Group 3 TANKER

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LIST OF ILLUSTRATIONS

CROSS REFERENCES

◄ *Mod. 2871 to navigation lamps* ... ... *Book 2, Chap. 2, Group 2* ►

Bomb door control, B/K/PR Mk. 1 ... ... *Chap. 8, Group 2*

Bomb door control, B/K Mk. 1 earlier Mod. standards (similar to B Mk. 1) *Book 2, Chap. 2, Group 5*

WARNING

Voltages in excess of 100v a.c. or d.c. can be dangerous under certain circumstances. Personnel should therefore, ensure that the electrical system is electrically safe before any servicing is attempted. Where it is essential that tests or adjustments are to be made with the electrical power switched on, the greatest care must be exercised.

DESCRIPTION AND OPERATION

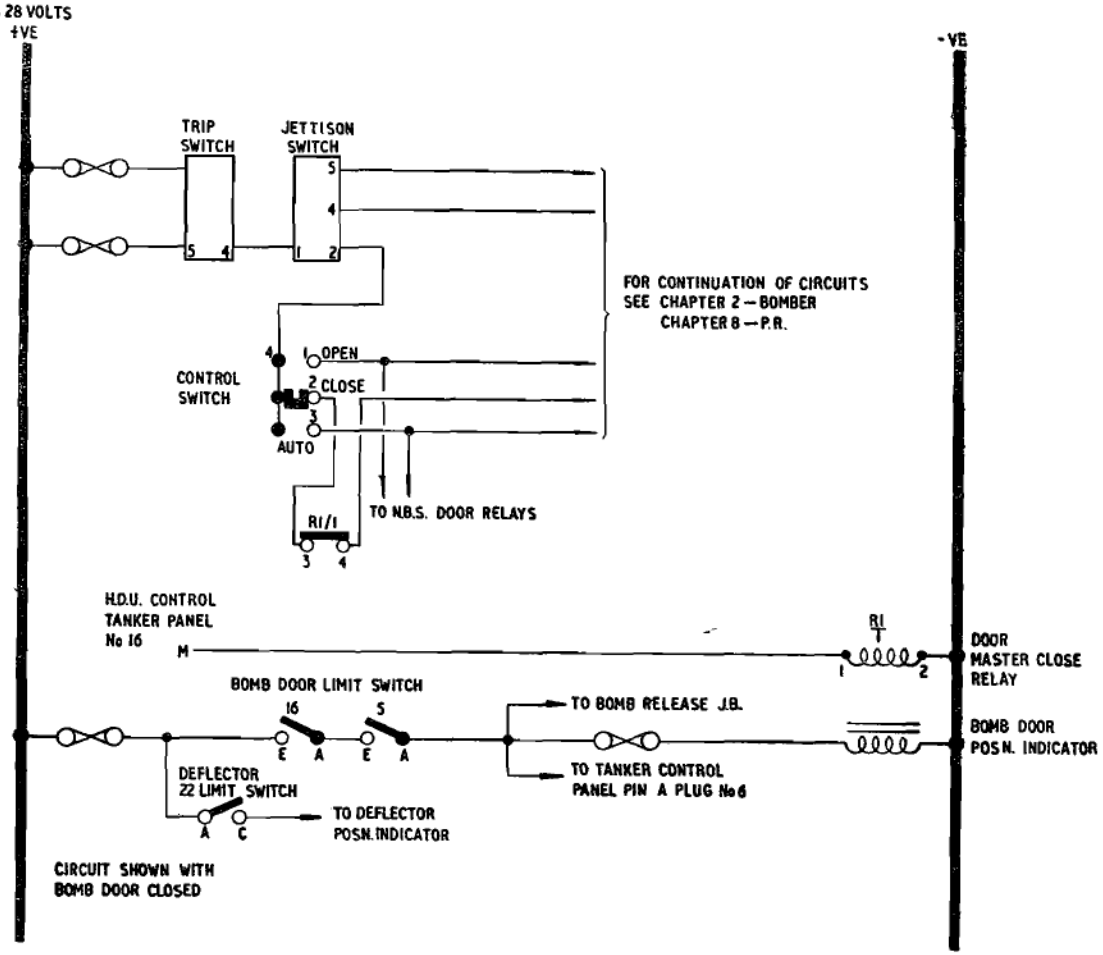

Fig. 1. Bomb door control

F.S./1A

Introduction

1. Information, on the layout and interpretation of the schematic circuit diagrams, can be obtained from the General Information group contained in Book 2, immediately after Section 5 marker card. Also to be found in the General Information group are all the general modifications applicable to all aircraft.

2. When operating as a tanker the tanker panel master switch must be selected ON, and the individual tank PILOT/OPERATOR switches must be selected OPERATOR before flight. This operation will isolate the pilot's fuel gauges from the storage tanks and make his totalizing fuselage tank gauges total on cells 1 and 2 only.

Note

If while operating as a tanker the pilot requires to transfer fuel from the bomb bay, transfer or underwing tanks to the wing, No. 1 *fuselage and reserve tanks, he may do so by selecting the appropriate switches on the pilot's fuel panel. The pilot's underwing tanks contents gauges will not operate unless the* PILOT/OPERATOR *switches are selected to* PILOT.

BOMB DOOR/H.D.U. INTERLOCKS
(*fig.* 1 *and* 2)

3. The transfer pumps switches have no supply until the bomb doors are open, nor can the hose be paid out, as the circuits for these are interlocked with the bomb door controls.

4. The normally-closed master close relay, Type Q1, is mounted in the starboard console and is connected in the doors close circuit immediately after the bomb door control switch, and before the P.R. change-of-role plug and sockets. The P.R. bomb bay door control circuit is not affected since P.R. doors will not be fitted when the aircraft is converted to the tanker role.

5. The bomb doors are opened in the normal way, and when open, limit switches 16 and 5 in series connect a supply to the control panel, via plug No. 6 pin A, to energize the main supply relays which in turn connect positive supplies to the H.D.U. and transfer pump control circuits.

6. When the hose is paid out, a positive supply from the control panel, via plug 16 pin M, is connected to the coil R1 of the master close relay. The relay thus energized, breaks R1/1 the circuit from the close position of the bomb door control switch. The doors cannot then be closed until the hose has been wound back and stowed.

(*Continued on next page*)

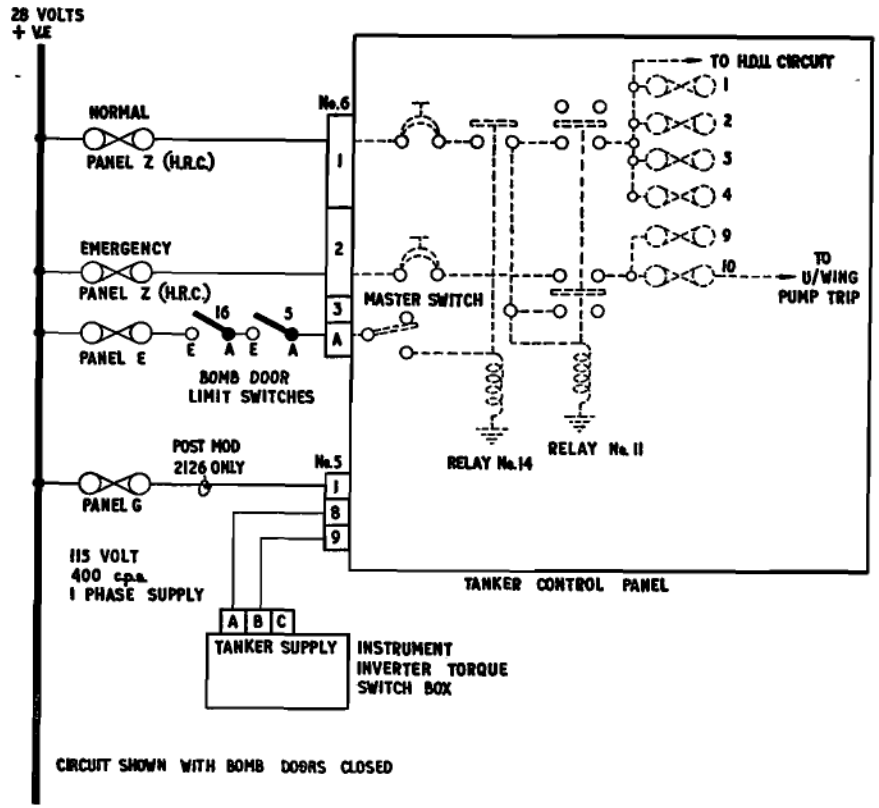

Fig. 2. Control panel supplies

7. When the hose is fully stowed, the positive supply to the relay coil R1 is broken. The relay resets and closes R1/1, the circuit from the close position of the bomb door switch so that the doors will close when selected. As soon as the doors leave the open position, the limit switches 16 and 5 open to break the supply to the control panel H.D.U. and transfer pump circuits so that neither will operate.

CONTROL PANEL SUPPLIES (*fig. 2*)

8. Two main supplies, Normal and Emergency, are fed via plug No. 6 on the control panel to the panel circuit-breakers; taken from panel Z, they are protected by H.R.C. fuses. A separate supply from panel G is fed to the panel for the No. 3 cell contents gauge relay rectifiers.

9. The control supply is fed from a fuse on panel E via bomb door limit switches 16 and 5 and plug No. 6 on the control panel to the panel master switch. This switch will connect the supply, when the bomb doors are open, to the panel relay 14. This relay controls the normal and emergency main supplies indirectly through relay No. 11 and connects them via fuses to the panel services. The bomb door limit switches ensure that none of the tanker delivery pumps, H.D.U. and panel services can be operated until the bomb doors are open.

10. A single phase, 115-volt, 400 c.p.s., a.c. supply is fed from the instrument inverter torque switch box via plug No. 5 on the control panel to the panel H.D.U. control circuits.

H.D.U. CONTROL (*fig. 3*)

11. The control of the H.D.U. is described in detail in A.P.4611, Vol. 1; fixed wiring is provided on the aircraft for the circuits between the H.D.U. and the control panel. The fixed wiring runs from the control panel plug and socket break-panel in the cabin via a break panel in the battery bay to the H.D.U. plug and socket break panel in the rear bomb bay.

12. A 112-volt supply is fed to the H.D.U. relay panel (on the H.D.U.) from panel J via a heavy duty terminal block on the H.D.U. break panel in the rear bomb bay. The negative return for this supply is run from a further heavy duty terminal block on the H.D.U. break panel to a local earth point.

TURBINE PUMP CONTROL (*fig. 4*)

13. The turbine pumps are controlled separately by their respective STOP and START switches on the control panel in conjunction with overriding master PILOT/OPERATOR switches and fuel pressure switches. An indicator lamp on the panel gives indication of low fuel pressure (tank empty).

14. With the PILOT/OPERATOR switch at PILOT, the turbine pump control circuits are not operative. With the switch at OPERATOR a supply from a fuse on the control panel will be connected (provided that the bomb doors are open) to the START switch and via the fuel pressure switch on the pump package (made across B-C with no fuel pressure) to the fuel pressure low warning lamp on the control panel.

15. When the START switch is depressed and held, the supply is connected via the normally closed STOP switch to the pump air valve solenoid, on the pump package,

(*To be issued later*)

Fig. 3. H.D.U. Control

and thence to earth. The air valve is opened and air from the tail de-icing air supply ducts is admitted to the turbine. When fuel pressure builds up to 10 lb/in² the fuel pressure switch makes across contacts B-A, thus breaking the supply to the tank empty indicator lamp and short-circuiting the START switch so that it may be released.

