Chapter 2 INSTRUMENT INSTALLATION

Note.—*This chapter supersedes that issued with A.L. No. 22*

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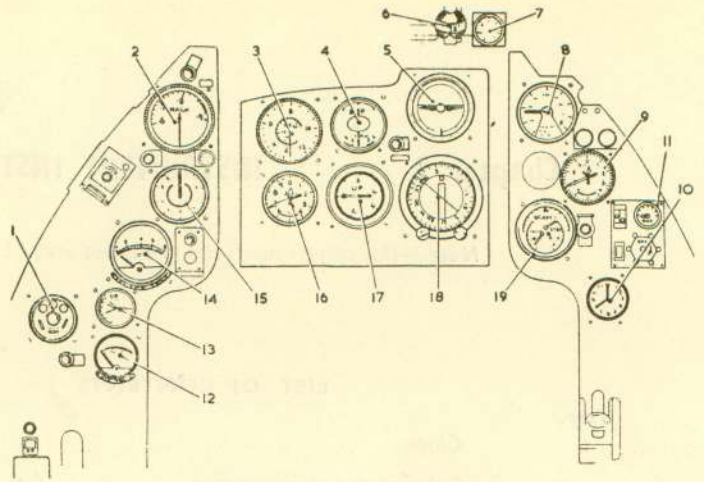
General

1. This chapter describes each individual system, giving the location of its component units and the associated electrical diagrams where applicable. The arrangement of the instrument panels upon which, with the exception of the E2A compass and accelerometer, all the recording instruments are mounted, is shown on Fig. 1. The key to this illustration indicates the position of each instrument. The routing charts and the theoretical diagrams for all the electrical instruments are contained in Chapter 1 of this Section. The installation and circuit diagrams of the larger instrument systems are shown in their relevant illustrations in this Chapter.



1 ALIGHTING GEAR INDICATOR
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Fig. 1. Instrument panels

DESCRIPTION

Instrument panels

2. The instrument panel assembly consists of four separate sections ; the left and right hand panels, the upper panel and the blind flying instrument panel. There is a cross tube secured to the sides of the fuselage, which takes the bottom anti-vibration mounting brackets for the blind flying panel and helps to secure the left and right hand instrument panels. The top blind flying panel anti-vibration mounting is secured to the windscreen casting, as is the upper instrument panel. The left and right hand panels are secured to the sides of the fuselage by small angle brackets. The blind flying panel and its associated anti-vibration mounting units are described in A.P.1275A, Vol. 1, Sect. 10, Chap. 1. The backs of the instruments are accessible, in situ, through the hinged armour plate door in bulkhead No. 1, accessible in itself in the nose compartment.

Pressure head pipe lines

3. The pressure head, Mk. 8Q, is fitted near the top of the port rudder fin and has two pipes connected to it which supply the air speed indicator, altimeter, rate of climb indicator and machmeter with a pressure differential which varies with the aircraft's speed and height. One of the pipes is open to atmosphere through the side of the pressure head and is termed the static line ; the other is open to atmosphere through the nose or tip of the pressure head, and is termed the pressure line. It will then be apparent that the pressure in the static line will only vary in accordance with the height of the aircraft and the general atmospheric conditions whereas the pressure in the pressure line will vary according to the aircraft's speed. The pressure head has an electrical heating element to prevent icing-up of the apertures and is described in Chapter 1 of this Section. The pipe lines are provided with two sets of water drain traps, one set being accessible in the forward end of the port boom and the other being accessible on the cockpit floor, situated at the lowest point of the pipe lines, thus collecting any water resulting from condensation. Full description and servicing details of the pressure head will be found in A.P.1275A, Vol. 1, Sect. 1, Chap. 17.

4. Details of the leak test for the A.S.I. pipe lines appear in A.P.1275B, Vol. 2, Part 1, Leaflet A.8.

Air speed indicator

5. This instrument, which is a Mk.9H*(P), is mounted on the blind flying panel and is operated by the pressure differential in the static and pressure lines. It is calibrated from 60 to 600 knots, the figures being rendered in fluorescent paint. The method of the pipe connection behind the instrument panel is shown in fig. 2. The instrument is fully described in A.P.1275B, Vol. 1, Sect. 1, Chap. 1.

Altimeter

6. A Mk. 14C (P) instrument is fitted to the blind flying panel and reads from 0 to 50,000 feet, the figures being fluorescent. Three pointers are utilized to give the complete height of the aircraft, one reading in " hundreds ", one reading in " thousands " and the last reading in " ten thousands". A small knob at the bottom of the instrument dial affords a correction in millibars on a small subsidiary scale on the dial. This should be set to the barometric pressure of the day in order that the altimeter will give the correct reading for that particular airfield location. Details of the pipe connections to the instrument are shown in fig. 2 and full details and servicing for the instrument are given in A.P.1275B, Vol. 1, Sect. 2, Chap. 4.

Cabin altimeter

7. This is an aneroid type instrument, Mk. 12D, and is mounted on the right hand instrument panel. Its purpose is to give the

pilot an indication of cockpit altitude, under pressurised flight conditions, in relation to actual aircraft altitude. The cockpit should maintain a pressure equivalent of not more than 24,000 feet at an aircraft height of 40,000 feet. For details of cockpit pressurisation refer to Sect. 3, Chap. 8 of this book. The instrument is fully described in A.P.1275B, Vol. 1, Sect. 2, Chap. 2.

