Chapter 4

COMBINED CONTROL UNITS, TYPE R.T.C. SERIES

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Introduction

1. These types of control units are similar in construction and operation, one type of R.T.C. will be fully described, and the differences in other units explained in the text or shown in the table at the end of this chapter.

2. Other variations in the types of unit are the installation and calibration details. These are identified by the figures and letter(s) following the type number of the unit. Taking the R.T.C.17/18 AM as an example, 17 is the basic type number of the unit, /18 identifies the specific engine installation, and the AM is the calibration code to which the unit must be tested. Later types of r.t.c. have only a basic number e.g. R.T.C.101, this identifies both the engine installation and calibration code of the unit.

3. The control unit uses the proportional flow system, in which a small proportion only of the pump fuel is used for controlling purposes, the rest of the fuel passing direct to the burner circuit, thereby reducing filtration requirements. A number of additional functions and trims are incorporated in the basic circuit. These additional functions enable the control to meet the requirements of a given engine, and only comparatively minor changes are necessary to meet the requirements of any engine with the same order of fuel flows.

4. The control unit provides the following control features:—

(1) Fuel is metered basically by a scheduling control to maintain a given engine condition for one throttle position at all altitudes.

(2) A jet pipe temperature control as an override to avoid damage to the engine. If the control does not operate for any reason, the pilot still has satisfactory control of the engine.

(3) Engine idling speed rising with altitude to suit engine requirements.

(4) An acceleration control capable of matching complicated engine stall requirements at all altitudes.

(5) A pressurizing valve to split the fuel stream into the proportions required for duplex type burners.

(6) Automatic dumping for both burner manifolds.

5. This control system is designed basically to supply the correct quantity of fuel to the engine under cold atmospheric conditions. To correct the fuel supply to that required for other conditions, or to cover unusual engine conditions, trims are provided.

DESCRIPTION

6. For ease of description the r.t.c. is divided into its four major sub-assemblies:—

(1) Acceleration control unit. (a.c.u.)

(2) Throttle valve unit.

(3) Altitude sensing unit. (a.s.u.)

(4) Governor unit.

Acceleration control

7. The a.c.u. comprises the following parts.—

(1) The a.c.u. body, containing the main control capsule, sensing lever and servo operated metering plunger.

(2) The pressure ratio switch, which is an air operated switch and provides the means of changing compressor delivery pressure applied to the control capsule.

(3) The R.T.C.100 and 127 are fitted with a P.3 limiter which is an air operated valve sensing compressor delivery pressure (P3) and serving to limit the effective valve of P3 on the control capsule.

(4) The kinetic block containing the pressure drop control and kinetic orifice system to control pump delivery in accordance with the pressure drop across the metering plunger orifice. Also a second kinetic orifice system which controls the position of the metering plunger according to compressor delivery, this system being operated by the sensing lever through an internal servo system.

Throttle valve

8. The throttle valve unit consists of the following items:—

(1) A ported rotary throttle valve operating in a fixed sleeve, an idling by-pass which provides an adjustable flow for ground idling, and a filter to the secondary flow system.

(2) The constant flow valve which increases the idling flow to suit engine operating conditions at altitude.

(3) The pressurizing valve which controls the main burner flow in accordance with pilot burner pressure, and the main and pilot dump valves which drain the manifolds when the engine is stopped.

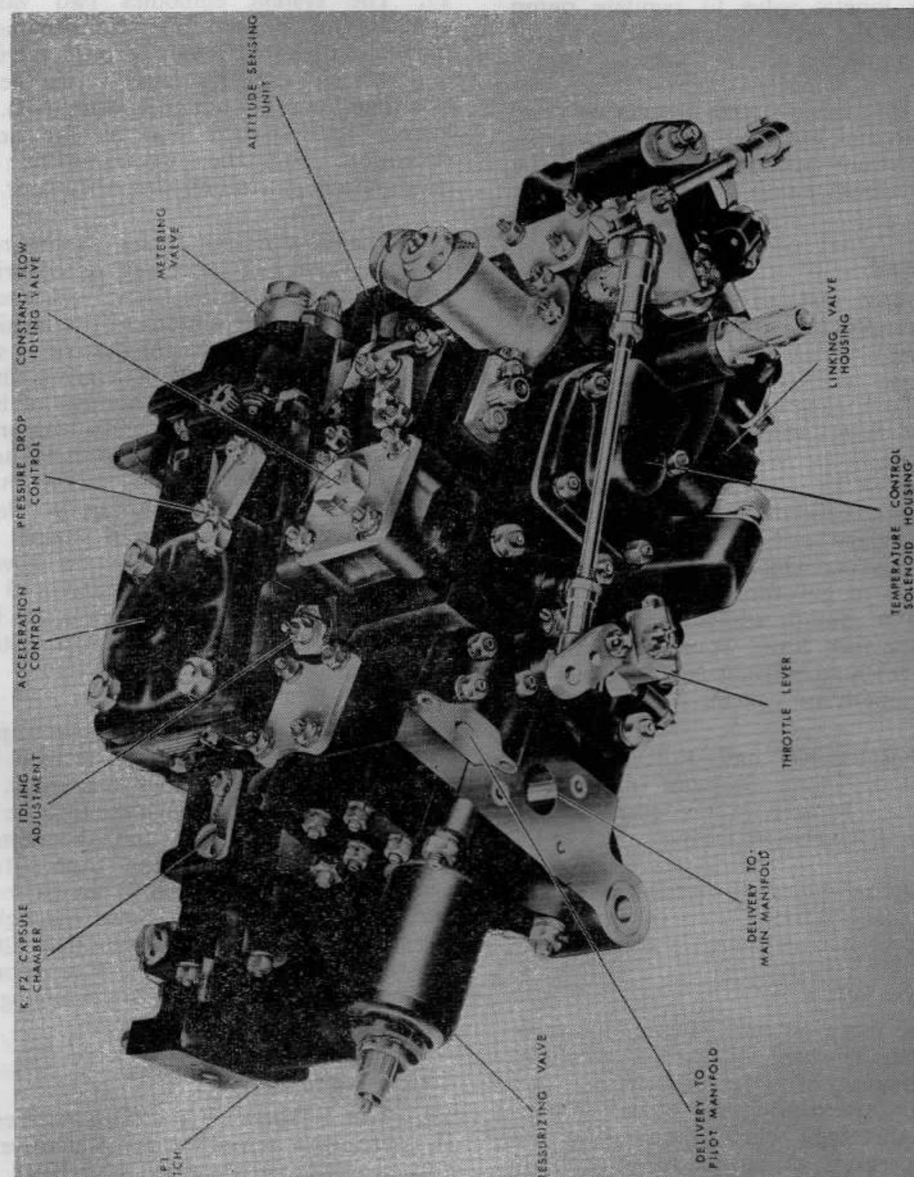
K. F2 CAPSULE CHAMBER
IDLING ADJUSTMENT
ACCELERATION CONTROL
PRESSURE DROP CONTROL
CONSTANT FLOW IDLING VALVE
METERING VALVE
ALTITUDE SENSING UNIT
P2 P1 SWITCH
PRESSURIZING VALVE
DELIVERY TO PILOT MANIFOLD
DELIVERY TO MAIN MANIFOLD
THROTTLE LEVER
LINKING VALVE HOUSING
TEMPERATURE CONTROL SOLENOID HOUSING