16. The pump will stop when the STOP switch is depressed and held until the warning lamp comes on, or until the fuel tank is empty when the pressure switch will operate, or when the MASTER-SWITCH is selected OFF.

17. In either case the fuel pressure switch operates when the pressure falls to 8 lb/in² to break the supply to the air valve solenoid, thus stopping the turbine, making contacts B-C to connect the supply to the L.P. (tank empty) indicator lamp.

Note

If the pilot switches the bomb bay tank pump switch to MAIN ON, *the refuelling valve circuits for the reserve tank and fuselage tank No.* 1 *cells will be energized and these tanks will be replenished with fuel from the bomb bay tank as fuel is used* (*Chap.* 4, *Group* 2). *Also, the air-to-air refuelling lamps on the* 12 *lamp indicator will operate for these tanks as the refuelling valve float switches make and break contact.*

UNDERWING TANKS FUEL PUMPS AND AIR VALVES (*fig.* 5)

18. Each tank has a fuel pump, driven by a 5 h.p. motor and a nitrogen pressurizing system controlled pneumatically from an air bottle and reducing valves; the air reducing valve, two stage pressure relief valve and the unimatic (shut-off) valve are, in turn, controlled electrically.

19. In the bomber/P.R. roles, the pump alone is used to transfer fuel into the wing tanks with the air/nitrogen system as a standby in case of pump failure. In the tanker role, both systems are used simultaneously to supply fuel at the required transfer rate via the 'ring main' to the H.D.U. delivery pump. When operating as a tanker, the pilot can take over control of the tanks at any time by using his switches, the circuits then operating as in the bomber/P.R. role. The switches on the tanker control panel required to control the tanks in the tanker role are interlocked electrically with the bomb doors and are not operative until the bomb doors are open.

PILOT CONTROL-PUMPS (*fig.* 5)

20. There are two double pole switches, labelled MOTOR ON/OFF MOTOR TRIP—EMERGENCY ON, mounted on the pilot's fuel panel, one for each tank. When a switch is selected to MOTOR ON, two supplies are connected from panel F, one to the relative selector relay coil R1 (Type Q1 mounted at station 240 in the wing) and the other to the relative underwing tank No. 1 relay R2 and No. 3 relay R3 (Types S4 and Q3 respectively and mounted on the panel behind the pilot's hood coaming).

21. Relay R2 and R3 operate as follows:—

R2/1—Isolates the supply from the relative control panel PILOT/OPERATOR switch to the pump START and STOP switches.

R2/2—Isolates the control panel operators L.P. (tank empty) indicator lamp.

R2/3—Connects the circuit from the pressure switch *low* terminal to the pilot's tank L.P. warning lamp.

R2/4—Connects a supply from panel D through the normally-closed contacts R4/1 of relay No. 2 to the feed side of the pressure switch in the wing stalk (and to the feed side of the tanker operators relative START switch).

R2/5—Connects a supply from panel D through the normally closed contacts R4/6 of relay No. 2 to the pump contactor start coil R6 via its normally-closed auxiliary contact R6/1 which shorts its economy resistance. The contactor is mounted in the wing stalk.

R2/6—Isolates the circuit from the control panel relay R5/1 to the pump contactor start coil R6.

R2/7—Isolates the circuit from the control panel relay R5/2 to the pump contactor trip coil R7.

R3/1—Isolates the circuit from the control panel PILOT/OPERATOR switch to the 6 lb/in² valve (air pressure reducing valve), 2-stage pressure relief and unimatic (shut-off) valve solenoids so that the nitrogen pressure system cannot be used.

22. The pump contactor start coil R6, thus energized, operates to connect R6/3 a 112-volt supply from panel J to the pump motor shunt field ◄ via the pre-set resistance in the wing stalk (*see Book* 2, *Sect.* 5, *Chap.* 4) ► and, via the start unit resistance in the wing stalk, to the motor armature. Auxiliary contact R6/1 introduces an economy resistance into the start coil R6 circuit and auxiliary contact R6/2 closes in the circuit to the trip coil R7 so that the contactor can be tripped when required. ◄ Post-Mod. 2784, contact R6/4 of the contactor completes the circuit of the pump-on indicator (*see para.* 42*A*). ►

23. As the pump motor runs up, its back e.m.f. rises and energizes the start unit relay coil R8 which closes its contact R8/1 to short-circuit the starting resistance to allow the motor to run on full voltage.

24. Before fuel pressure has built up the fuel pressure switch in the fuel transfer pipe in the wing stalk will connect the supply from panel D to the pilot's fuel L.P. warning lamp via contact R2/3 of relay No. 1 and a series resistance. When the fuel pressure reaches 10 lb/in² (18 lb/in² pre-Mod. 2447) the pressure switch operates to break the supply to this lamp and to connect its supply through the STOP switch to the coil R5 of the panel relay No. 13. The operation of relay R5 is not

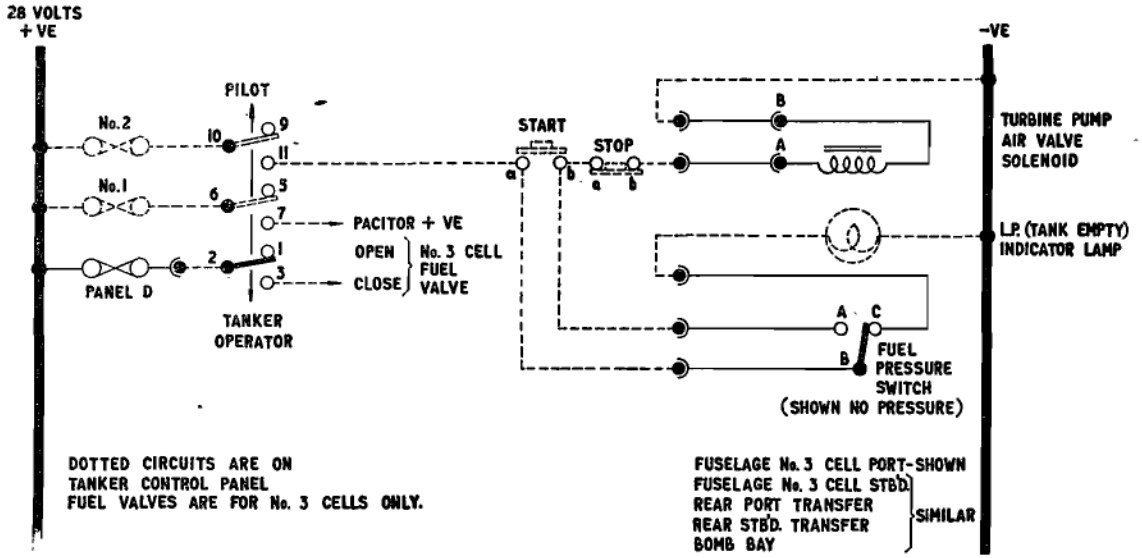

Fig. 4. Turbine pump solenoid valves and pressure switches

necessary for the efficient functioning of the pump nor is it detrimental, If the STOP switch is operated under these conditions the pump will remain running, relay R5 only, being de-energized.

25. To stop the pump, the switch is first placed to MOTOR TRIP—EMERGENCY ON, this breaks the supply to the relative underwing tank No. 1 relay R2 and No. 3 relay R3, and connects the supply to No. 2 relay R4.

26. Relays R2 and R3 are de-energized, their contacts operating as follows:—

R2/1—Closes the circuit between tanker operators switch and the START switch.

R2/2—Closes the circuit between the pressure switch (terminal C) and the tanker panel L.P. (tank empty) indicator lamp.

R2/3—Opens the circuit between the pressure switch (terminal C) and the pilot's L.P. warning lamp.

R2/4—Breaks the positive supply to the pressure switch (terminal B).

R2/5—Breaks the supply to the pump motor contactor start coil R6.

R2/6—Closes, in the circuit between the control panel relay No. 13 (R5/1) and the pump motor contactor start coil R6.

R2/7—Closes, in the circuit between the control panel relay No. 13 (R5/2) and the pump motor contactor trip coil R7.

R3/1—Closes, in the circuit between the tanker operator's switch and the air system solenoid valves.

27. Relay R4 is energized, its contacts operating as follows:—

◄ R4/1—Breaks the supply via contact R2/4 ► of relay No. 2 to the pressure switch (terminal 8).

◄ R4/2—Connects a supply from panel D to ► the pressure switch (terminal B).

R4/3—Closes the circuit between the pressure switch (terminal C) and the pilot's L.P. warning lamp.

R4/4—Connects a supply from panel D to the air system solenoid valves.

R4/5—Isolates the circuit from the control panel PILOT/OPERATOR switch to the air system solenoid valves (in series with contact R3/1 of relay No. 3).

R4/6—Isolates the circuit to the pump contactor start coil R6.

R4/7—Isolates the circuit from the control panel relay No. 13 (R5/2) to the pump motor contactor trip coil.

R4/8—Connects a supply from panel D to the pump contactor trip coil R7 via its auxiliary contacts R7/2.

Note

In order to switch off the pump it is necessary to select MOTOR TRIP EMERGENCY ON *to trip the contactor and then return the switch to* OFF. *The switch must not be left at* MOTOR TRIP—EMERGENCY ON *since this will allow the air and nitrogen bottles to completely discharge.*

28. The pump motor contactor trip coil R7, thus energized, operates to disconnect R7/3 the 112-volt supply to the pump motor. Auxiliary contact R7/1 closes in the circuit to the start coil R6 so that the contactor can be reset when required. Auxiliary contact R7/2 opens in the circuit to the trip coil so that both coils cannot be energized simultaneously. ◄ Post-Mod. 2784, contact R7/4 of the contactor breaks the supply to the pump-on indicator (*see para.* 42*A*). ►

29. Simultaneously with the contactor tripping, the 6 lb/in², 2-stage pressure relief and unimatic shut-off valve solenoids are energized (*para.* 33). In order, therefore, to stop the bottles discharging, the control switch must be placed to OFF to de-energize these solenoids and allow their associated valves to close.

PILOT CONTROL—AIR VALVES
(*fig.* 5)

30. In case of failure of the pump, fuel can be transferred by using the air-controlled nitrogen pressure system. The control switch is placed to MOTOR TRIP—EMERGENCY ON. This trips the pump contactor (*para.* 27-28) and connects a supply from panel F to the selector relay R1 as before, and connects another supply from panel F to the underwing tank No. 2 relay R4. R4 thus energized, operates as follows:—

R4/1—Breaks in series with contact R2/4 of relay No. 1 to isolate the supply to the pressure switch (terminal B) and the tanker panel stops switch.

R4/2—Connects a supply from panel D to the pressure switch (terminal B).

R4/3—Closes the circuit between the pressure switch (terminal C) and the pilot's L.P. warning lamp. It should be noted that both the pilot's and the tanker operator's L.P. (tank empty) indicator lamps will operate under this condition.

R4/4—Connects a supply from panel D to the 6 lb/in², two-stage pressure relief and unimatic shut-off valve solenoids.

R4/5—Isolates the circuit from the control panel PILOT/OPERATOR switch to the air system solenoids.

R4/6—Isolates the circuit to the pump contactor start coil R6.

R4/7—Isolates the circuit from the control panel relay No. 13 (R5/2) to the coil of the pump contactor trip coil R7.