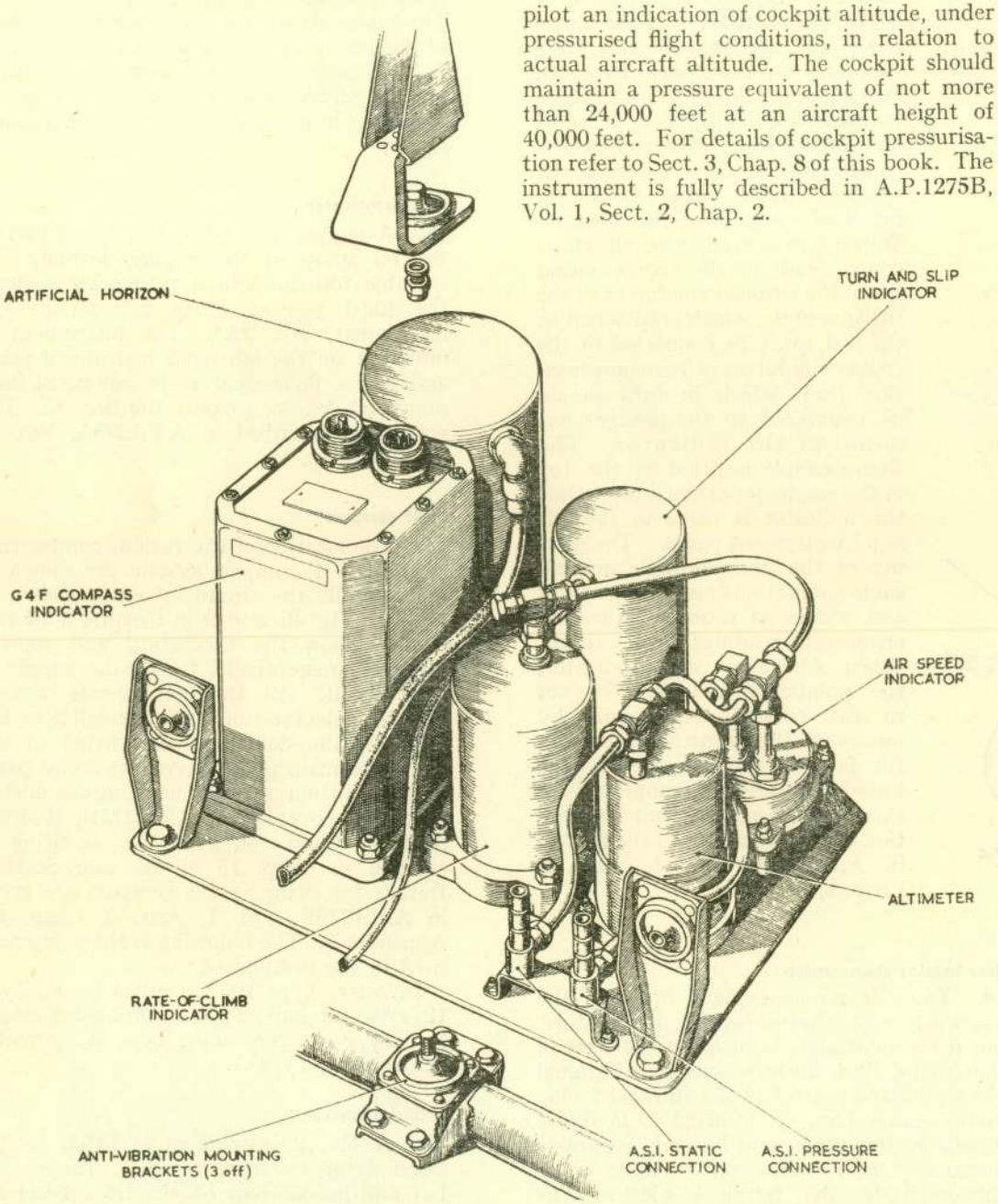

Fig. 2. Flying instrument panel

Rate-of-climb indicator

8. Mounted on the blind flying panel, this instrument, which is a Mk. 3A (P), is connected to the static line from the pressure head and has a fluorescent scale. It is calibrated from 0 to 4,000 feet per min. up or down. Details of the instrument appear in A.P.1275A, Vol. 1, Sect. 1, Chap. 16.

Machmeter

9. The machmeter, Mk. 1A*, is mounted at the top of the left hand instrument panel and is fitted to give to the pilot a continuous indication of the ratio of true air speed to the speed of sound at the altitude at which the aircraft is flying. The instrument consists of an air speed indicator and altimeter mechanism which combine to give a Mach reading. The instrument has a fluorescent scale and is calibrated from 0·5 to 1·0 mach. The pressure and static pipe line connections to the instrument are shown in fig. 3 and the instrument is described in A.P.1275B, Vol. 1, Sect. 1, Chap. 2.

Brake pressure gauge

10. This instrument is a multiple reading gauge employing three Bourdon tubes. The main Bourdon tube operates a pointer, through a suitable mechanism, to indicate the total air pressure available in the system, while the other tubes operate pointers to indicate the pressure being applied to the port and starboard undercarriage wheels via the brake controls, respectively. The instrument has a fluorescent dial and is calibrated from 0 to 600 lb. per sq. in. It is mounted on the right hand instrument panel. Full details of the brake pneumatic system are given in Sect. 3, Chap. 7 of this book, and full details of the instrument, which is a Mk. 1D, will be found in A.P.1275A, Vol. 1, Sect. 3, Chap. 10.

Oxygen indicator

11. This instrument is incorporated in the Mk. 16A oxygen regulator fitted between the right-hand instrument panel and cockpit wall. The oxygen economizer, Mk. 4, is mounted on the cockpit floor, the complete

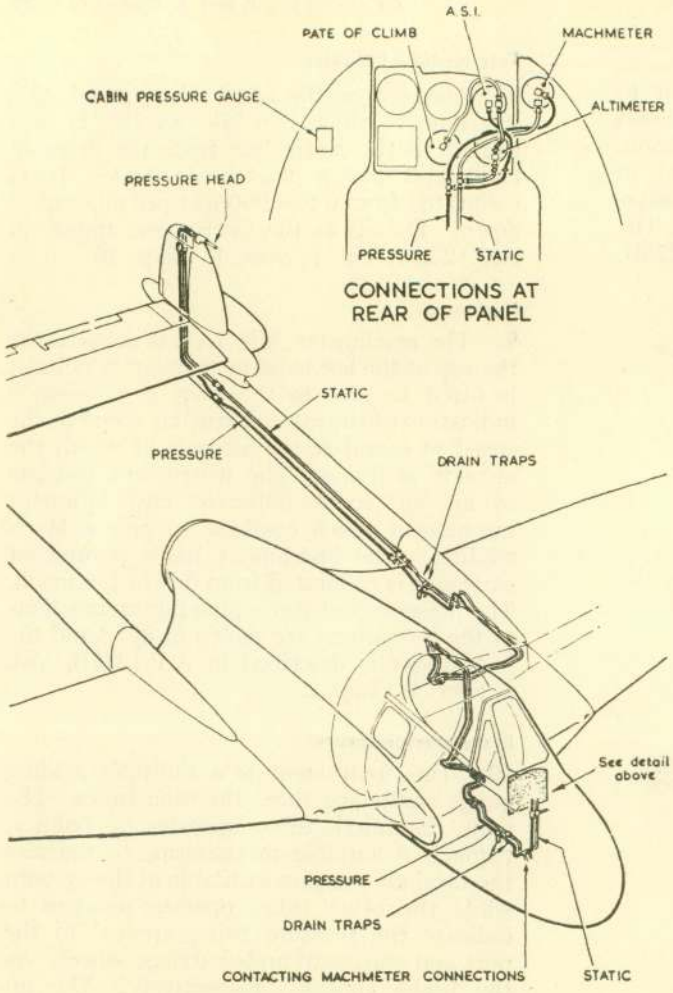

Fig. 3. Pressure head pipe line connections

installation being illustrated and described in Sect. 3, Chap. 10 of this book. The regulator is described in A.P.1275A, Vol. 1, Sect. 8, Chap. 18, while the economizer is described in Chap. 8 of the same Section as the regulator.