Fig. 1. R.T.C.17

Altitude sensing unit

9. This assembly provides the engine steady-running control. It comprises a diaphragm and piston balanced through a sensing lever by an evacuated capsule opposed by a spring force; the capsule is subject to air intake pressure (P1). The diaphragm and piston operate a kinetic valve to regulate pump delivery, via the servo system, with ambient barometric pressure.

10. The unit also contains a metering valve which maintains the proportional flow pressure at a constant value to compensate for the effect of reduced pump delivery at any one altitude.

Governor unit

11. The unit contains the secondary flow system, comprising two variable orifices in parallel, with a linking valve in series with them. Types of r.t.c. in which the governor is not applied, have one orifice set to a predetermined flow during calibration, and the other orifice varied by the temperature trim lever. The R.T.C.100 and 127 have two variable orifices and the flow through each of these secondary orifices is controlled by trimming levers. One, the governor trim lever, reacts to governor pressure N2 from the h.p. fuel pump, whilst the other, the temperature trim lever, is operated by an electrical solenoid sensing signals from the jet pipe temperature system.

12. The R.T.C.100 and R.T.C.127 also embodies an idling lock-out mechanism which is a safeguard in the event of the governor unit diaphragm failing.

13. A micro-switch is incorporated on the R.T.C.100 and R.T.C.127 to relieve excess fuel pressure when the engine is stopped.

Kinetic servo valves

14. In the servo system a kinetic type valve is employed. The principle used, is to control the kinetic energy of a jet of high pressure fuel by partially interrupting the jet with a controlled knife type blade, and using the recovery pressure of the jet to control the servo piston movement of the pump and the metering plunger.

OPERATION

15. References are to be made to fig. 5 for the R.T.C.100 and 127 and to fig. 4 for other series. For the purposes of explanation refer to fig. 4 unless otherwise stated.

16. A tapping is taken from a different stage of the engine compressor for application to the R.T.C.100 and R.T.C.127, consequently the compressor delivery pressure is referred to as P3; for other types of r.t.c. it is referred to as P2.

17. The system embodies two variable controls for normal operation, namely a manually operated rotary throttle valve (32) and an a.s.u. (22); the latter varies the flow as a function of air intake pressure (P1). The system is described first as for normal operation, and the trims, altitude and acceleration controls are described later.

18. The flow datum is set by the rotary throttle valve (32) exposing or covering a series of holes in the throttle valve sleeve (31), from zero (throttle closed) to the maximum number of holes in the throttle valve sleeve (throttle fully open). Thus a given throttle setting uncovers a certain number of holes; the actual setting is dependent upon the particular installation. An additional adjustable orifice (34) is provided in the throttle valve body to enable the idling fuel flow to be adjusted to suit a type of engine. This adjustment is carried out on the governor adjusting screw on the R.T.C.100 and R.T.C.127 due to inaccessability of the idling adjustment when the P3 limiter is installed.

Secondary flow

19. Delivery fuel from the pump passes through the a.c.u. (7) to the throttle valve (32) where it divides into two streams. The main stream passes through the throttle valve to the pressurizing valve (40) thence to the burner system, whilst the other stream, termed the secondary flow, by-passes the throttle valve and then flows through the filter (30), and the secondary orifices (26 and 27) to the linking valve (24). The secondary orifices provide the means of trimming, this will be described later.