R4/8—Connects a supply from panel D to the pump contactor trip coil R7 via its auxiliary contact R7/2.

31. The 6 lb/in², 2-stage pressure relief and unimatic shut-off valves are opened (*para.* 32) controlling the nitrogen system, pressurizing the tank and forcing out the fuel.

Note . . .

With the nitrogen pressure system alone being used, the fuel pressure attains about 7 lb/in²

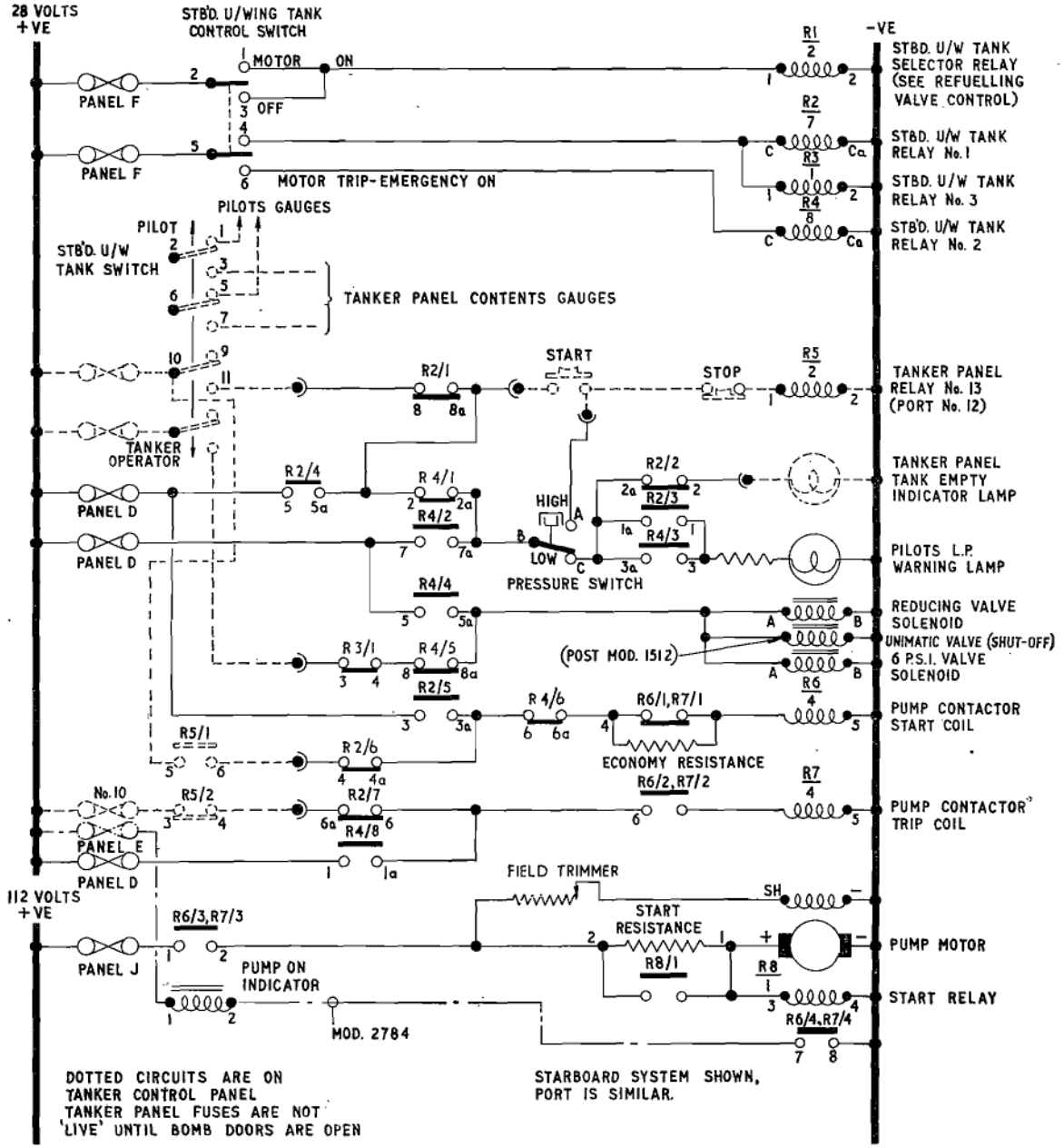

Fig. 5. Underwing tank fuel pump and air valves (post-Mods. 2449 and 2466)

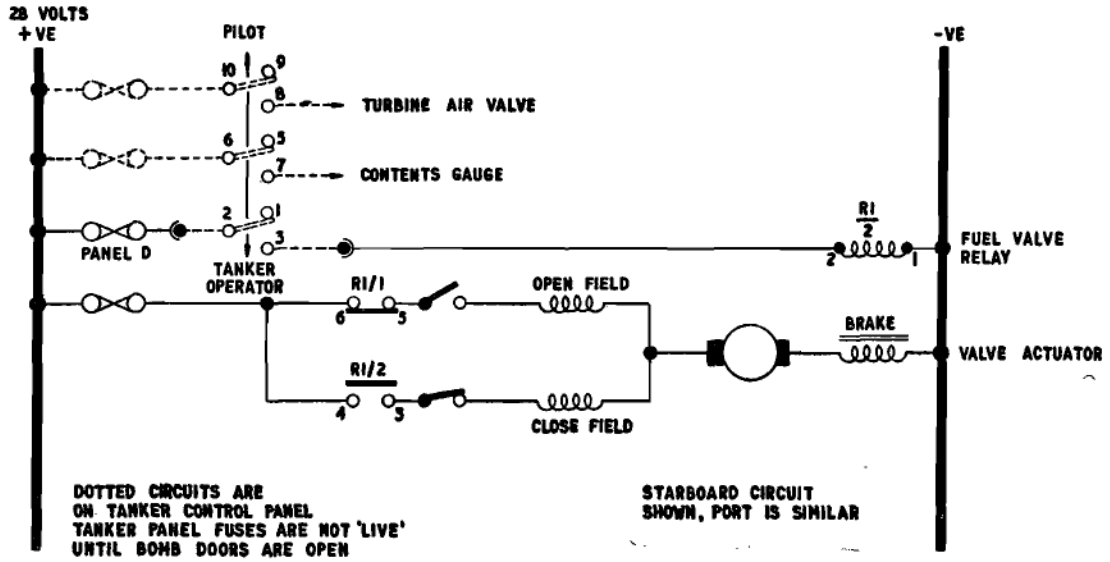

Fig. 6. Fuselage tanks No. 3 cells fuel valves

which is insufficient to operate the pressure switch to make at 10 *lb/in²*, (18 *lb/in² pre-Mod.* 2447) *and break at* 8 *lb/in²* (16 *lb/in² pre-Mod.* 2447). *In consequence, the L.P. warning lamps (including the L.P. (tank empty) indicators on the control panel which will be in circuit) will remain on during the transfer operation. Use the contents gauges to ascertain when the underwing tanks are almost empty and switch to* OFF *immediately.*

32. When the tank is empty and the control switch selected OFF, the supply to the No. 2 relay R4 is broken, the relay resets, its contact R4/2 disconnecting the supply to the pressure switch, the L.P. warning lamps will then go out. Contact R4/3 opens in the pilot's L.P. warning lamp circuit on the negative side of the pressure switch. Contact R4/4 disconnects the 6 lb/in² 2-stage pressure relief and unimatic shut-off valve solenoids and contact R4/8 opens in the pump contactor trip coil R7 circuit.

TANKER OPERATOR CONTROL
(*fig.* 5)

33. The PILOT/OPERATOR switches are placed to OPERATOR before take-off, with the control panel MASTER SWITCH at ON supplies will be connected to the PILOT/OPERATOR switches as soon as the bomb doors are opened. Since these switches are at OPERATOR, the supplies will be connected to the 6 lb/in², 2-stage pressure relief and unimatic shut-off valve solenoids. The nitrogen pressure system will then increase pressure in the tank.

34. Assuming that the control panel master switch is at ON and that the bomb doors are open. One pole of the PILOT/OPERATOR switch at OPERATOR, will connect a supply from the control panel through normally-closed contacts R3/1 of relay No. 3 and R4/5 of relay No. 2 to the 6 lb/in², 2-stage pressure and unimatic shut-off relief valve solenoids in parallel. The nitrogen pressure system will now start to transfer fuel into the ring main. Another pole of the PILOT/OPERATOR switch will connect a supply from the control panel through normally-closed contacts R2/1 of the underwing tank No. 1 relay to the pump START switch and to the pressure switch (terminal B), via the normally-closed contacts R4/1 of the underwing tank No. 2 relay.

35. With the nitrogen pressure system operating, fuel pressure will build up in the transfer line to about 7 lb/in². This is not sufficient, however, to operate the pressure switch, 10 lb/in² (18 lb/in² pre-Mod. 2447), being required to automatically start the pump motor as the circuit would suggest. The L.P. (tank empty) indicator lamp will remain on until the pump is started.

36. When the START switch is depressed and held, the supply is connected via the STOP switch to the associated relay R5 on the control panel. The switch can be released when the indicator lamp goes out (*para.* 40).

37. This relay operates, contact R5/2 breaking the circuit to the pump contactor trip coil R7 and contact R5/1 connecting a supply from the control panel to the pump contactor start coil R6 via its auxiliary contacts R6/1.

38. The pump contactor start coil R6, thus energized, operates to connect R6/3 a 112-volt supply from panel J to the pump motor shunt field and, via the start resistance, to the motor armature. Auxiliary contact R6/1 introduces an economy resistance into the start coil R6 circuit and auxiliary contact R6/2 closes in the circuit to the trip coil R7 so that the contactor can be tripped when required. ◄Post-Mod. 2784, contact R6/4 makes the supply to the pump-on indicator (*see para.* 42*A*). ►

39. As the pump motor runs up, its back e.m.f. rises and energizes the start unit relay coil R8, which closes its contact R8/1 to short-circuit the starting resistance to allow the motor to run on full voltage.