Clock

12. An eight-day clock Mk. 4 is fitted to the right-hand instrument panel; it is described in A.P.1275B, Vol. 1, Sect. 1, Chap. 9.

Exhaust gas thermometer

13. This installation consists of a thermocouple, Foster Type 33KK/902, forming the hot junction and an indicator, Type B, forming the cold junction. These two units are connected by chromel and alumel leads with copper and constantan compensating leads, the routing circuit being shown in fig. 8 of Chap. 1 of this Section. When connecting the thermocouple leads to the compensating leads, the chromel conductor of the thermocouple, which is flattened at the end, must be connected to the copper conductor of the compensating lead, which in turn should be connected to the positive terminal of the indicator. The thermocouple is fitted in the top of the engine jet exhaust pipe while the indicator is fitted to the left hand instrument panel. The seating of the thermocouple and all cable connections must be as tight and secure as possible, otherwise erroneous readings will result. When fitting a new indicator, the pointer should first be set to the cockpit temperature by means of the adjusting screw on the face of the instrument, the instrument being disconnected for this adjustment. A full description of the installation is contained in A.P.1275A, Vol. 1, Sect. 4, Chap. 9.

Rear bearing thermometer

14. There is no instrument fitted in the aircraft to record the rear bearing temperature, but a thermo-couple is fitted in the base of the engine, its leads terminating at terminal block 30 fitted to rib 1 of the starboard wing in the engine bay. It is fitted to facilitate ground testing of the rear bearing, a suitable instrument and compensating leads being connected to the terminal block. The thermocouple and leads measure 0·45 ohms resistance, the compensating leads, therefore, should measure 1·55 ohms to give a 2 ohm total resistance for the completed system. The materials used for the complete system of cables is copper and constantan only. A full description of the system is described in A.P.1275A, Vol. 1, Sect. 4, Chap. 7, under the heading of engine cylinder thermometer.

Oil thermometer

15. A temperature bulb, Mk. 3, is fitted in the oil sump of the engine, forming the variable resistance in a ratiometer system, the fixed resistor being integral in the instrument, Mk. 2A*. The instrument is mounted on the left-hand instrument panel and has a fluorescent scale calibrated from minus 50 deg. C. to plus 100 deg. C. The system is described in A.P.1275A, Vol. 1, Sect. 4, Chap. 1.

GM4F compass

16. The location of the various components in the GM4F compass system are shown in Fig. 4, while the circuit layout is shown in Fig. 5. Fig. 4C and 9 in Chapter 1 of this Section show the theoretical and routing diagrams, respectively, for the d.c. supply to this circuit. All the components, except for the detector unit, are accessible in the fuselage, the detector being fitted in the starboard main plane having its access panel in the bottom skin. The compass installation is covered in A.P.1275B, Vol. 1, Sect. 3, Chap. 14, while its servicing is covered in Chap. 15 of the same Section. Details for swinging the compass are given in A.P.1275B, Vol. 1, Sect. 3, Chap. 14, Appendix 3. The following is the equipment used in the installation :—

Inverter, Type 100A, control panel, Type 12, detector unit, Type A, precession amplifier, Type A, gyro unit, Type A, corrector control box, Type A.

Artificial horizon

17. A Mk. 2 instrument is fitted to the blind flying instrument panel. The horizon bar and graduations on the front bezel are rendered in fluorescent paint. The instrument derives its 115 volts, 3 phase, 400

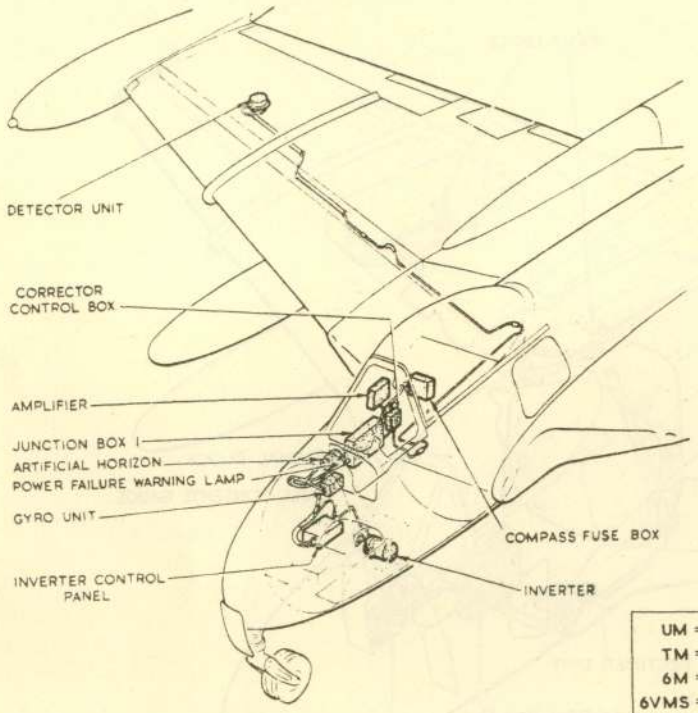

Fig. 4. GM4F compass and artificial horizon installation

cycles a.c. supply from the same inverter, Type 100A, which supplies the GM4F compass. The installation of the artificial horizon is consequently shown on the GM4F compass illustrations, Fig. 4 and 5. The supply to the inverter is controlled by the flight instrument switch, fitted on J.B.1, this supply being described in Chap. 1 of this Section. A.P.1275A, Vol. 1, Sect. 2, will contain further details of the instrument at a later date.

Turn and slip indicator

18. On this instrument alone the aircraft can be safely flown, and its supply, therefore, has been safeguarded as described in Chap. 1 of this section. The instrument is a 28-volt (nominal) d.c. instrument, Mk. 2, and is further described in A.P.1275A, Vol. 1 Sect. 2, Chap. 8. A small flag appears on the dial of the instrument, reading OFF whenever the electrical supply to the instrument is disconnected.