Linking valve

20. The linking valve (24) equalises the pressure drop across the throttle valve with that across the secondary orifices, and comprises a spring loaded diaphragm and plate valve controlling an orifice in communicating with the a.s.u. The equalisation of pressure is achieved by the diaphragm sensing on its upper surface the downstream pressure of the throttle valve, and on its underside the downstream pressure of the secondary flow. When these two pressures

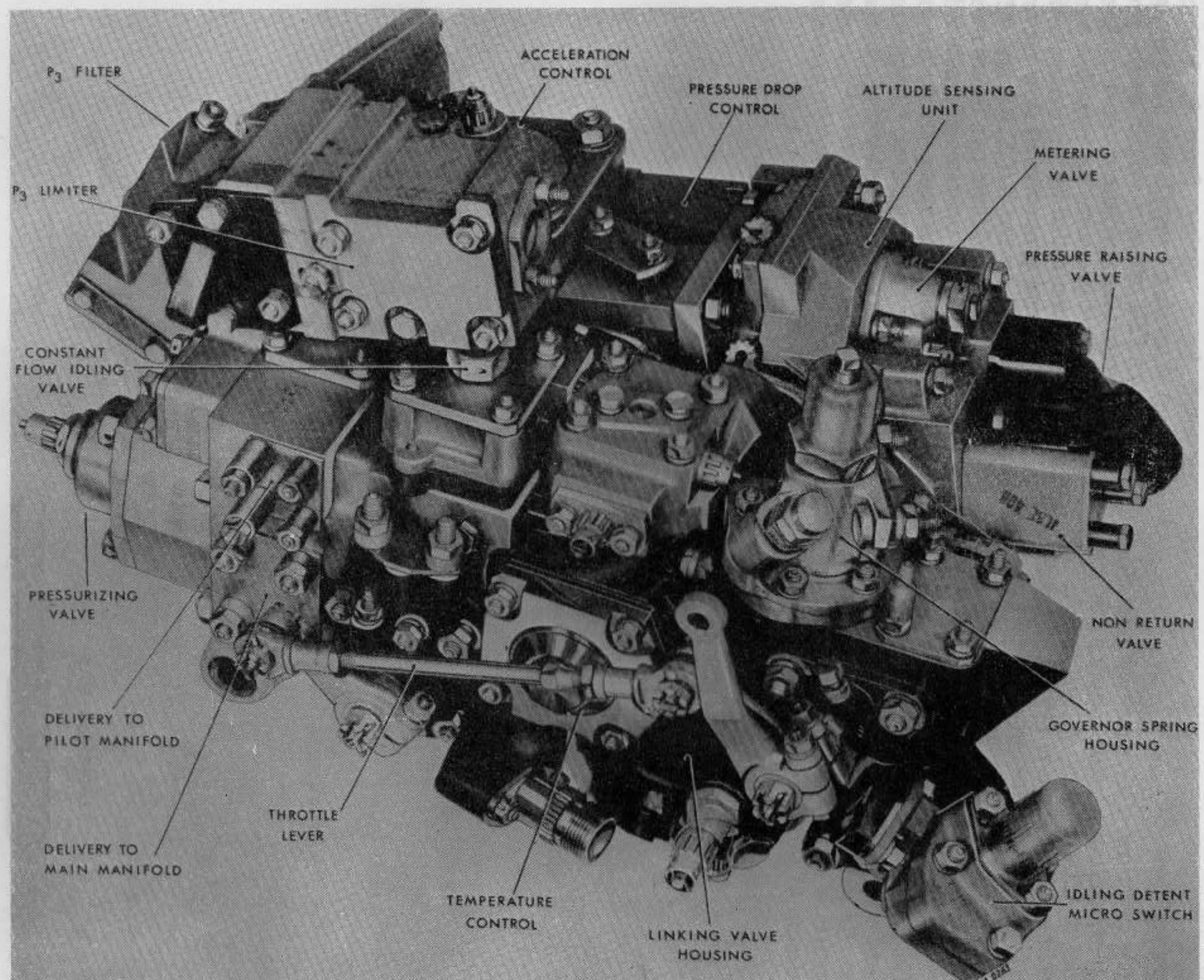
P_3 FILTER
ACCELERATION CONTROL
PRESSURE DROP CONTROL
ALTITUDE SENSING UNIT
METERING VALVE
P_3 LIMITER
PRESSURE RAISING VALVE
CONSTANT FLOW IDLING VALVE
PRESSURIZING VALVE
NON RETURN VALVE
DELIVERY TO PILOT MANIFOLD
GOVERNOR SPRING HOUSING
THROTTLE LEVER
DELIVERY TO MAIN MANIFOLD
TEMPERATURE CONTROL
LINKING VALVE HOUSING
IDLING DETENT MICRO SWITCH

Fig. 2. R.T.C.127

are equal the valve passes a steady flow to the a.s.u. Any unbalance of these pressures will displace the diaphragm valve and alter the flow through the orifice, thereby modifying the flow downstream of the linking valve. This downstream fuel is termed the proportional flow.

Proportional flow

21. The pressure of this proportional flow is the controlling factor applied to the diaphragm (20) of the a.s.u. which, by controlling a kinetic valve (19) in the pump servo system, regulates pump delivery in accordance with the pressure balance across the linking valve.

22. The closing of the throttle valve serves as a shut-off cock. By blanking off the holes in the throttle valve sleeve the main supply to the burners is shut off. This fall in pressure downstream of the throttle valve, due to the stoppage of the main flow, will unbalance the linking valve diaphragm and open the valve to increase proportional flow and reduce pump delivery.

Altitude sensing unit

23. In the a.s.u. (22) an evacuated capsule opposed by a spring force is balanced through a sensing lever (21) by a diaphragm and piston (20) which is subject to the pressure difference between the proportional flow and pump inlet pressure. (A modified pump inlet pressure controlled by a pressure raising valve and termed proportional flow metered pressure is used on the R.T.C.100 and 127). Any out of balance of these two forces moves the sensing lever and operates a kinetic valve (19) which adjusts the pump stroke through the pump servo system. Thus this pressure drop is kept directly proportional to air intake pressure (P1), by direct control of the pump stroke. This pressure differential is maintained by the metering valve (17).