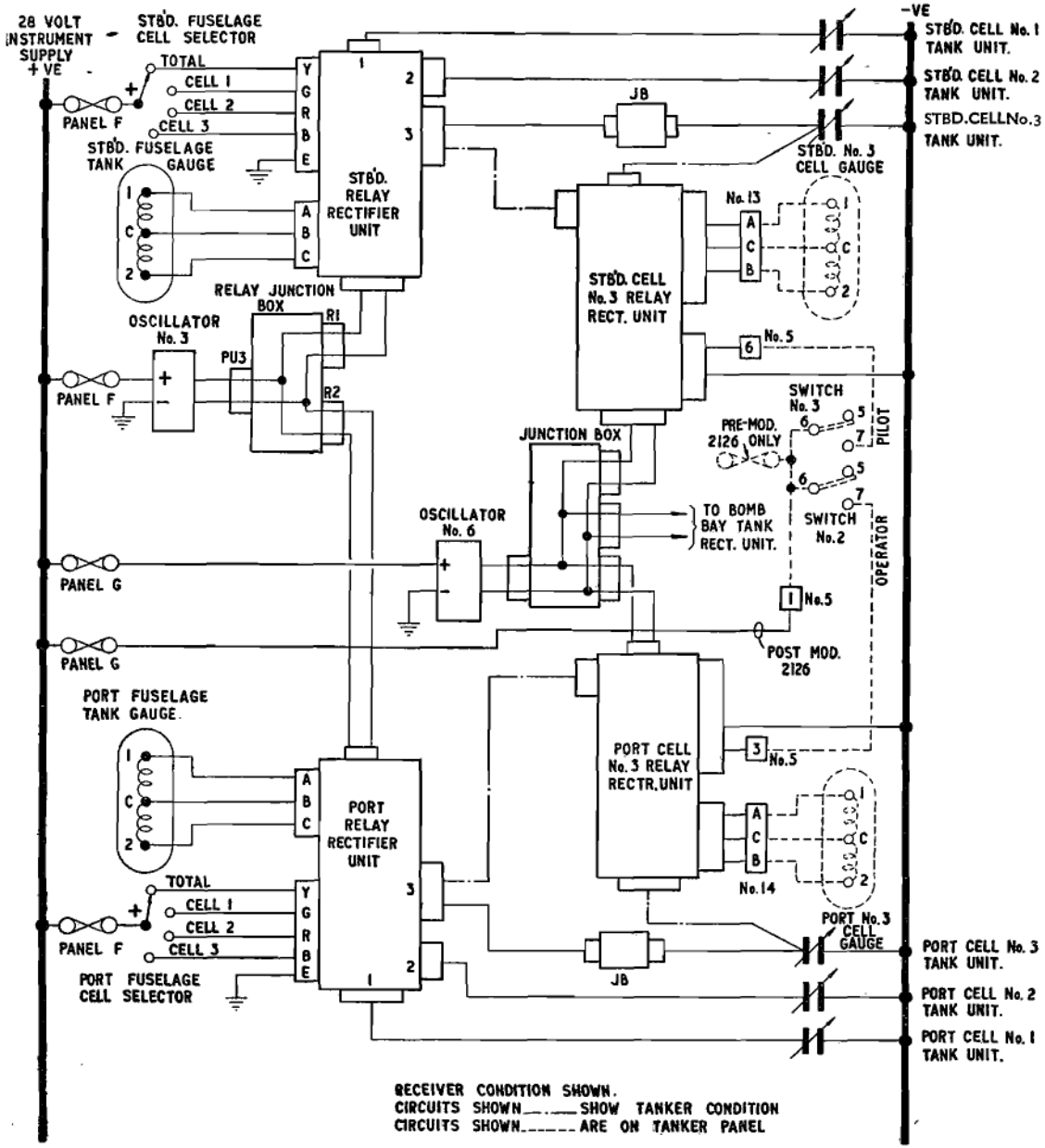

Fig. 7. Fuselage tanks fuel contents gauges

F.S./5

40. With the pump running the pressure switch will close (contacts B-A) when the fuel pressure reaches 10 lb/in² (18 lb/in² pre-Mod. 2447). This disconnects the L.P. (tank empty) indicator lamp and connects the supply through the STOP switch to the control panel relay R5 as a hold-in supply. When the L.P. (tank empty) indicator lamp goes out, the START switch can be released.

41. When the tank is empty, or if the fuel pressure falls off, the pressure switch will re-close (contacts B-C) when the pressure has fallen to 8 lb/in² (16 lb/in² pre-Mod. 2447). This breaks the hold-in supply to relay coil R5 and connects the supply to the L.P. (tank empty) indicator lamp. Relay R5 thus de-energized, operates to break R5/1 the circuit to the pump contactor start coil R6 and makes R5/2 the circuit to the contactor trip coil R7). The contactor trips to disconnect and stop the pump ◄ and, post-Mod. 2784, to de-energize the pump-on indicator (*para.* 42*A*). ►

42. The nitrogen pressure system will not be shut down until the bomb doors are closed or the PILOT/OPERATOR switch is placed to PILOT. In either case, the supply to the 6 lb/in², 2-stage pressure relief and unimatic (shut-off) valve solenoids will be broken. The L.P. (tank empty) indicator lamp will come on as soon as the pump stops although the nitrogen pressure system is still operating.

◄ PUMP INDICATORS (Mod 2784)
(*fig.* 5)

42A. Mod. 2784 introduces magnetic indicators on the pilot's fuel panel to indicate when the pump contactors are made and therefore that the pump should be running. These indicators are supplied from fuses on panel E and are controlled in the negative line by auxiliary contacts (7-8) of the pump contactors. When the pump is switched on, the pump contactor start coil R6 is energized, its contact R6/4 closes to complete the indicator circuit in the negative line. When

the pump is switched off, the contactor trip coil R7 is energized and its contact R7/4 opens to disconnect the indicator. The indications are as follows:—

Pump contactor reset—pump running—indicator WHITE

Pump contactor tripped—pump stopped—indicator BLACK ▶

FUSELAGE TANK No. 3 CELL SHUT-OFF VALVES (*fig.* 6)

43. In order to retain the fuselage tank No. 3 cells as storage tanks, shut-off cocks have been fitted between the cells and the fuselage pump housings. These cocks are closed when the PILOT/OPERATOR switch is selected OPERATOR before take-off. As it is important that these cocks are open when operating as a bomber or P.R. aircraft, the circuit is arranged so that if the selector switch has been left at OPERATOR, the cocks will open as soon as the electrical system is made live after the tanker control panel has been removed.

44. When the PILOT/OPERATOR switch is selected OPERATOR a supply is connected from panel D to energize the coil R1 of the relative No. 3 cell fuel cock relay, Type Q3, mounted on the panel behind the pilot's hood coaming. Contact R1/1 of this relay breaks the circuit to the actuator *open* field whilst contact R1/2 connects a supply from panel D to the actuator *close* limit switch, and thence through the armature and brake solenoid to earth.

45. The actuator closes the cock, its *close* limit switch breaking the supply when the limit of travel is reached. The cock will remain closed until the PILOT/OPERATOR switch is selected PILOT or the control panel is removed from the aircraft.

46. When the switch is selected PILOT or the control panel is removed, the supply to the fuel cock relay R1 is broken. The relay is thus de-energized. Contact R1/2 breaks the circuit to the actuator *close* field and contact R1/1 closes to connect the supply from panel D to the *open* field, via the *open* limit switch (closed when the actuator left the open position), and thence to the armature and brake solenoid to earth.

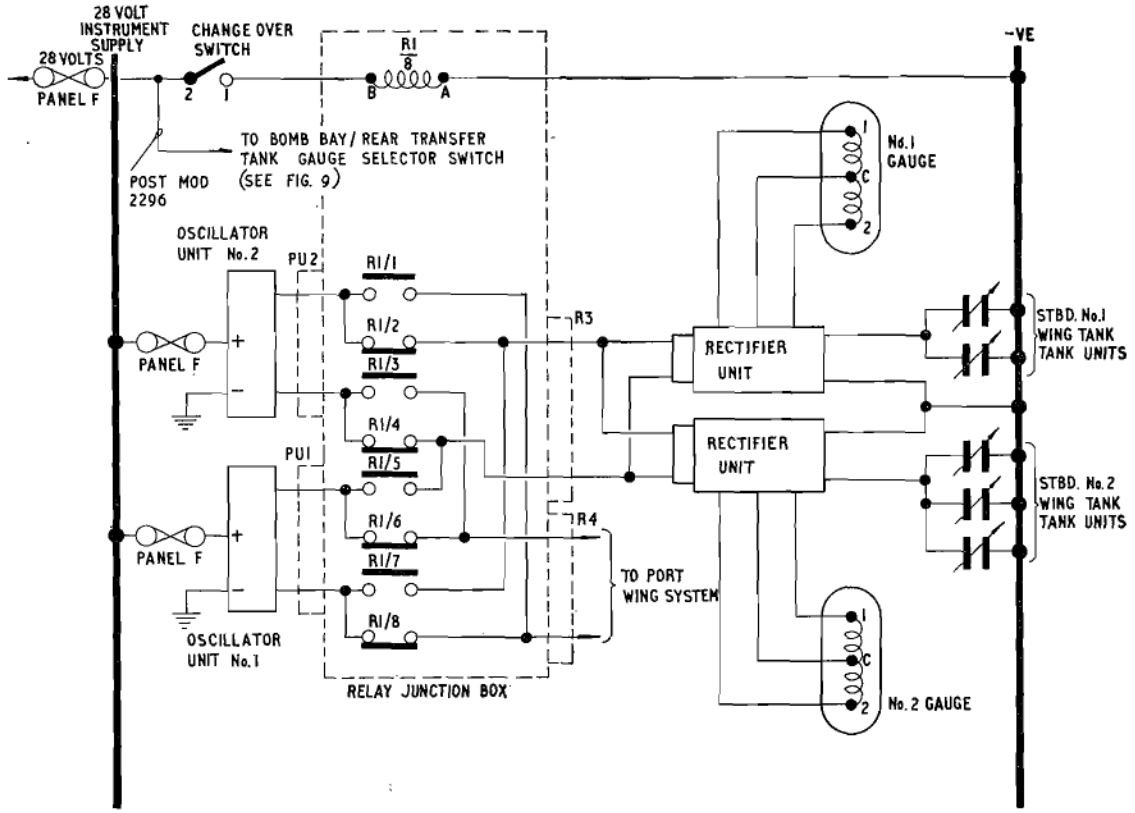

Fig. 8. Wing tanks fuel contents gauges

FUEL CONTENTS GAUGES

48. When reading the following paragraphs on fuel contents gauges, reference should be made to Chapter 6, Group 4.

47. The actuator will now open the cock, its *open* limit switch breaking the supply when the limit of travel is reached.

FUSELAGE TANKS (*fig.* 7)

49. The system for these gauges on the tanker type aircraft in the bomber/P.R. role is the same as that for the B. Mk. 1 and B/PR Mk. 1 aircraft except that there is a junction box between the relay rectifiers and the No. 3 cell tank units.

50. For operating in the tanker role, additional oscillator unit No. 6, and junction box have been added and additional relay rectifier units have been added for the No. 3 cell gauges. The connectors for the No. 3