Fuel contents system

19. A Pacitor fuel contents system Mk. 5A is used, the layout and circuit of which is shown in fig. 6. The routing chart is shown in fig. 9 of Chapter 1 of this Section. A general description of the Mk. 5A system appears in A.P.1275A, Vol. 1, Sect. 3. Briefly, the principle of operation is as follows. The value of a capacitor will alter if its dielectric material is changed —that is, if other factors remain constant. In practice, a capacitor (tank unit) is fitted in a fuel tank where the fuel and air act as its dielectric. As the proportion of the fuel and air varies, so the capacitance of the unit varies. This change in capacitance, which is a direct and accurate measure of the amount of fuel in the tank, is used to operate a fuel contents indicator.

20. Five tank units are fitted, one in each wing tank 1, one in each wing tank 3, and one in the fuselage tank. The sum of the fuel in these tanks is shown, in gallons or lb., on the contents indicator on the instrument panel. Further fuel may be carried in pylon and/or wing-tip tanks. Any such fuel is used up, being pressure-fed into the fuselage tank, before fuel is drawn from the five main tanks ; it may, therefore, be considered as an auxiliary supply. The fuel contents system does not measure the fuel in the

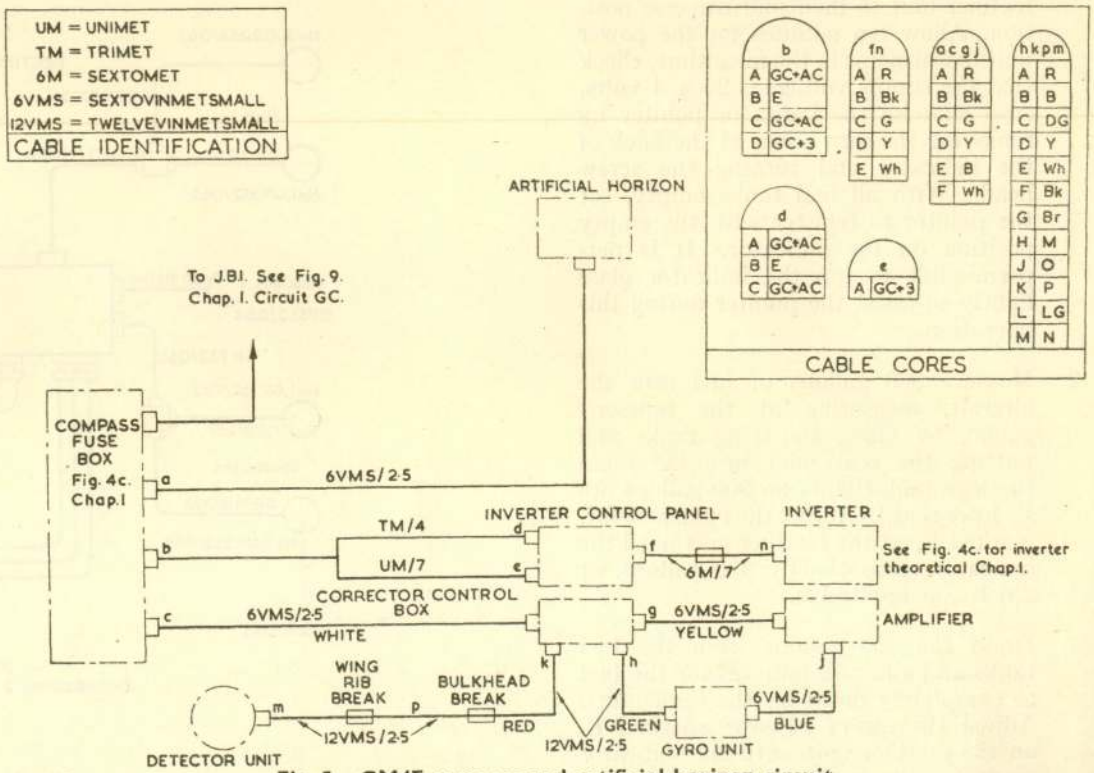

Fig. 5. GM4F compass and artificial horizon circuit

pylon or wing-tip tanks. A fuller description of the fuel system appears in Sect. 4, Chap. 2.

Servicing

21. *General.*—All the components are readily accessible. The indicator and power unit are in the cabin, the rectifier and fuselage tank unit being in the fuselage fuel tank bay. The four wing tank units are reached by way of access panels in the upper surface of the wings.

22. *Setting up the indicator.*—First, the aircraft must rigged in a 5 deg. nose-up attitude (*Sect. 2, Chap. 4 gives rigging instructions*). Check that the system is correctly wired, noting that coaxial cables must at no point have a bend radius of less than 4 in. Proceed as follows :—

(1) Switch ON. Set both trimmers on the rectifier unit to their mid-traverse position. Allow ten minutes for the power unit to warm up ; in the meantime, check that the supply voltage is 26 ± 1 volts. Also exercise the indicator pointer by removing the dust cover at the back of the indicator and turning the screw head. With all fuel tanks empty, set the pointer to register with the empty position on the indicator. It is per-permissible to tap the indicator glass lightly to assist the pointer during this operation.

(2) Measure 300 gallons of fuel into the aircraft, measuring at the bowser's gauge, by filling the wing tanks and putting the remainder into the main fuselage tank (limits on 300 gallons are ± 1 per cent.). Adjust the FULL resistor, marked F, on the rectifier unit until the indicator reads exactly 300 gallons, or 231 lb., as applicable.

(3) Drain the 300 gallons from the fuel tanks and allow 10 minutes for the fuel to completely drain off the tank units. Adjust the EMPTY resistor, marked E, on the rectifier unit until the indicator reads exactly empty.