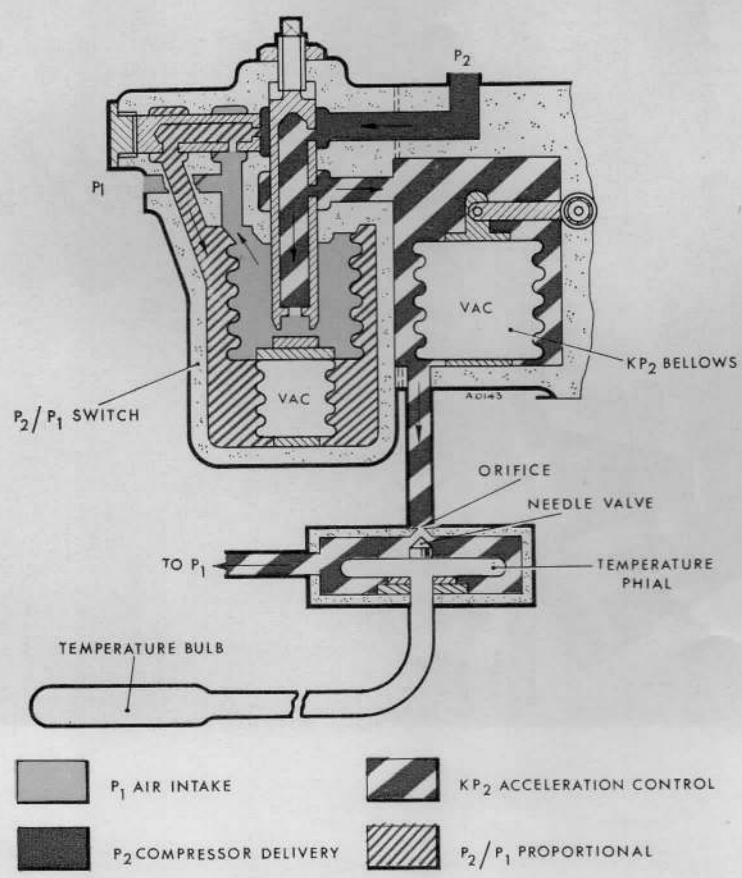

Fig. 3. T.I. Compensating device. Functional diagram

Metering valve

24. The metering valve is designed to produce the correct fuel flow/P1 relationship to meet altitude requirements of the engine. It comprises a diaphragm carrying a moving orifice which moves over a fixed profiled needle. The diaphragm is moved by the pressure drop and its movement opposed by a tension spring.

25. For ease of manufacture the profiled needle is of conical form, consequently the metering valve does not give the correct flow and pressure relationship. This is corrected by fitting an adjustable orifice (18) upstream in series with the metering valve. The total pressure drop across both the valve and orifice is applied across the diaphragm of the a.s.u. to produce the correct fuel flow and P1 relationship.

26. As a result of the control so far described, the following conditions are achieved:—

(1) The proportional flow is a required function of P1.

(2) The proportional flow controls a certain pressure drop across two variable orifices (throttle valve and secondary orifices).

(3) The pressure drop across the holes in the throttle valve sleeve is identical with the pressure drop across the controlled orifices.

(4) The main flow is controlled solely by the number of throttle valve sleeve holes uncovered and the pressure drop across them.

27. This means that for any fixed throttle setting, the flow suitable for a given engine condition may be set for all altitudes. At other throttle positions the same proportion of this flow will maintain the same engine condition at all altitudes, subject to the existence of approximately standard conditions.

Governor unit

28. This unit provides the means of applying overriding trims to the fuel flow, when a variation from the theoretical fuel/throttle angle requirement is necessary.

Temperature trim

29. Under steady running conditions the temperature trim lever (28) rests on a stop which prevents it from sealing the orifice, and so provides a minimum secondary flow. If the jet pipe temperature exceeds the permissible maximum, current is fed to a solenoid (29) to operate the trim lever. This allows an increase in secondary flow, and the rise in pressure opens the linking valve and increases proportional flow to the a.s.u. The unbalanced diaphragm then moves the sensing lever to operate the kinetic valve and reduce pump delivery until the temperature reaches the required value.

Governor trim (R.T.C.100 and 127. Fig. 5)

30. At all conditions above idling speed, the governor trim lever (36) is held against a maximum flow step and, therefore, can only reduce the secondary flow when a correction is applied. This governing is achieved by the spring loaded diaphragm (33) which senses centrifugal pressure from the h.p. fuel pump governor and operates the trim lever (31). Any change in the ratio between the main fuel flow and the secondary flow is transmitted instantly through the linking valve to the a.s.u. and then via the servo system to modify the pump stroke until the true ratio is restored.

Idling lock-out mechanism (R.T.C.100 and 127. Fig. 5)

31. The idling lock-out mechanism (32) is a safety device in the event of governor diaphragm failure. It is a mechanical override mechanism in the form of a cam on the governor spindle operating on an idling lock-out lever. The spring loading of the lever keeps it in contact with the governor trim lever. The governor spindle is interconnected with the throttle valve.

32. Under normal conditions, when the throttle lever is moved to the idling position, the cam on the governor spindle contacts the idling lock-out lever to overcome the spring loading and move the lock-out lever clear of the governor trim lever to allow it to close the orifice. This effects a decrease in secondary flow and also a decrease in proportional flow to the a.s.u. which will unbalance the diaphragm, and operate the kinetic valve to increase fuel delivery to meet engine requirements.

33. If the diaphragm fails, the governor trim lever moves and closes the orifice. The decrease in the secondary flow and therefore the proportional flow to the a.s.u. will unbalance the diaphragm and operate the kinetic valve to increase the pump delivery to a safe value.

Micro-switch (R.T.C.100 and 127. Refer to fig. 5)

34. The minimum flow as governed by the h.p. fuel pump is in excess of requirements for engine shut-down purposes, resulting in excessive fuel pressures and increased throttle valve torque. To overcome this condition, a micro-switch (30) is embodied in the system, to operate a bleed valve which by-passes excess fuel to the inlet side of the pump.

