 119 and Avon 120 respectively.

FUEL BLEED UNIT.

Construction.

The fuel bleed unit is fitted to the lower port side of the compressor casing and is an ON/OFF control of a fixed orifice bleed from pilot burner manifold pressure to L.P. at the fuel pumps.

Fuel flow is determined by a fixed restrictor placed downstream of an orifice which can be sealed by the head of a servo piston.

The servo piston is spring-loaded so as to close the orifice and is fed with pilot burner pressure on both sides, the pressure to the spring side first passing through a restrictor.

A solenoid operated half-ball valve connects pressure on the spring side to downstream of the main orifice.

Operation.

When the guns are not firing, the solenoid is not energised and the half-ball valve remains closed. The fuel pressures on both sides of the servo piston are therefore equal and the spring-load holds the piston on to the orifice so that no fuel bleed takes place.

/continued.

When the gun button is depressed, the solenoid opens the half-ball valve and drops the pressure on the spring side of the piston. This moves so as to open the orifice and a fuel bleed commences, controlled by the current pilot burner pressure and the final restrictor.

BLEED VALVES AND AIR BLEED UNIT.

Two additional air bleed valves are fitted to the anti-icing air outlet faces on the compressor outlet casing and controlled by a solenoid valve in the air bleed unit.

Construction.

The bleed valves are similar to the existing type as fitted to the compressor, but have no torsion spring on the upper side. They are held closed by the application of P_2 to the valve upper surface, which is larger than the effective area of the under surface when closed.

The control unit consists of a double ended valve positioned by P_2 acting on one end of the valve. The supply of P_2 is controlled by a solenoid operated half-ball valve controlled from the gun-button.

Operation.

Normally both the bleed valves are in the closed position, held there by the application of P_2. When the firing button is depressed the solenoid on the air bleed unit is energised and shuts off the supply of P_2 to the head of the piston.

The spring force closes the poppet valve thus changing the air pressure on the upperside of the bleed valves from P_2 to atmospheric pressure.

The two bleed valves open, bleeding P_2 from an internal annular manifold in the compressor outlet casing to atmosphere.

As soon as the gun firing button is released the solenoid valve is de-energised and a spring force opens the valve supplying P_2 to the top of the bleed valves, closing them.

Both of the above units are used in conjunction with:-

TIME DELAY RELAY.

A time delay relay is fitted in the gun firing electrical circuit to ensure that when the first round is fired the fuel and air bleeds have operated sufficiently. The delay is less than a tenth of a second.

FINAL NOZZLE.

A larger final nozzle has been added to permanently increase the margin from surge. Loss of thrust is offset by increasing the governed speed to 8150 R.P.M.

TESTING GUN FIRING

1 Unload Guns
2 Install at Butt Test
3 Run Engine to 7600 RPM.
4 Operate Firing button
5 Run back 300 REV APPROX
6 Release Gun Firing Button
7 Ensure Revs come back to normal.

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