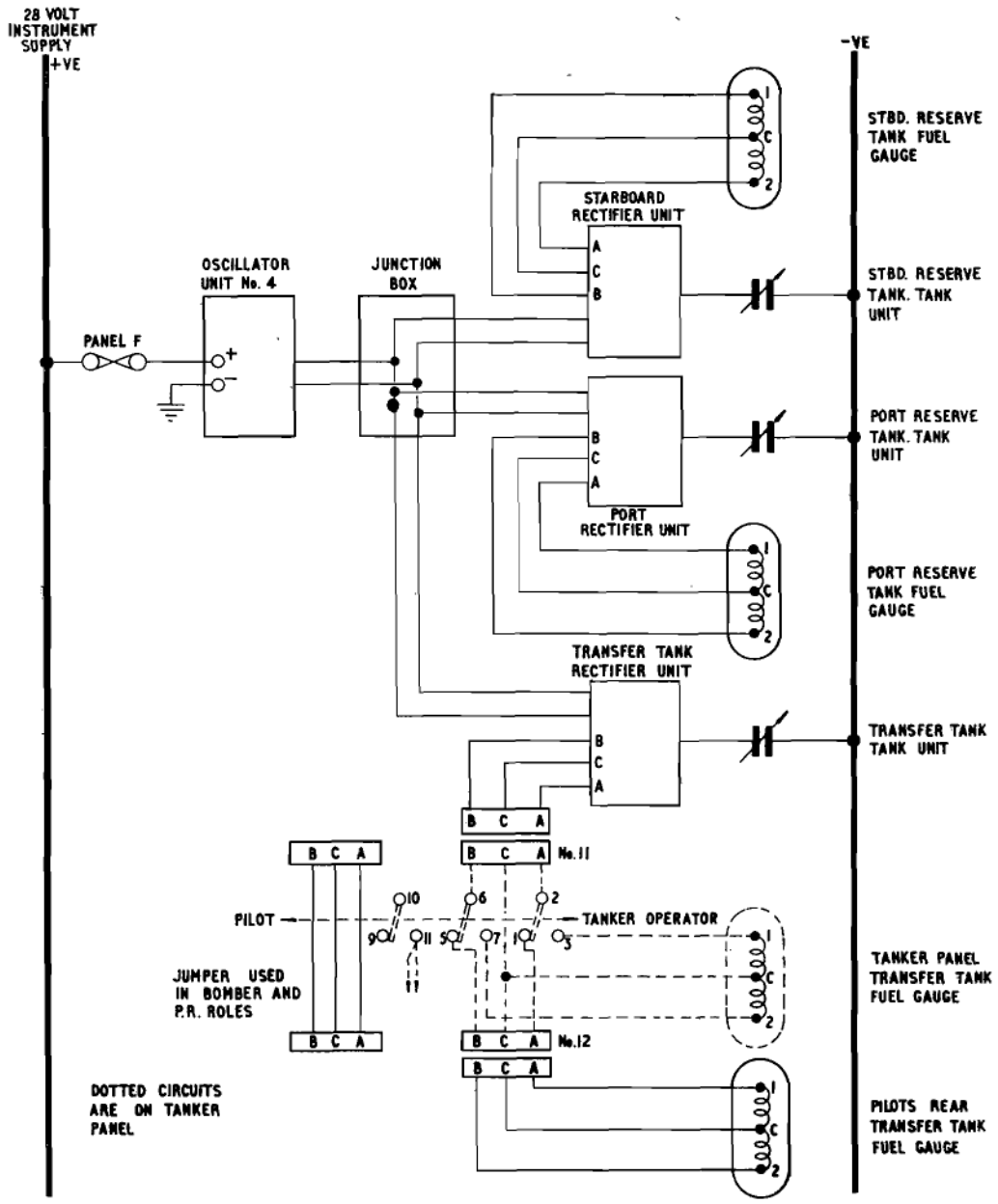

Fig. 9. Transfer tank (pre-Mod. 2296) and reserve tank contents gauges

cell tank units are removed from the junction boxes and reconnected to these additional relay rectifiers.

51. When the associated PILOT/OPERATOR switches are at OPERATOR, the relay rectifiers will adjust the pilot's fuselage tank contents gauge to totalize Nos. 1 and 2 cells only, no reading will be obtained with the selector switch at No. 3. The fuel contents of the No. 3 cells will be indicated on the relative gauges on the tanker control panel. The oscillator unit No. 6 also supplies the bomb bay tank gauge system (*para.* 58).

52. Oscillator unit No. 6 mounted under the radio crate, is supplied from panel G. The output of the oscillator is routed via the adjacent junction box to the port and starboard additional relay rectifier units (mounted just aft of the ground refuelling points) and also to the bomb bay tank system.

53. When the No. 3 cell PILOT/OPERATOR switches are at OPERATOR, a single supply from panel G, via the control panel, is connected to the respective relay rectifiers. The relays in these units adjust the circuits for the pilot's fuselage tank gauges to totalize Nos. 1 and 2 cells only and reconnect the No. 3 cell circuits so that they provide readings for the No. 3 cell fuel contents on gauges on the control panel.

54. The circuits will revert to the bomber/P.R. condition when the PILOT/OPERATOR switch is selected PILOT or when the control panel is removed from the aircraft. In either case, the supply to No. 3 cell relay rectifier units is broken and the relay, thus de-energized, resets the circuits.

WING TANKS (*fig.* 8)

55. The system for the wing tanks contents gauges in these aircraft in whichever role they are operating, is identical to that on the B. Mk. 1 and B/PR Mk. 1 aircraft.

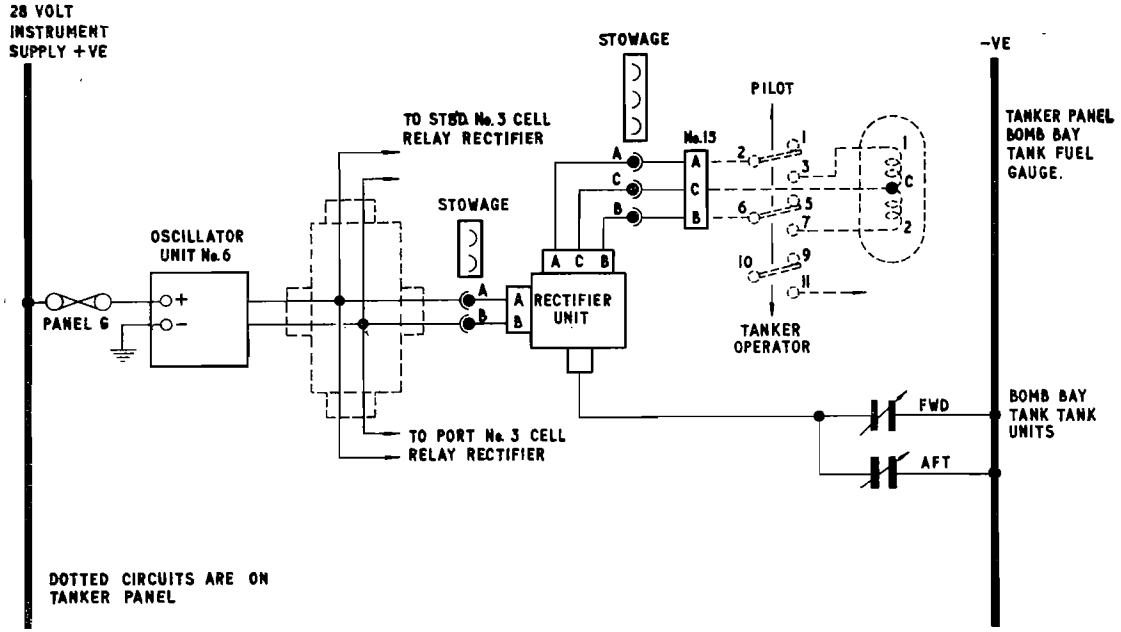

Fig. 10. Bomb bay tank fuel contents gauge (pre-Mod. 2296)

◂TRANSFER TANK (pre-MOD. 2296) AND RESERVE TANK (*fig.* 9)▸

Note . . .

Mod. 2643 *introduces a stowage bag, fitted adjacent to the tanker control panel to accommodate the jumper cables when the control panel is fitted.*

56. This system is the same as that for the B. Mk. 1 and B/PR Mk. 1 aircraft except that the connections for the transfer tank between the rectifier unit and the gauge are taken via connectors 11 and 12 on the control panel plug and sockets break panel. When operating as a bomber or P.R. aircraft, a jumper is fitted in place of the control panel to link connectors 11 and 12.

57. When converting a tanker, the jumper is removed when the control panel is fitted. The circuit between connectors 11 and 12 is now taken through the PILOT/OPERATOR switch. With the switch at PILOT, the pilot's gauge will indicate, and with the switch at OPERATOR, the control panel gauge will indicate.

Note . . .

It is important that the jumper is re-fitted when the control panel is removed.

◂BOMB BAY TANK (pre-Mod 2296)▸ (*fig.* 10)

58. The bomb bay fuel contents gauge system is used for the tanker role only. When the tank is fitted, the two rectifier unit connectors are removed from their stowages on the tank and are connected to the bomb bay tank break panel in the forward bomb bay. Oscillator unit No. 6 is used for this system and the indicator is on the control panel.

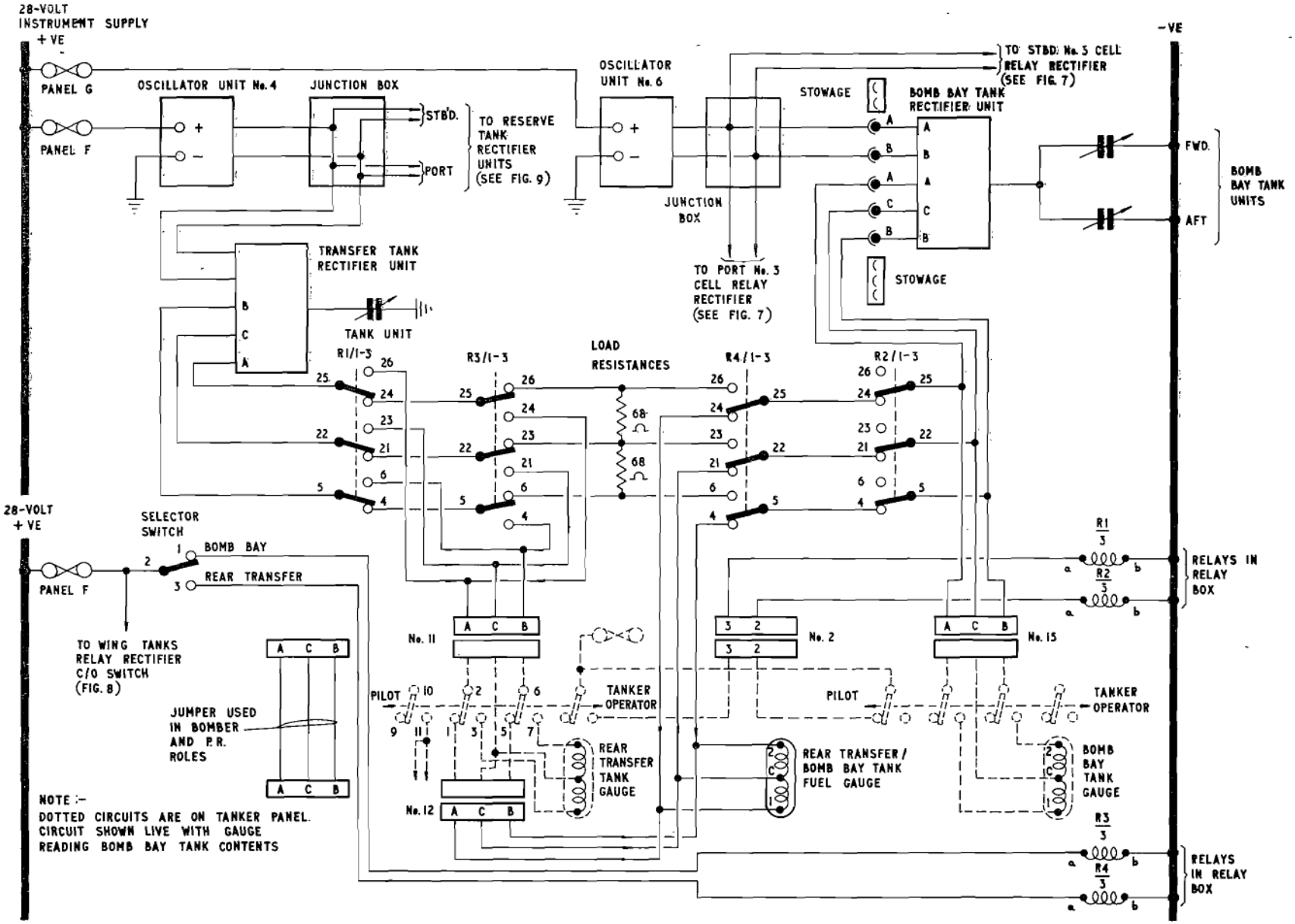

Fig. 10A. Transfer and bomb bay tanks contents gauges (post-Mod. 2296)

◄ **59.** The supply to the rectifier unit is taken from the oscillator unit No. 6 junction box. The oscillator is supplied from panel G. The circuit to the indicator is taken via the PILOT/OPERATOR switch at OPERATOR. If the switch has been selected PILOT, time must be allowed for the rectifier unit to warm up after the switch is selected to OPERATOR before accurate readings can be obtained from the indicator.