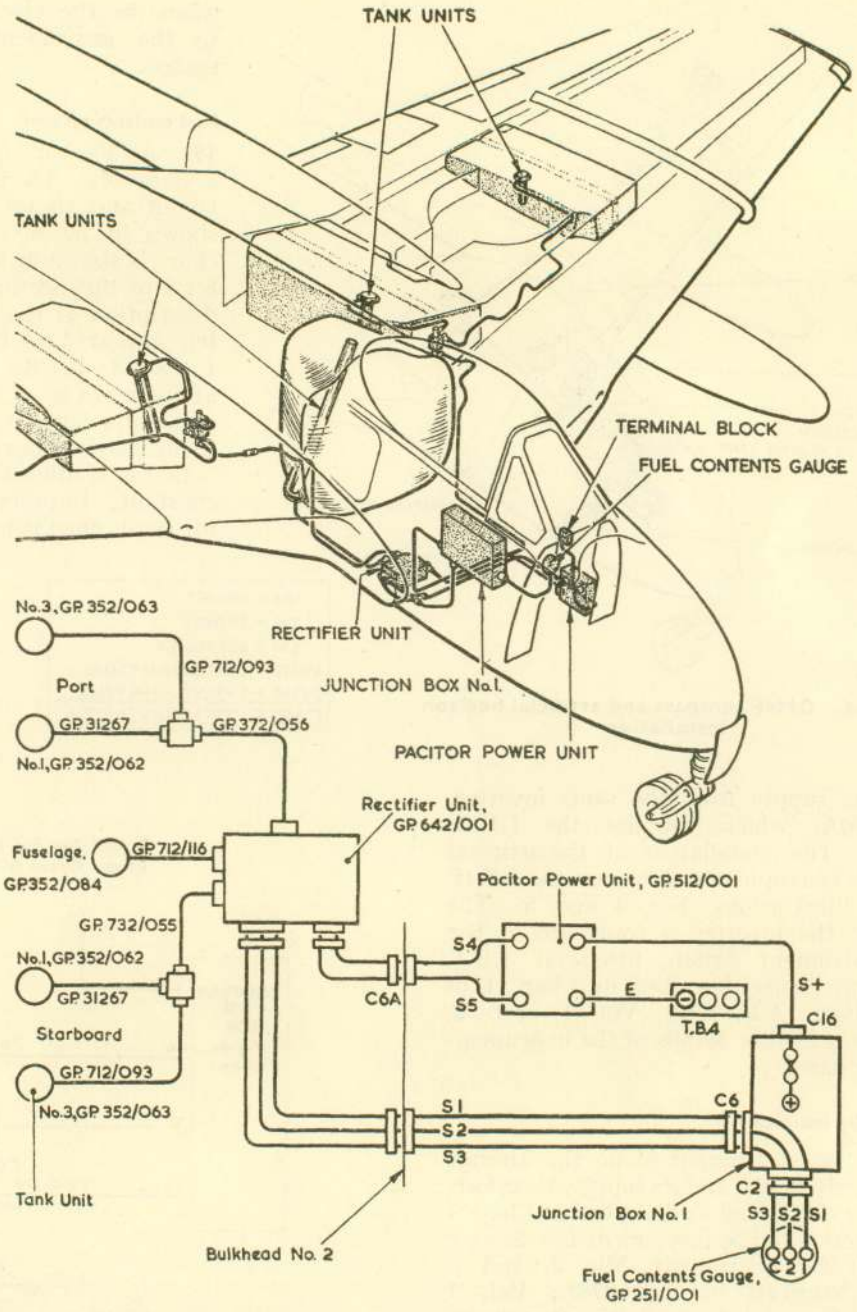

Fig. 6. Fuel contents system

(4) If a large variation of the E or F resistors has been made, it is advisable to repeat operations (2) and (3).

Fault location tests

23. General notes, in the form of a Table, are included in A.P.1275A, Vol. 1, Sect. 3, Chap. 17 to help in locating a fault shown at the indicator. The following is a more detailed procedure which can be carried out on the aircraft system, using the Pacitor test set as described in A.P.1275T, Vol. 1, Sect. 5, Chap. 3.

24. *Power unit.—*

(1) With an external supply of 26 to 28 volts d.c. connected to the aircraft, disconnect the d.c. connections to the power unit and connect them to the D.C. IN terminals of the test set. Ensure that the polarity is correct.

(2) Using cable GP.30900 supplied with the test set, connect the D.C. OUT terminal block on the test set to the d.c. terminal block of the power unit. Now inter-connect the a.c. output socket of the power unit and the A.C. IN socket of the test set with cable GP.30978/2.

(3) Turn test set switch C to FREQ. EXT. P.U. position.

(4) Set switch A to VOLTS D.C. and check that the pointer of meter B lies within the arc marked VOLTS D.C.

(5) Set switch A to AMPS D.C. and check that the pointer of meter B lies within the arc marked AMPS D.C.

(6) Set switch A to VOLTS A.C. and check that the pointer of meter B lies within the arc marked VOLTS A.C.

(7) Operate the FREQUENCY AND CAPACITANCE toggle switch and check that the pointer on Meter A, lies within the orange coloured sector.

(8) If all these checks prove satisfactory then the power unit is serviceable. Switch OFF the external supply.

25. *Indicator.—*

(1) Remove the dust cap from the back of the indicator and turn the zero adjusting screw anti-clockwise to zero.

(2) Disconnect the three pole indicator socket from the rectifier and connect the adapter GP.30729 to this socket. Now, connect cable GP.30978/3 to the adapter and to the 3-pole plug marked EXT. INDICATOR, on the test set.

(3) Remove fuse 20 from J.B.1. Using unipren 6 amp. cable, connect the test set D.C. IN positive to the socket of the gun bay inspection lamp supplied from its terminal 1 connection. Now connect the test set negative to the remaining socket of the lamp. *This correct polarity is important.* Switch ON external supply.

(4) Turn switch A of the test set to its EMPTY R position. The aircraft indicator should read zero.

(5) Turn switch A to its FULL R position and check that the indicator now reads FULL.

Note . . .

If it is suspected that the indicator pointer is sticking over its scale range, turn switch A to SLOW *and rotate the* SLOW CHECK AND OHMMETER ZERO *knob slowly so that the indicator pointer traverses from zero to* FULL. *If the pointer jumps the indicator movement is sticking and the indicator should be renewed. The readings on the indicator should be within 2 per cent. of its full scale reading.*

(6) Switch OFF the external supply, remove the unipren 6 amp. cable from the gun bay inspection lamp socket and replace fuse 20 in J.B.1. If the indicator has passed this test satisfactorily then it is serviceable.

Note . . .

The system must be reset as detailed in the setting-up procedure.

26. *Rectifier.—*

(1) Disconnect all five connections to the rectifier. Remove the lid of the rectifier. Set the test set switch A to its 20 TO 60 OHMS position. Connect cable GP.30967 to test set OHMS terminal, that is with the spade clip to the black terminal and the wander plug to the socket.

(2) Connect the test set to the gun bay inspection lamp as detailed in para. 25(3). Switch ON the external supply.

(3) Zero the test set ohmmeter by shorting the GP.30967 cable leads together and turning the SLOW CHECK AND OHMMETER ZERO knob until meter B reads full scale deflection.

(4) Connect cable GP.30980 to the three pole plug of the rectifier unit and connect the crocodile clip lead of cable GP.30967 to the blue lead of cable GP.30980.

(5) Connect the probe lead of cable GP.30967 to the blue lead on the rectifier element. Now rotate the F resistor in the rectifier till meter B reads 25 ohms. The rectifier FULL adjustment is now set. Switch OFF the external supply.