35. A spring loaded detent ball on the governor housing is used to operate the micro-switch. A fixture incorporated on the governor spindle contacts the ball and moves a push rod to make the contact which opens a by-pass to the inlet side of the pump through the solenoid operated starting bleed.

Pressurizing valve

36. The main fuel flow leaves the throttle valve already metered to suit the engine requirements. For the duplex type burners, it is necessary to split the flow into a pilot flow and a main flow. This is achieved by the pressurizing valve which diverts part of the fuel direct to the pilot burner manifold, whilst regulating the main flow in accordance with pilot burner pressure.

37. The pressurizing valve (40) is situated in the fuel supply line to the main burners and comprises a spring loaded profiled plunger, which is moved back progressively with increase of pilot burner pressure to open a flow area to the main burners that will provide the correct ratio of main flow to pilot flow.

38. The combination of large flows (hence large areas) and the comparatively high pressure drops required by modern high efficiency burners would necessitate a large spring force to oppose the movement of the plunger, were the pilot burner pressure made to provide the operative force. To reduce this factor and keep the spring to a reasonable size, the pilot burner flow is passed through a fixed orifice incurring a pressure drop. This fixed orifice pressure drop is applied across the plunger area to move it back against a relatively small spring force. The setting of the valve is therefore dependent upon the accuracy of the calibration of the pilot burners, but these are sufficiently accurate for any variations in the setting of the pressurizing valve to be within reasonable limits.

Dump valves

39. Built into the pressurizing valve block are two automatic dump valves, one for each of the main and pilot burner manifolds. The pilot dump valve (36) is a differential area piston operating against a spring. When the pilot burner pressure drops below a given value, the spring force operating on the piston seals off the pilot flow from the throttle valve and opens the pilot manifold to a dump collecting block. Owing to the differential area piston, when the engine is re-started, a higher pressure is required before the dump valve closes and allows the pilot manifold to fill.

40. The main manifold dump valve (38) is operated by the pressure in the pilot flow line. As soon as the pressure falls sufficiently, a spring opens a piston type valve which allows the main manifold to drain into the dump collection block. In the same way, as soon as the pilot burner pressure increases to a certain value to overcome the spring loading of the valve, this dump valve closes automatically.

Acceleration control

41. The function of the fuel control system so far described has been to maintain steady running conditions. An additional control is required during acceleration and this control has two basic requirements, it must allow the engine to accelerate in the shortest possible time, and it must make it impossible to overfuel the engine and stall the compressor. These two conflicting requirements must be met at all altitudes and atmospheric conditions, and it is necessary to use functions that are themselves independent of altitude and atmospheric variations to limit the supply of fuel to the engine. These are the ratio of air to fuel in the combustion chambers, and the compression ratio (P2/P1) of the compressor.

42. As the mass flow of air through the compressor can for all practical purposes be taken as directly proportional to compressor delivery pressure (P2), this factor is used to limit the amount of fuel that can be passed to the rest of the fuel control system. In order to match as closely as possible the complex curve that represents the overfuel curve, or compressor stall characteristic of an engine, it is necessary to use more than one ratio of flow to P2. An intermediate value between P1 and P2 is used to provide this, the change of ratio being controlled by the pressure ratio (P2/P1) switch.

43. The a.c.u. (7) consists of a variable orifice across which a constant pressure drop is maintained by a pressure drop control mechanism (12). The flow therefore is proportional to the area which is varied, to conform to the required functions of P2 and P2/P1, and is achieved by a metering plunger (9) moved by an internal servo system. The plunger is attached to a spring (8) and the sensing lever (10). An evacuated capsule (K.P2) which senses P2, moves the sensing lever and operates the internal servo kinetic valve (11) to re-position the plunger until equilibrium is restored.

44. On most engines it is desirable to have a lower air/fuel ratio at low engine speed, and increasing rapidly after a certain value of P2/P1, to a completely uncontrolled value or to a selected high ratio. This is effected by permitting a reduced proportion of P2 to operate on the K.P2 capsule over the lower speed range, and increasing to the full value at the selected value of P2/P1.

45. The pressure ratio switch (1) by which this is achieved, consists of two orifices (5) in series, with a tapping between them, so that whilst air is flowing through the orifices, a reduced proportion of P2 (which is the entry pressure) is available via the tapping on the K.P2 capsule; a smaller proportion of fuel against P2 is then obtained from the control than if full P2 were applied. At the selected value of P2/P1 an air switch is operated which closes off the exit from the lower orifice and therefore applies full P2 to the K.P2 capsule, with a consequent rise in fuel flow.

46. The mechanism of the P2/P1 switch consists basically of a large bellows to which is attached a smaller evacuated capsule (2). The bellows and capsule are surrounded by a proportion of P2/P1, determined by two small fixed orifices termed the potentiometer (4). The bellows are open to P1 on the inside and there is a plate valve (3) in its base. This plate valve shuts off the P2/P1 orifice exit when the ratio between the intermediate pressure and P1 has reached a certain pre-determined value; when the plate valve closes the orifice completely, full P2 is applied to the K.P2 capsule.

T1 compensating device (fig. 3)

47. The R.T.C.101 and R.T.C.126 are fitted with a T1 compensating device to control the stall characteristics of the engine with change in temperature. The device allows for a bleed of P2 from K.P2 capsule chamber via an orifice controlled by a needle valve. The needle is attached to a temperature phial controlled by a temperature bulb in the air intake. An increase in temperature expands the phial and causes the needle valve to tend to close off the orifice. This will allow an increase of P2 to operate on the K.P2 capsule and reposition the metering plunger of the a.c.u. to allow in increase in fuel flow. The reverse will apply when the temperature decreases.

P3 limiter (R.T.C.100 and 127. Refer to fig. 5)

48. To allow for excessive air pressure, and its resultant high fuel ratio in the combustion chambers, a P3 limiter (8) is incorporated in the system to reduce the effective value of P3 on the K.P3 capsule and keep fuel delivery to a safe value.