TRANSFER TANK AND BOMB BAY TANKS (post-Mod. 2296) (*fig.* 10*A*)

59A. This modification provides a means whereby the fuel contents of either the transfer tank or the bomb bay tank can be read on the gauge on the 2nd pilot's fuel panel which previously read the transfer tank fuel contents only. As the contents of these tanks cannot be read simultaneously on the gauge a change-over switch is provided and is mounted on the 1st pilot's fuel panel. When either tank is selected, the rectifier of the tank not selected is placed on a resistance load so that it is ready to give instantaneous, correct, readings when required. In the case of the bomb bay tank, the circuit is arranged so that the rectifier unit is on resistance load if, in the tanker role, the PILOT/OPERATOR switch is selected PILOT and the transfer/bomb bay tank switch is selected TRANSFER TANK; this ensures instantaneous accurate readings on the tanker panel gauge as soon as the tanker/operator switch is selected OPERATOR.

59B. In the bomber or P.R. role, when the transfer/bomb bay tank switch is selected TRANSFER TANK, relay R4 is energized from panel F, contacts R4/1-3 change-over and the output from the bomb bay rectifier unit is fed through the normally-closed contacts of relay R2 to the resistance load consisting of two 68 ohm resistances. Simultaneously, relay R3 will be de-energized and its contacts R3/1-3 will disconnect output from the transfer tank rectifier unit from the resistance load and connect it to the gauge. When BOMB BAY TANK is selected, R4 is de-energized and R3 is energized, contacts R4/1–3 disconnecting the transfer tank rectifier and placing it on resistance load and contacts R3/1-3 disconnecting the bomb bay tank rectifier output from the resistance load and connecting it to the gauge.

59C. In the tanker role, the circuit operates as described above when the pilot/operator switches are at PILOT. When either the transfer tank or bomb bay tank switches are selected OPERATOR, relay R1 or R2 respectively is energized from a fuze in the tanker panel. These relays operate to isolate the respective tank rectifier unit from the dual gauge and, in the case of the transfer tank, to connect it to the gauge on the tanker panel (the dual gauge and the bomb bay tank gauge on the tanker panel are effectively in parallel). When the pilot-operator switches are returned to PILOT, the rectifier outputs are returned to the load resistors or the dual gauge according the selection made on the transfer/bomb bay tank switch. ►

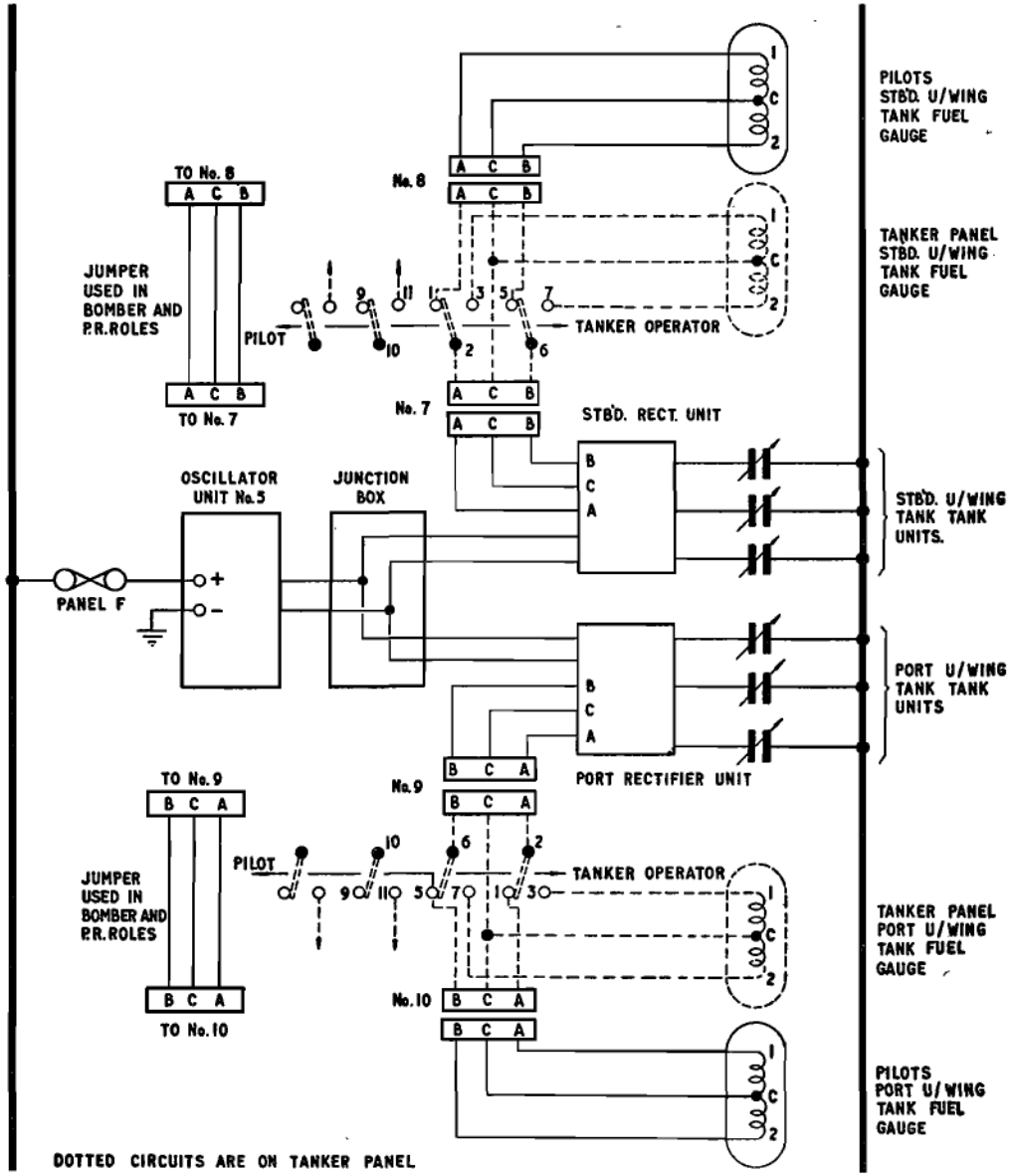

Fig. 11. Underwing tanks fuel contents gauges

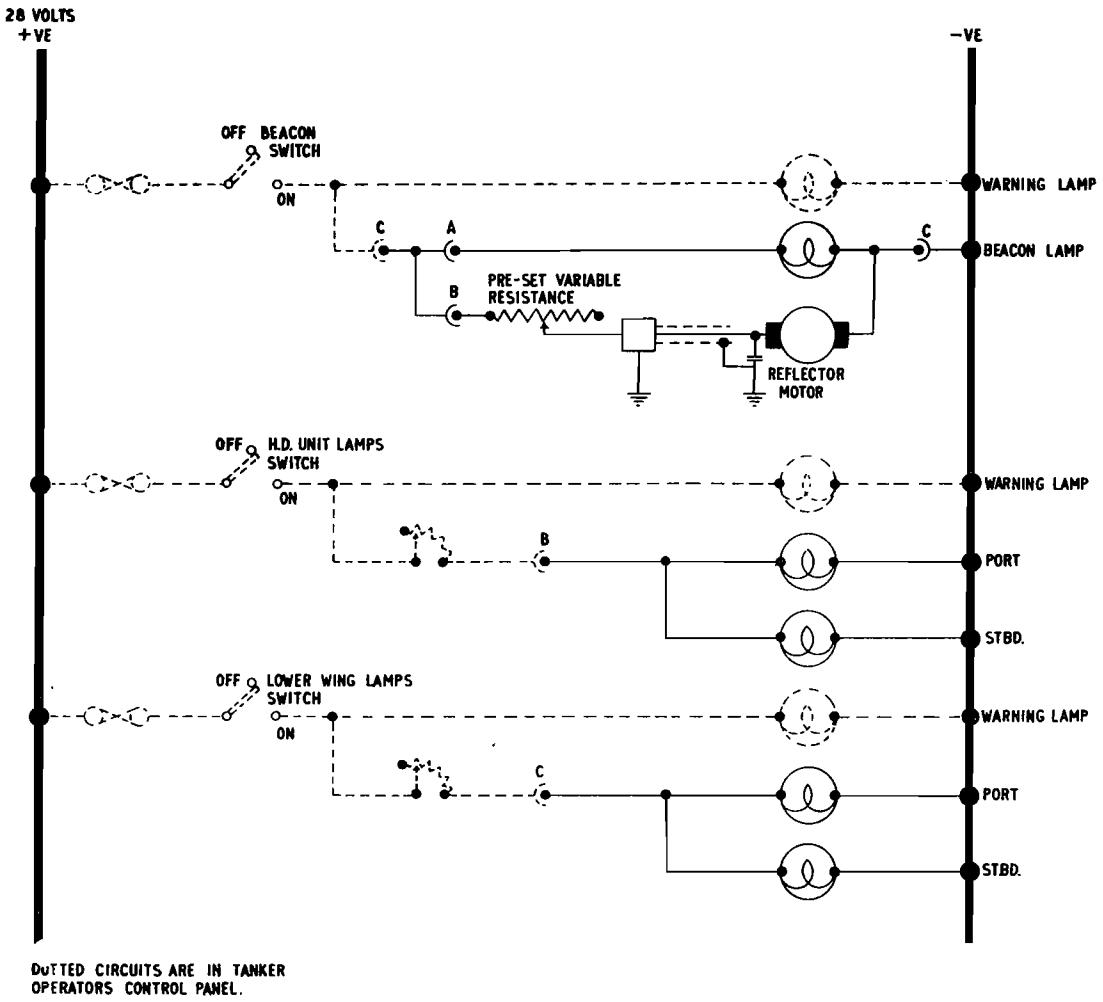

Fig. 12 External Lighting

UNDERWING TANKS (*fig.* 11)

Note . . .

Mod. 2643 *introduces a stowage bag, fitted adjacent to the tanker control panel, to accommodate the jumper cables when the control panel is fitted.*

60. This system is the same as that for the B. Mk. 1 and B/PR Mk. 1 aircraft except that the connections between the rectifier units and the gauges are taken via connectors 7 and 8 (starboard tank) and connectors 9 and 10 (port tank) on the control panel plug and socket break panel. When operating as a bomber or P.R. aircraft the control panel is replaced by jumpers linking connectors 7 and 9, to 8 and 10 respectively.

61. When converting to a tanker, the jumpers are removed when the control panel is fitted. The circuit between each set of connectors is now taken through the respective PILOT/OPERATOR switches. With the switches at PILOT, the pilot's gauges will be in circuit and with the switches at OPERATOR, the control panel gauges will be in circuit.