(6) Set test set switch A to OHMS 700–800, switch ON and again zero the test set ohmmeter. Connect the probe lead of cable GP.30967 to the remaining lead of cable GP.30980.

(7) Rotate the E resistor in the rectifier till meter B reads on the orange 700 line. The rectifier EMPTY adjustment is now set. Switch OFF.

Note . . .

At no time during tests contained in para. 26 *may any external circuit be connected to either the three-pole or two-pole connector of the rectifier, except when using cable GP.*30980.

(8) Using cable GP.742/074/1, junction unit GP.30694 and cable GP.732/063/1, connect the RECTIFIER coaxial plug on the test set to either of the three coaxial plugs on the rectifier.

(9) Using cable GP.30978/3, connect the three pole INDICATOR IN plug on the test set to the three-pole plug on the rectifier. Now, connect the two-pole A.C. OUT plug on the test set to the two-pole plug on the rectifier, using cable GP.30978/2. Turn switch C on the test set to F. CAP.

(10) Set switch B to the rectifier type number for the aircraft, i.e., GP.642/001. Set switch A to either INNER SCALE or OUTER SCALE depending on the position of the Type No. on switch B. Switch ON external supply.

(11) Set the pointer of meter A to the white line at the end of the capacitance scale marked 500 and Mk. 5A, using the SET INDICATOR POINTER KNOB.

(12) Allow a period of 10 minutes to elapse and set switch C to E. CAP. position. Meter A should then read approximately zero : it may be adjusted to zero by means of the E resistor of the rectifier. Switch OFF the external supply. Unless it is intended to check the cables and tank units, disconnect the leads from the gun bay inspection lamp and all the test set leads, and reconnect the rectifier to the aircraft cables. Refit the rectifier lid, ensuring to treat the Dowty O-ring seal with Kingsnorth compound No. 1026 (*Stores Ref.* 33C/810).

Note . . .

The system must be reset as detailed in the setting-up procedure.

27. *Cables and tank units.—*

(1) For these tests reference should be made to the table that follows :—

TABLE 1

Tank units and cable assemblies—capacitance

	Part Nos.	Capacitance (pF)
Tank units :	GP.352/084	128—118
	GP.352/063	105—97
	GP.352/062	90—84
Cable assemblies :	GP.732/056	160—150
	GP.732/055	151—141
	GP.712/116	56—52
	GP.712/093	242—226
	GP.712/092	87—81
	(Superseded by GP.31267)	
	GP.31267	87—81

(2) The unipren 6 amp. cables should be connected to the gun bay inspection lamp, as detailed in para. 25(3).

(3) Main tank : Connect junction unit GP.30694 to the coaxial plug marked CAPACITY on the test set. Plug aircraft cable GP.712/116 to junction unit GP.30694 and set switch C to the nearest value below 170. Switch ON the external supply. Press the FREQ. CAP. switch and note the reading on Meter A. Add this reading to 170 ; the result should be within the limits of 194 and 170 pF. Switch OFF external supply.

(4) Starboard tanks : Disconnect aircraft cable GP.712/116 from the junction unit and connect aircraft cable GP.732/055 to it. Switch ON external supply. Set switch C to the nearest value below 629, press the FREQ. CAP. switch and note the reading on Meter A. Add this to 629 ; the result should be within the limits of 675 and 629 pF. Switch OFF external supply.

(5) Port tanks : Disconnect aircraft cable GP.732/055 from the junction unit and connect aircraft cable GP.732/056 to it. Switch ON the external supply. Set switch C to the nearest value below 638, press the FREQ. CAP. switch and note the reading on Meter A. Add this to 638 ; the result should be within the limits of 684 and 638 pF. Switch OFF external supply.

(6) If these three tests have proved satisfactory all cables and tank units are serviceable. The test set may then be removed from the aircraft and all aircraft cables reconnected to the rectifier. If any test has proved faulty reference should be made to fig. 6 and each cable tested separately, being disconnected at each end for this purpose. Their capacitance is shown in Table 1.

28. The following Tables are included to facilitate complete range testing on the bench of the indicator and rectifier unit :—

TABLE 2

Indicator (gallons) and rectifier—resistance and capacitance

Gallons	Indicator (ohms)	Rectifier (pF)
0	777	1525
10	771	1529
20	760	1538
30	738	1555
40	721	1569
50	705	1584
60	690	1596
70	676	1608
80	658	1626
90	628	1653
100	602	1681
110	588	1695
120	566	1717
130	547	1737
140	530	1758
150	513	1777
160	498	1796
170	484	1815
180	467	1834
190	455	1852
200	441	1868
210	436	1877
220	430	1885
230	426	1891
240	422	1897
250	418	1902
260	413	1910
270	407	1919
280	400	1928
290	394	1940
300	382	1956
FULL	356	2000

TABLE 3

Indicator (mass units) and rectifier—resistance and capacitance

lb. x 10	Indicator (ohms)	Rectifier (pF)
0	777	1525
10	767	1532
20	743	1551
30	725	1567
40	702	1587
50	684	1602
60	662	1623
70	617	1660
80	597	1696
90	575	1707
100	548	1737
110	525	1768
120	502	1790
130	486	1813
140	463	1842
150	447	1862
160	437	1876
170	429	1885

TABLE 3—*continued*

Indicator (mass units) and rectifier—resistance and capacitance

lb. x 10	Indicator (ohms)	Rectifier (pF)
180	425	1894
190	418	1902
200	412	1910
210	404	1922
220	396	1938
230	383	1953
240	372	1968
250	364	1982
260	358	1994
FULL	356	2000

(1) Indicator: Connect an external test circuit, as shown in Fig. 6a, between the suspected indicator and a stable 24 volt d.c. supply. Adjust the variable resistor to the values shown in Table 2 or 3, as applicable, and check that the indicator reads, over its complete range, the gallons or lb. content for the resistance value inserted. If the indicator fails this test it should be renewed.

(2) Rectifier: Connect an external test circuit, as shown in fig. 6a, to any coaxial plug of the suspected rectifier. The power unit and indicator must be of tested serviceability. Adjust the variable capacitor to the values shown in Table 2 or 3 as applicable, taking into account the capacitance of the interconnecting Uniradio 31 cable, and check that the indicator reads, over its complete range, the gallons or lbs. content for the capacitance value inserted. If these readings are not obtained the rectifier must be renewed.

Note . . .

The E and F trimming resistors of the rectifier must be set to their mid-position before calibrating as above. The indicator should read within 2 per cent. of its full scale reading.