49. The P3 limiter comprises a capsule which is open on the inside to P3, and is opposed by a spring force through a hinged lever accommodating a half ball valve. The valve controls an orifice in communication with the K.P3 capsule chamber. Slight changes of loading can be applied to the lever by means of an adjustable trimming spring.

50. During the lower speed range, the P3 limiter is inoperative, as the opposing spring force overcomes the force of the capsule and retains the half ball valve on its seat. Increase of P3 sensed on the K.P3 capsule (P3/P1 switch closed) is also applied to the inside of the P3 limiter capsule, with the result that the capsule force will overcome the force of the opposing spring, and allow the half ball valve to be lifted from its seat. An amount of P3 will be bled from the K.P3 capsule chamber, thereby reducing the effective value of P3 on the capsule, and keeping fuel delivery to a safe value.

51. The a.c.u. is fitted upstream of the other controls so that the whole of the fuel flow passes through the a.c.u. to the throttle valve. In doing this, a certain pressure drop is incurred, and this pressure drop is used to operate the constant flow valve.

Constant flow valve

52. Owing to certain engine requirements it is necessary to provide an engine idling speed which increases with altitude. This is effected by adding to the flow passed by the proportional flow system a constant flow by-pass in the order of 30 gal/h. The constant flow valve (33) consists of a diaphragm and plate valve, spring loaded to give a constant pressure drop. This pressure drop is applied across a fixed orifice, and the combination of fixed orifice and fixed pressure drop gives a constant flow. The pressure drop across the a.c.u. is used to operate the constant flow valve, the downstream side being connected to the main flow feed to the pressurizing valve.

53. An additional porting system is provided in the rotary throttle valve so that this extra flow, and the ground idling flow is shut off when the throttle lever is moved to the closed position.

INSTALLING AND SERVICING

54. Information on the fitting of the unit to the engine, connecting and setting up of throttle linkages is given in the relevant-engine and aircraft Air Publications.

55. The control unit should be inspected for damage, and damage to wire-locking, security of attachments and connections, and fuel leakage from connections and joint faces. At inhibiting periods during storage, and when being withdrawn from storage for installation, the control unit must be generally inspected for damage, and for foreign matter when dust caps are removed. In either event, and in the event of broken locking wire, the unit must be returned to a Repair Unit for examination and rig testing to ensure that the calibration has not been disturbed.

56. When the unit is installed on the engine, the only adjustments permissible, are to the idling adjustment screw (governor adjusting screw on R.T.C.100 and 127) for adjustment of ground idling speed, to the acceleration control pressure-drop trimmer screw, which controls acceleration time, and to the metering valve to correct for positive or negative rev/min creep.

57. To set the ground idling speed, the throttle valve linkages must be set up in accordance with the instructions given in the relevant engine and aircraft Air Publications, and the engine then trimmed if necessary by means of the idling adjustment screw or governor adjusting screw.

58. If the engine acceleration response is incorrect, the a.c.u. pressure drop trimmer screw should be adjusted. Rotation of the screw clockwise will increase acceleration time, i.e. decrease acceleration rate, whilst anti-clockwise rotation will decrease the time taken, i.e. cause engine to accelerate more rapidly.

Note . . .

It is important that both idling speed and a.c.u. pressure drop adjustments are made strictly in accordance with speeds and times specified in the relevant engine and aircraft Air Publications.

59. To correct for positive or negative creep, slight adjustment can be made on the metering valve adjustment screw. Rotation of the screw clockwise will decrease the speed.

60. The control unit must be inhibited with oil O.M.11 or O.M.13 and stored in accordance with the instructions given in A.P.4471A.

61. Do not introduce oil or any other fluid into either the P1 connection on the a.s.u. or into the P1 and P2 (P3) connections on the a.c.u. as this would seriously affect the calibration of the control unit.

TABLE 1

Types of R.T.C. units

Type	*Remarks*
R.T.C.17	Unit as described, with modified stop plate for pressurizing valve.
R.T.C.19	As R.T.C.17 with bonded diaphragm and ball bearing for swinging mounting.
R.T.C.24	As R.T.C.17 with revised a.c.u. and a.s.u. calibration.
R.T.C.26	As R.T.C.24 with revised calibration details, and clicker adjustment on a.c.u. pressure drop control.
R.T.C.100	Unit as described with P3 limiter fitted. Idling lock-out mechanism and governor micro-switch for solenoid operated starting bleed. Revised calibration.
R.T.C.101	As R.T.C.24 with revised calibration details and T1 compensator fitted.
R.T.C.116	As R.T.C.26 with variable governor orifice.
R.T.C.118	As R.T.C.24 with revised calibration details and modified stop plate for pressurizing valve.
R.T.C.119	As R.T.C.118 with revised a.s.u. calibration.
R.T.C.122	As R.T.C.119 with new throttle valve sleeve and revised calibration.
R.T.C.126	As R.T.C.101 with revised calibration details, and clicker adjustment on pressure drop control.
R.T.C.127	As R.T.C.100 with revised throttle valve and a.s.u. calibration.