TANKER EXTERNAL LIGHTING (Mod. 2588 and 2590) (*fig.* 12)

Beacon

62. A beacon, mounted to the rear of the tailplane, enables the receiver aircraft to locate the tanker aircraft during darkness. The beacon is fitted with a 28-volt, 100w filament which is connected in parallel with the beacon reflector armature. Spark suppressing equipment is built into the beacon unit and connected in series with the reflector motor armature. Also connected in series with the reflector motor armature and incorporated in the beacon unit is a variable resistance, to compensate for the variation in the resistance of the motor windings and to adjust the speed of the reflector motor. This resistance is pre-set and should not be adjusted. A two position ON and OFF switch, mounted on the tanker operator's control panel, controls the supply to the beacon. A warning lamp, also on the tanker operator's control panel, indicates when the beacon supply is switched on. When the beacon control switch is selected to ON a supply, from a fuse in the tanker operator's control panel, is connected to the warning lamp and beacon unit, both in parallel. The supply to the beacon unit is connected to the beacon lamp and also, via the pre-set variable resistance to the reflector motor causing the reflector to rotate and the beacon light to flash alternately long and short flashes.

Lower wing lamps

63. Two lamps, fitted with 28-volt, 60w filaments and mounted in the bomb bay port and starboard rear service bays, are provided to illuminate the underwing tanks, thereby enabling the pilot of the receiver aircraft to determine the direction of flight of the tanker aircraft. A two-position ON and OFF switch and dimmer switch, mounted on the tanker operator's control panel controls the supply to the lamps. A warning lamp, also mounted on the tanker operator's control panel and connected in parallel with the lower wing lamps, indicates when the supply to the lower wing lamps is switched on. When the control switch is selected to ON, a supply, from a fuse in the tanker operator's control panel, is connected directly to the warning lamp. At the same time the supply is connected to the lower wing lamps via the dimmer switch.

Table 1

Fuel contents system—components (additional items fitted on tanker aircraft)

Note . . . *Other items as B. Mk.* 1 *aircraft, see Chapter* 6

Item	Ref.	No. off	Location
Gauge, underwing tanks	GP.280-064/2 (post-Mod. 2303)	2	Tanker control panel
	GP.280-064 (pre-Mod. 2303)	◄ 2 ►	
Gauge, transfer tanks	GP.280-065	1	Tanker control panel
Gauge, bomb bay tank	◄ GP.280-065 ►	1	Tanker control panel
Gauge, fuselage cell 3	GP.280-069	2	Tanker control panel
Oscillator unit, No. 6	GP.512-002	1	Under radio crate table
Cable junction unit for No. 3 relay rectifier unit	G.P.922-002	2	Port and starboard fuel service bays

H.D. unit lamps

64. Two lamps, fitted with 28-volt, 60w filaments and mounted on each of the bomb door rear radius rods, provide the illumination for the H.D.U. and bomb bay. A two position ON and OFF switch and a dimmer switch, mounted on the tanker operator's control panel, control the supply to the lamps. A warning lamp, mounted on the tanker operator's control panel and connected in parallel with the bomb bay lamps indicates when the supply to the bomb bay lamps is switched on. When the control switch is selected to ON a supply, from a fuse in the tanker operator's control panel,

Table 2

Fuel contents system—component capacities (additional items fitted on tanker aircraft)

Note . . . *Other items as B. Mk.* 1 *aircraft, see Chapter* 6, *Group* 4

Tank units

Tank	Ref. No.	No. off	Capacity	Location
Bomb bay—forward	GP.354-085	1	257 ± 10 pf.	Bomb bay tank
aft	GP.354-086	1	257 ± 10 pf.	

Cable assemblies

Position	Ref. No.	No. off	Capacity
Between bomb bay tank units	GP.742-217	1	135 ± 3 pf.
Between bomb bay tank and rectifier	GP.742-215	1	104 to 109 pf.
Between fuselage relay rectifier unit and cable junction or additional No. 3 cell relay rectifier unit	GP.742-211 GP.742-271 (post-Mod. 2505)	2	— (length not to exceed 12 inches)

Rectifier units

Note . . .

(1) *For satisfactory operation of the fuel contents gauges the following modifications must be incorporated. Mod.* 2669, 2670.

(2) *For additional rectifier units used on the aircraft see Chap.* 6, *Group* 4.

Tank	Ref. No.	No. off	Capacity	Location
Bomb bay	GP.645-019/2 (post-Mod. 2223) GP.645-019/3 (post-Mod. 2670)	1		On bomb bay tank
Relay rectifier for fuselage No. 3 cells	GP.654-009	2	Empty 736 pf. Full 1243 pf.	Port and starboard service bays
Relay rectifier for fuselage tanks	GP.645-001 (pre-Mod. 2347) GP.645-012 (post-Mod. 2347) GP.645-012/2 (post-Mod. 2505) GP.645-012/4 (post-Mod. 2669)	2		Port and starboard fuel service bays

654

is connected directly to the warning lamp. At the same time the supply is connected to the bomb bay lamps via the dimmer switch.

Introduction

65. The General Information group, contained in Book 2 immediately after Section 5 marker card gives a detailed description of the general tests to be applied to all aircraft circuits and the procedure to be adopted when servicing special circuits. The servicing procedure for the normal aircraft fuel system can be found in Chapter 4. This group describes the functional tests for individual circuits only. For information on the functional check of the complete tanker installation see Book 1, Sect. 2, Chap. 6.

BOMB DOORS MASTER CLOSE RELAY

66. (1) Check the bomb door circuit fuses and connect 112- and 28-volt d.c. supplies to the external connection.
(2) Select the 96-volt and 24-volt battery switches to ON.
(3) Select the BOMB DOOR CONTROL switch to OPEN.
(4) Select both door isolating switches to ISOLATE.
(5) Connect a 28-volt test lamp between terminal 4 of the master close relay and earth.
(6) Unwind the hose from the hose drum unit.
(7) Select the bomb door control switch to CLOSE. Check that the test lamp does not come on.
(8) Wind the hose onto the drum and check that the test lamp lights when the hose is fully wound in.
(9) Disconnect the 28-volt test lamp.
(10) Select the BOMB DOOR CONTROL switch to OPEN and return the door isolating switches to NORMAL.

Navigation lamps (Mod. 2638)

◄ **64A.** Facilities are provided by this modification to enable the tail navigation lamps to be switched off independently of the other navigation lamps during refuelling in flight. A switch on the starboard coaming panel is connected in series with the two lamps. ►

SERVICING

(11) Select the 96-volt and 24-volt battery switches to OFF.

TANKER CONTROL PANEL SUPPLIES

Note . . .

The bomb doors must be OPEN *before a supply is available to the control panel.*

67. (1) Check the bomb doors and control panel circuit fuses and connect 112- and 28-volt d.c. supplies to the external connections.
(2) Select the 96-volt and 24-volt battery switches to ON.
(3) Connect 28-volt test lamps between the control panel bus-bars and earth.
(4) Reset the control panel circuit breakers.
(5) With the bomb doors CLOSED select the control panel master switch ON. Check that the test lamps do not come on.
(6) Select the control panel MASTER switch to OFF.
(7) OPEN the bomb doors.
(8) Select the control panel MASTER switch to ON. Check that the test lamps come on.
(9) Trip and reset each circuit breaker and check that respective test lamp goes out and comes on again.
(10) Disconnect the test lamps and return the control panel MASTER switch to OFF.
(11) Select the 96-volt and 24-volt battery switches to OFF.

H.D.U. CONTROL

68. All information on the servicing procedure for these circuits is contained in A.P.4611, Vol. 1.

TURBINE PUMP SOLENOID VALVES AND PRESSURE SWITCHES

Note . . .

Bomb doors must be OPEN *before operation of this circuit is possible. If no air supply is available for the turbine the L.P. (tank empty) indicator lamp will not operate.*

69. (1) Check the circuit fuses in the control panel and connect a 28-volt d.c. supply to the external connection.
(2) Select the 24-volt battery switch to ON.
(3) Select the control panel MASTER switch to ON.
(4) Select to OPERATOR the fuselage No. 3 cells, rear transfer and bomb bay tanks switches.
(5) Check that the L.P. (tank empty) indicator lamps come on.
(6) If no air supply is available press each selected tank start switch and check that the valve can be heard to operate.
(7) If air is available for the turbine, press the START push until the L.P. (tank empty) indicating lamp goes out then release. Check that the indicating lamp stays out.
(8) Press the STOP push and check that the indicating lamp comes on.
(9) Select the 24-volt battery switch to OFF.

UNDERWING FUEL PUMPS AND L.P. (TANK EMPTY) INDICATOR LAMPS

Note . . .

1. *The fuel pumps must not be operated for periods of more than 2 minutes unless blast cooling is applied. A period of 30 minutes must elapse between each 2 minute period. The bomb doors must be* OPEN *before operation of this circuit is possible.*

◄ 2. *If during fuel flow checks the required rate of flow is not achieved, it may be found necessary to adjust the resistance in the field circuit of the pump motor (see Book 2, Sect. 5, Chap. 4).* ►

70. (1) Check the circuit fuses in the control panel and connect 112- and 28-volt d.c. supplies to the external connections.
(2) Select the 96-volt and 24-volt battery switches to ON.
(3) Reset the control panel circuit breakers and select the control panel MASTER switch ON.
(4) Select OPERATOR the port underwing tank pilot/operator switch. Check that the L.P. (tank empty) indicating lamp comes on.
(5) Press the START push and release when the L.P. (tank empty) indicating lamp goes out. ◄ Post-Mod. 2784, check that the pump-on indicator shows white. ►
(6) Press the STOP push and check that the L.P. (tank empty) indicating lamp comes on after a few minutes have elapsed. ◄ Post-Mod. 2784, check that the pump-on indicator shows black. ►
(7) Repeat for the starboard tank fuel pump.
(8) Return MASTER switch to OFF and PILOT/OPERATOR switches to PILOT.
(9) Select the 96-volt and 24-volt battery switches to OFF.

UNDERWING TANK AIR VALVES

Note . . .

Ensure the nitrogen system is OFF. (*The* ON/OFF *cock is in the nose portion of the tank*).

71. (1) Check the circuit fuse in the control panel and connect a 28-volt d.c. supply to the external connection.
(2) Select the 24-volt battery switch to ON.
(3) Select the control panel MASTER switch to ON.
(4) Select the port underwing tank PILOT/OPERATOR switch to OPERATOR. Check that the valves can be heard to operate.
(5) Select to PILOT and check that the valves can be heard to operate.
(6) Repeat for the starboard side.
(7) Select the control panel MASTER switch to OFF.
(8) Select the 24-volt battery switch to OFF.

FUSELAGE TANK No. 3 CELLS FUEL VALVE

72. (1) Check the circuit fuses and connect a 28-volt d.c. supply to the external connection.
(2) Select the 24-volt battery switch to ON.
(3) Select to OPERATOR the port fuselage No. 3 cell pilot/operator switch.
(4) Check that the actuator has operated to CLOSE the valve.
(5) Select to PILOT and check that the actuator has operated to OPEN the valve.
(6) Repeat for the starboard side.

Note . . .

A pointer visible through a window on the actuator, indicates whether the valve is OPEN *or* CLOSED.

FUEL CONTENTS GAUGES

Setting up gauges

73. Before any adjustments are made to the rectifiers the following checks should be carried out:—
(1) Ensure that the aircraft is level laterally and that the fuselage datum is 1·1/4 deg. nose down approximately.
(2) Drain all fuel tanks (*Book* 1) by opening all fuel drains. It is not necessary to open the water drains.
(3) Connect a 28-volt d.c. supply to the external connection.
(4) Select the instrument master switch to ON.
(5) Using Pacitor test set 7C/1202 (if the test set is not available a thermocouple voltmeter consuming not more than 5 mA at 70v may be used), check the output of each oscillator unit as follows:—Check that the output is 70 ± 5 volts a.c. (input voltage —26 volts d.c.) with a standard load of 8,000pF in series with a 500 ohm, 2 watt resistance across the output terminals.
(6) Allow the gauges to operate for 10 minutes with the fuel tanks empty.