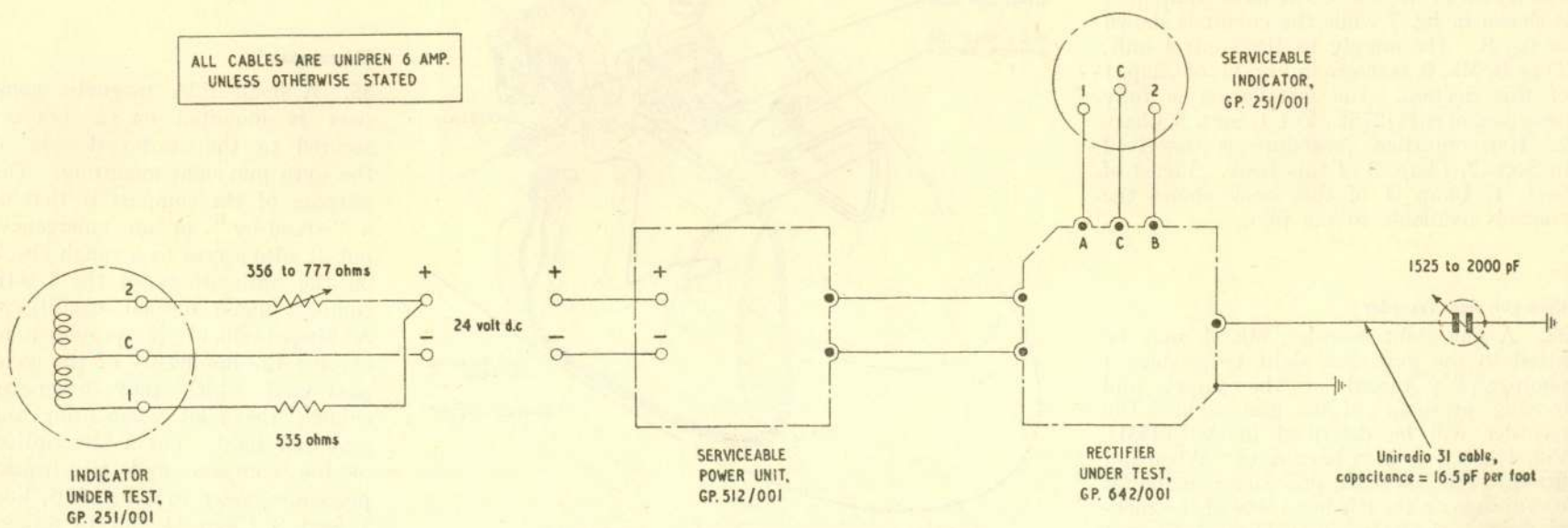

Fig. 6A. Fuel contents system test circuits

Flap indicator

29. The theoretical and routing diagrams for this installation are shown in figs. 4a and 7, respectively, in Chap. 1 of this Section. It is a Desynn system, the indicator, Type A, being fitted to the left hand instrument panel and the transmitter, Type C, being fitted in the starboard flap bay at the root of the boom. The indicator markings are rendered with fluorescent paint. The system may be tested, in situ, using the Desynn test set as described in A.P.1275A, Vol. 1, Sect. 6, Chap. 5. The indicator and transmitter are described in Sect. 1, Chap. 12 of the same A.P.

Alighting gear position indicator

30. This instrument is described, with its relevant circuit, in Chap. 1 of this Section and is fitted to the left hand instrument panel.

Gyro gun sight

31. A Mk. 4B gyro gun sight is fitted to the aircraft for gun and R.P. firing, the installation being wired to Class 2A specifications. The layout of the various items of equipment is shown in fig. 7 while the circuit is shown in fig. 8. The supply to the control unit, Type B, Mk. 6, is shown in Fig. 11, of Chap. 1 of this Section. The installation is fully described in A.P.1275E, Vol. 1, Sect. 5, Chap. 2. Harmonization procedure is described in Sect. 7, Chap. 3 of this book. Fig. 3 of Sect. 1, Chap. 1 of this book shows the controls available to the pilot.

Gyro gun sight recorder

32. A gun sight recorder, Mk. 4, may be fitted to the gyro gun sight to produce a photographic record of the target and moving graticule of the gun sight. The recorder will be described in A.P.1355D, Vol. 1, Sect. 3, at a later date. When not fitted to the gun sight, provision is made for its stowage on the left hand side of the cockpit floor, as shown in Fig. 3 of Sect. 1, Chap. 1 of this book.

G.45B camera

33. A G45B camera gun is fitted in a pod mounted to the lower surface of the port wing, inboard of the boom, and is accessible through a panel in the side of the pod to allow the magazine to be serviced. The location of the pod is shown in fig. 2 of Chap. 1 of this Section. The camera may be operated independently of, or in conjunction with, the guns, and R.P.'s. Provision is made for testing the camera when the aircraft is on the ground, a camera test switch, mounted on the left hand instrument panel, short-circuiting the armament micro switch in the nose wheel well when made to its TEST position. The method of harmonizing the camera with the guns and gun sight is described in Sect. 7, Chap. 3 of this book. The camera is described in A.P.1355D, Vol. 1, Sect. 1.