Key to Fig. 4

1 PRESSURE RATIO (P2/P1) SWITCH
2 CAPSULE AND BELLOWS
3 PLATE VALVE
4 POTENTIOMETER
5 P2/P1 ORIFICE
6 K.P2 CAPSULE
7 ACCELERATION CONTROL UNIT (A.C.U.)
8 A.C.U. SENSING SPRING
9 A.C.U. METERING PLUNGER
10 A.C.U. SENSING LEVER
11 A.C.U. INTERNAL SERVO KINETIC VALVE
12 A.C.U. PRESSURE DROP CONTROL (P.D.)
13 P.D. CONTROL DIAPHRAGM AND PISTON
14 P.D. CONTROL SENSING LEVER
15 P.D. CONTROL SERVO KINETIC VALVE
16 PRESSURE RAISING VALVE
17 METERING VALVE
18 METERING VALVE ADJUSTABLE ORIFICE
19 A.S.U. SERVO KINETIC VALVE
20 A.S.U. DIAPHRAGM AND PISTON
21 A.S.U. SENSING LEVER
22 ALTITUDE SENSING UNIT (A.S.U.)
23 A.C.U. PRESSURE DROP TRIMMER SCREW
24 LINKING VALVE
25 IDLING DETENT BALL
26 VARIABLE ORIFICE (SET ON CALIBRATION)
27 TEMPERATURE TRIM VARIABLE ORIFICE
28 TEMPERATURE TRIM LEVER
29 SOLENOID
30 FILTER
31 THROTTLE VALVE SLEEVE
32 THROTTLE VALVE
33 CONSTANT FLOW VALVE
34 IDLING ADJUSTMENT SCREW
35 PILOT BURNER FLOW
36 PILOT DUMP VALVE
37 DUMP TO ATMOSPHERE
38 MAIN DUMP VALVE
39 MAIN BURNER FLOW
40 PRESSURIZING VALVE

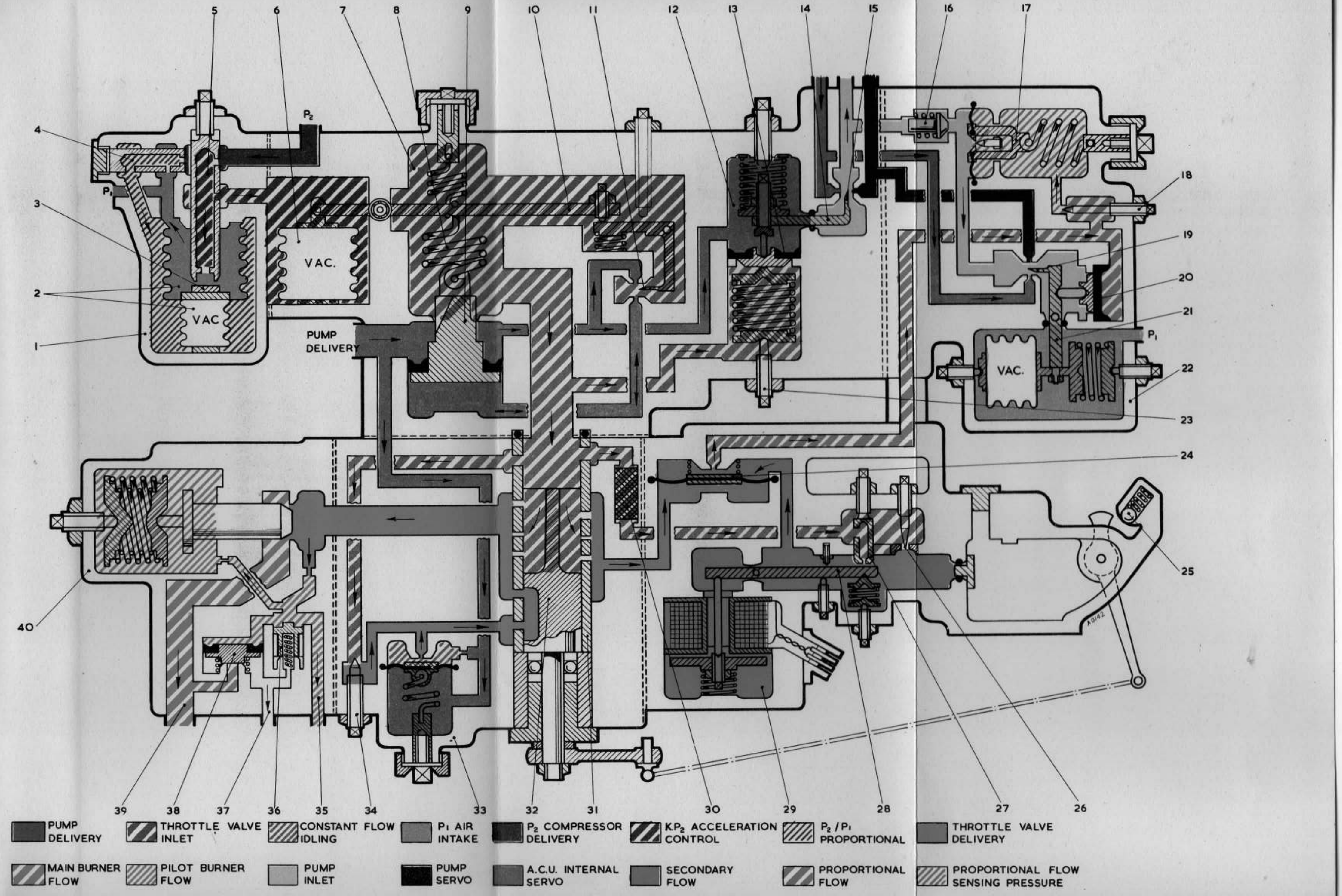

Fig. 4. R.T.C. 17 Functional diagram

PP9137 4126/280830 2/63 C & P

Key to Fig. 5

1 K.P.3 CAPSULE
2 PRESSURE RATIO (P3/P1) SWITCH
3 BELLOWS AND CAPSULE
4 PLATE VALVE
5 POTENTIOMETER
6 P3 FILTER
7 P3/P1 ORIFICE
8 P3 LIMITER
9 ACCELERATION CONTROL UNIT (A.C.U.)
10 A.C.U. METERING PLUNGER
11 A.C.U. SENSING LEVER
12 A.C.U. INTERNAL SERVO KINETIC VALVE
13 A.C.U. PRESSURE DROP CONTROL (P.D.)
14 P.D. CONTROL DIAPHRAGM AND PISTON
15 P.D. CONTROL SENSING LEVER
16 P.D. CONTROL SERVO KINETIC VALVE
17 NON-RETURN VALVE
18 METERING VALVE DIAPHRAGM AND ORIFICE
19 METERING VALVE
20 METERING VALVE ADJUSTMENT SCREW
21 METERING VALVE ADJUSTABLE ORIFICE
22 PRESSURE RAISING VALVE
23 A.S.U. SERVO CONTROL KINETIC VALVE
24 A.S.U. DIAPHRAGM AND PISTON
25 A.S.U. SENSING LEVER
26 ALTITUDE SENSING UNIT (A.S.U.)
27 P.D. CONTROL TRIMMING SCREW
28 LINKING VALVE
29 SECONDARY ORIFICES
30 IDLING DETENT MICRO-SWITCH
31 GOVERNOR LEVER
32 IDLING LOCK-OUT MECHANISM
33 GOVERNOR DIAPHRAGM
34 GOVERNOR
35 GOVERNOR ADJUSTING SCREW
36 GOVERNOR TRIM LEVER
37 TEMPERATURE TRIM LEVER
38 SOLENOID
39 FILTER
40 THROTTLE VALVE
41 THROTTLE VALVE SLEEVE
42 CONSTANT FLOW VALVE
43 IDLING ADJUSTMENT SCREW
44 PILOT BURNER FLOW
45 PILOT DUMP VALVE
46 DUMP TO ATMOSPHERE
47 MAIN DUMP VALVE
48 MAIN BURNER FLOW
49 PRESSURIZING VALVE

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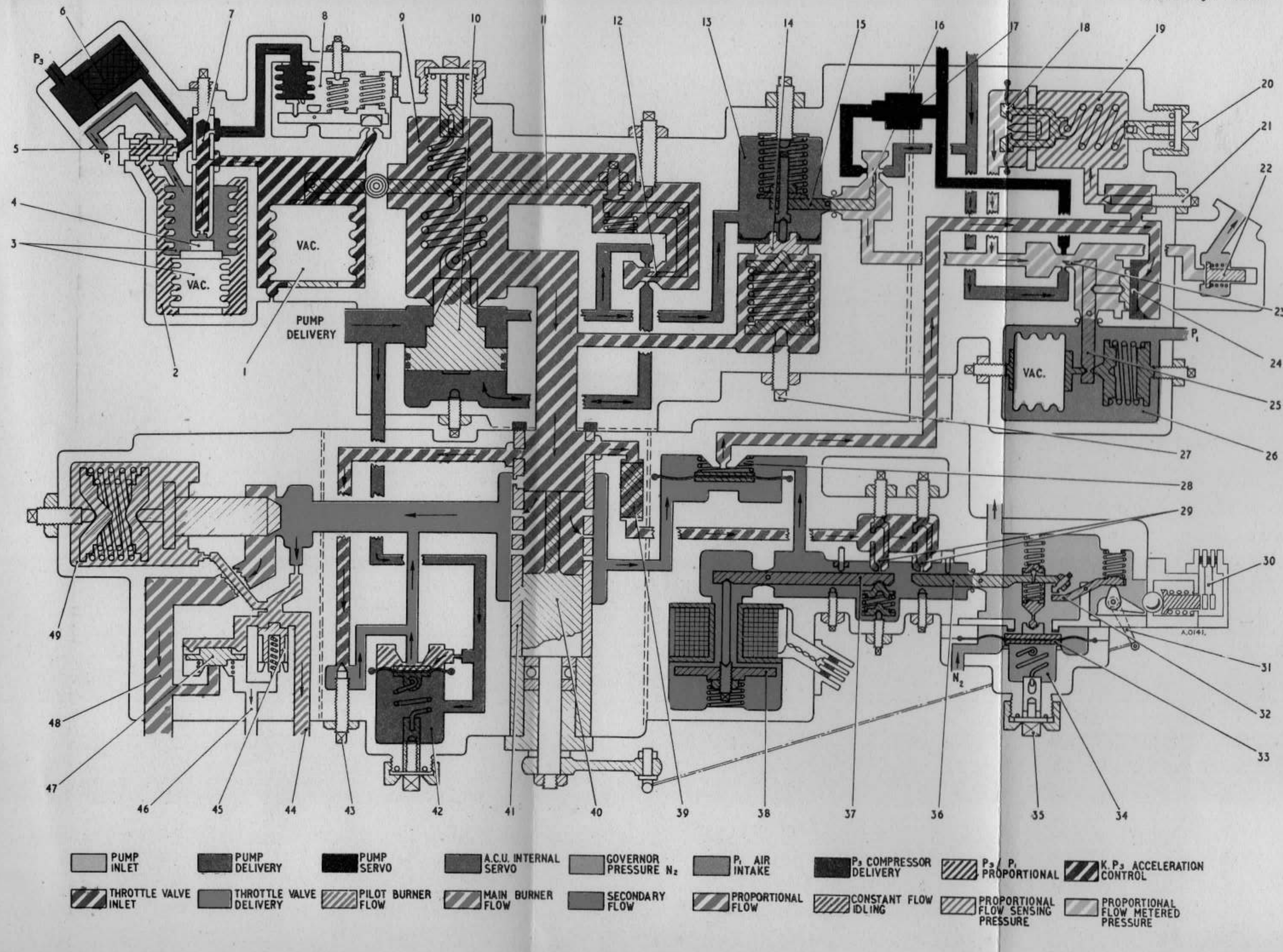

Fig. 5 R.T.C. 127 Functional diagram


MACH
Instrument panel
from a
Mk4 Jet Provost
(XP558)