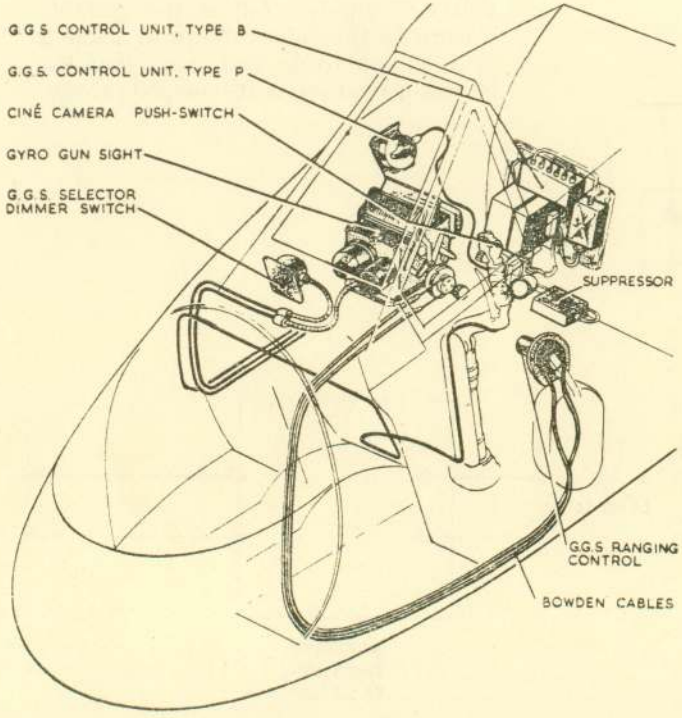

Fig. 7. Gyro gun sight and cine camera installation

Tachometer

34. The arrangement for indicating the speed of the engine comprises a small 3-phase generator connected to a cockpit indicator, constituting an independent electrical service. The generator, Mk. 8A, which is mounted on the upper engine wheel case, is directly driven through reduction gears at a quarter of the engine speed. The indicator, Mk.10A, consists of a 3-phase self-starting synchronous motor with a magnetic drag element, co-axial with the motor, which moves two pointers over the dial through suitable gearing, one indicating hundreds, the other thousands of r.p.m. The indicator dial and pointers are fluorized. The theoretical and routing diagrams are shown in fig. 4D and 12, respectively, of Chap. 1 of this Section. For full description and servicing details of the generator and indicator, refer to A.P.1275A, Vol. 1, Sect. 1, Chap. 14.

E2A compass

35. A small E2A magnetic compass is mounted on a bracket secured to the starboard side of the gyro gun sight mounting. The purpose of the compass is that of a "stand-by" in an emergency, but it also serves as a rough check on the authenticity of the GM4F compass under normal conditions. A hinged shield is provided to obscure the luminosity of the compass card which may otherwise confuse the pilot when using the gyro gun sight. For a description of the compass and adjustment procedure, refer to A.P.1275B, Vol. 1, Sect. 3, Chap. 11 and 13 respectively.

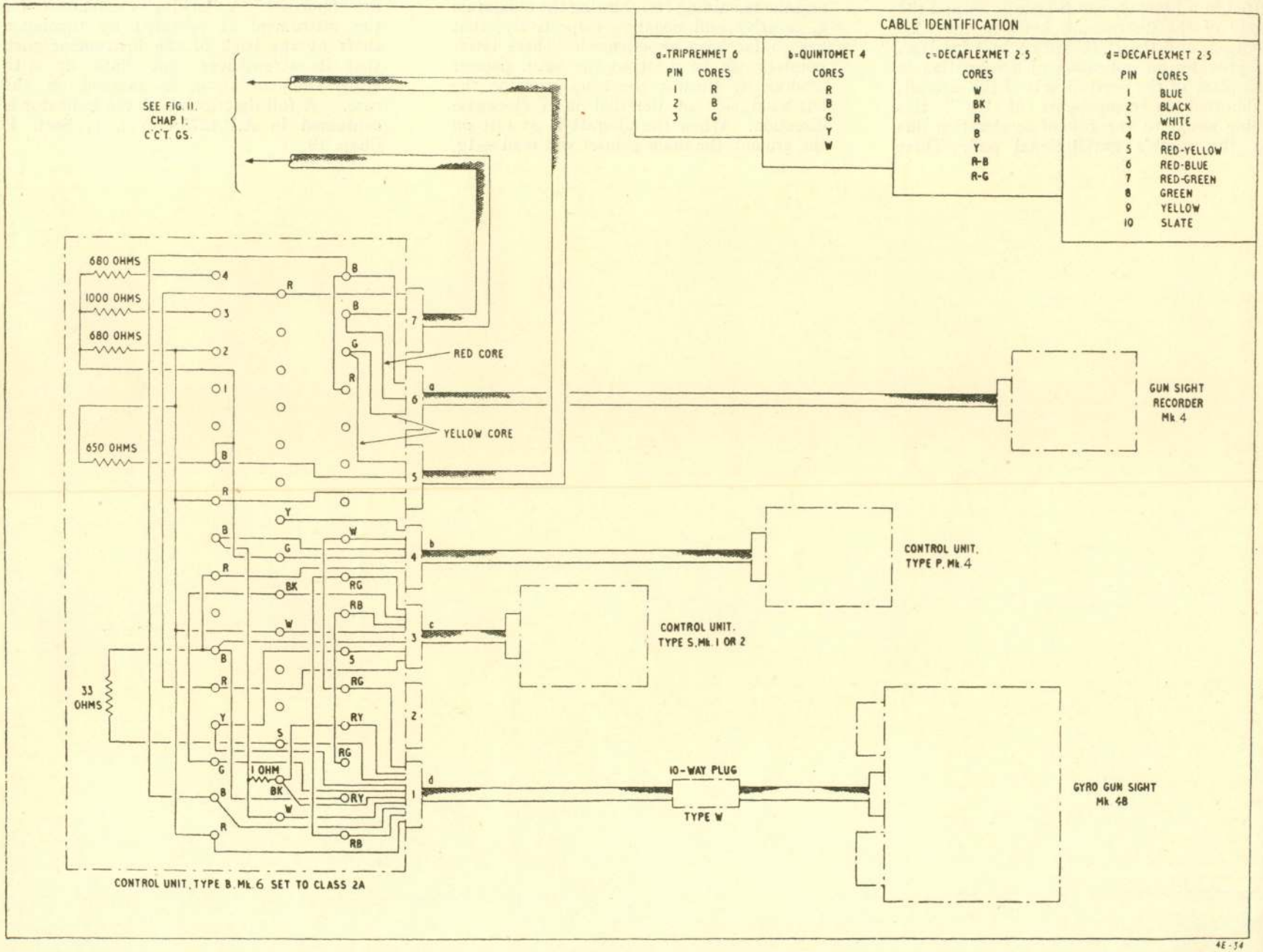

Fig. 8. Gyro gun sight circuit

Accelerometer

36. A Type KB.482/01 accelerometer is fitted in a bracket, which clamps around the body of the instrument, between the E2A compass and the starboard cockpit fuselage. It provides an indication of acceleration in the plane of the vertical axis of the aircraft, calibrated in components of "g", this being equal to the rate of acceleration due to the earth's gravitational pull. Three pointers are employed, the main one providing instantaneous readings from −4g to +12g, and the remaining two showing the maximum g, positive and negative respectively, that has so far been experienced. These latter pointers can be reset to the main pointer reading by turning the reset knob on the left-hand side of the dial in a clockwise direction. When the aircraft is at rest on the ground, the main pointer will read +1g, provided the aircraft is in its flying attitude. The pointers and graduations of the dial are fluorized. A locking mechanism for the instrument is operated by turning a shaft at the back of the instrument such that its screwdriver slot lines up with either FREE or LOCK, as marked on the case. A full description of the indicator is contained in A.P.1275A, Vol. 1, Sect. 1, Chap. 19.

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