Note . . .

1. *It is most important to measure the Specific Gravity of the fuel being used.*
2. *For absolute accuracy for setting gauges, all refuelling equipment should be checked (hydrometer and refueller flowmeter). The refueller can be checked against a standard tank and correction tables formulated.*
3. *Pilot's fuel contents gauges are to be used as 'master' gauges and all setting-up must be carried out on the pilot's gauges.*
◄ 4. *In order to ensure, when refuelling a specific tank or cell with a specified quantity of fuel, that none of this fuel leaks past the refuelling valves into other tanks or cells, the refuelling valve selector switches for all cells and tanks must be set to* OFF *with pressure in the refuelling pipes. This ensures that the refuelling valves are closed under pressure and each hydraulically locked shut. If this instruction is observed, no fuel should leak past the refuelling valves into other tanks or cells and all the fuel required for calibration purposes, as measured at the refueller will pass into the tank concerned.* ►

Specific gravity of fuel

74. (1) Specific Weight (S Wt) = Specific Gravity (SG) × 10.
(2) The Specific Gravity of fuels under various conditions should not fall outside the range 0·75 to 0·81.
(3) A specific quantity of fuel, in gallons, has been calculated to be pumped into each tank for setting up purposes whatever the S.G. conditions of the fuel may be, otherwise, the following conditions would arise with consequent indecision and error.
(*a*) The variation of S.G. of the fuel would in some cases result in the weight of fuel to fill a tank being greater than the maximum scale reading on the gauge, consequently setting up must be carried out within the limits of the gauge scales.

(*b*) Under some conditions of S.G. and temperature the maximum scale reading (in lbs.) when converted to gallons would result in a quantity of fuel (in gallons) greater than the volumetric capacity of the tank in which case it would be necessary to fill the tanks to capacity and to convert this number of gallons to lbs. for the gauge setting.

No. 1 wing tanks (553 ± 10 gallons per side including unusable fuel)

75. (1) Select the pilot's change-over switch to NORMAL.

(2) With 8 gallons unusable fuel in the tanks, adjust the rectifiers (adjustment E (so that the gauges read ZERO.

(3) Refuel the port and starboard tanks with 490 gallons measured at the refueller.

(4) Multiply the 490 gallons by the Specific Weight of the fuel to give the total weight of fuel.

(5) Adjust the rectifiers (adjustment F) so that the gauges read the exact weight of fuel given by item 4.

No. 2 wing tanks (473 ± 10 gallons per side with unusable fuel)

76. Proceed as for No. 1 wing tanks, except that each tank must be refuelled with 420 gallons. (*See items* 4 *and* 5).

Reserve tanks (590 ± 10 gallons port and starboard total)

77. (1) With the tanks empty adjust the rectifiers (adjustment E) so that both gauges read ZERO.

(2) Refuel the tanks with 580 gallons measured at the refueller.

(3) Multiply the 580 gallons by the Specific Weight of the fuel to give the total weight of fuel.

(4) Adjust the rectifiers (adjustment F) so that each gauge reads ½ the exact weight of fuel given by item 3.

Fuselage tanks, cells 1, 2 and 3

78. 735 ± 10 gallons port and starboard total for cell 1. 1,370 ± 10 gallons port and starboard total for cell 2. 1,285 ± 10 gallons port and starboard total for cell 3.

(1) Select to PILOT the tanker control panel switches for the No. 3 cells.

(2) With all cells empty, adjust port and starboard relay rectifiers (adjustments E1-2-3 and T) with the selector switches on the pilot's fuel panels at the corresponding positions:—Cell 1, Cell 2, Cell 3 and Total so that the gauges read ZERO.

(3) Refuel No. 1 cells with 670 gallons measured at the refueller.

(4) Multiply the 670 gallons by the Specific Weight of the fuel to give the total weight of fuel.

(5) Adjust the relay rectifiers (adjustment F-1) with the selector switches at Cell 1 so that the gauges read ½ the exact weight of fuel given by item 4.

(6) Refuel No. 2 cells with 1,300 gallons measured at the refueller.

(7) Multiply the 1,300 gallons by the Specific Weight of the fuel to give the total weight of fuel.

(8) Adjust the relay rectifiers (adjustment F-2) with the selector switches at Cell 2, so that the gauges read ½ the exact weight of fuel given by item 7.

(9) Select No. 3 cell tanker control panel switches to OPERATOR.

(10) Adjust the additional relay rectifiers (adjustment E) so that the control panel gauges read ZERO.

(11) Refuel No. 3 cells with 1,260 gallons measured at the refueller.

(12) Select No. 3 cell control panel switches to PILOT.

(13) Multiply the 1,260 gallons by the Specific Weight of the fuel to give the total weight of fuel.

(14) Adjust the normal relay rectifiers adjustment (F-3) with the selector switches at Cell 3 so that the gauges read ½ the exact weight of fuel given by item 13.

(15) Select No. 3 cell control panel switches to OPERATOR.

(16) Adjust the additional rectifier (adjustment F) so that the gauges read ½ the exact weight given by item 13.

(17) Select the control panel switches to PILOT.

(18) With all cells refuelled to items 4, 7 and 13, and selector switches at TOTAL, adjust the relay rectifiers (adjustment F-T) so that the gauges read ½ the total weight of fuel given by addition of items 4, 7 and 13.

Note . . .

The weights of fuel given by items 4, 7 *and* 13 *are for the port and starboard cells combined. The weight per side will therefore be* ½ *this weight.*

(19) Select control panel No. 3 cell switches to OPERATOR.

(20) Select the pilot's tanks selector switches to TOTAL and check that the pilot's gauges totalize Nos. 1 and 2 cells only.

Note . . .

With the No. 3 *cell control panel switches at* OPERATOR, *the pilot's fuselage fuel contents gauges do not read when the selector switches are set to cell* 3.

Transfer tank (710 ± 10 gallons port and starboard total)

79. (1) Select the tanker control panel switches to PILOT.

(1A) If Mod. 2296 is fitted, select the transfer/bomb bay tank selector switch to TRANSFER TANK.

(2) With the tank empty adjust the rectifier (adjustment E) so that the pilot's gauge reads ZERO.

(3) Refuel the tanks with 690 gallons measured at the refueller.
(4) Multiply the 690 gallons by the Specific Weight of fuel to give the total weight of fuel.
(5) Adjust the rectifier (adjustment F) so that the gauge reads the exact weight of fuel given by item 4.
(6) Select the tanker control panel switches to OPERATOR and check that the control panel gauges read sensibly correct.

Underwing tanks (1615 ± 10 gallons per side with unusable fuel)

80. (1) Select the tanker control panel switches to PILOT.
(2) With 15 gallons of unusable fuel in each tank adjust each rectifier (adjustment E) so that the gauges read ZERO.
(3) Refund each tank with 1,550 gallons measured at the refueller.
(4) Multiply the 1,550 gallons by the Specific Weight of fuel to give the total weight of fuel.
(5) Adjust the rectifiers (adjustment F) so that the gauges read the exact weight in each tank given in item 4.
(6) Select the control panel switches to OPERATOR and check that the control panel gauges read sensibly correct.

Bomb bay tank (575 ± 10 gallons)—pre-Mod. 2296

81. (1) Select the tanker control panel switch to OPERATOR.
(2) With 5 gallons of unusable fuel in the tank, adjust the rectifier (adjustment E) so that the control panel gauge reads ZERO.
(3) Refuel the tank until cut-off, and measure the number of gallons at the refueller.
(4) Multiply the number of gallons (given by item 3) by the Specific Weight of the fuel to give the total weight of fuel.
(5) Adjust the rectifier (adjustment F) so that the gauge reads the exact weight of fuel given in item 4.

Bomb bay tank (575 ± 10 gallons)—post-Mod. 2296

81A. (1) Select the tanker control panel switch to PILOT.
(2) Select the transfer/bomb bay tank switch to BOMB BAY TANK.
(3) With 5 gallons of unusable fuel in the tank, adjust the rectifier (adjustment E) so that the pilot's gauge reads ZERO.
(4) Refuel the tank until cut-off and measure the number of gallons at the refueller.
(5) Multiply the number of gallons (given by item 4) by the Specific Weight of the fuel to give the total weight of fuel.
(6) Adjust the rectifier (adjustment F) so that the gauge reads the exact weight of fuel as given by item 5.
(7) Select the tanker control panel switch to OPERATOR and check that the control panel gauge reads sensibly correct.

EXTERNAL LIGHTING

Note . . .

The bomb doors must be open to connect a supply to the tanker operator's control panel.

Beacon

82. (1) Check the circuit fuse in the control panel and connect a 28-volt d.c. supply to the aircraft external connection.
(2) Select the 24-volt battery switch to ON.
(3) Select the control panel MASTER switch to ON.
(4) Reset the control panel circuit breakers.
(5) Select the BEACON switch to ON. Check that the warning lamp on the control panel comes on and that the beacon operates to flash alternate long and short flashes.
(6) Select the BEACON switch to OFF, trip the control panel circuit breakers and select the control panel MASTER switch to OFF.
(7) Select the 24-volt battery master-switch to OFF.

H.D. unit lamps

83. (1) Check the circuit fuse in the control panel and connect a 28-volt d.c. supply to the aircraft external connection.
(2) Select the 24-volt battery switch to ON.
(3) Select the control panel MASTER switch to ON.
(4) Reset the control panel circuit breakers.
(5) Select the H.D. unit lamp switch to ON. Check that the warning lamp on the panel comes on.
(6) Operate the dimmer switch over its whole range and check that the lamps light accordingly. When the lamps are on, check that they are focussed on the H.D.U.
(7) Select the H.D. unit lamps switch to OFF, trip the control panel circuit breakers and select the control panel MASTER SWITCH to OFF.
(8) Select the 24-volt battery switch to OFF.

Lower wing lamps

84. (1) Check the circuit fuse in the control panel and connect a 28-volt d.c. supply to the aircraft external connection.
(2) Select the 24-volt battery switch to ON.
(3) Select the control panel MASTER switch to ON.
(4) Reset the control panel circuit breakers.
(5) Select the LOWER WING switch to ON and check that the warning lamp on the control panel comes on.
(6) Operate the dimmer switch over its whole range and check that the lamps light, accordingly. When the lamps are on check that they are focussed on the underwing tanks.
(7) Select the LOWER WING switch to OFF trip the control panel circuit breakers and select the control panel MASTER switch to OFF.
(8) Select the 24-volt battery switch to OFF.

◀ **Navigation lamps (post-Mod. 2638 pre-Mod 2871)** ▶

85. (1) Connect a 28-volt external supply to the aircraft.
(2) Select the 24-volt battery switch to ON.
(3) Select the external lamps master switch to ON.
(4) Select the navigation lamps switch to BRIGHT or DIM.
(5) Select the flash/steady switch (Mod. 2593) to FLASH and STEADY and at each position check accordingly.
◀ (6) With the tail lamps switched at ON all ▶ lamps should be on and flashing or steady according to the position of the flash/steady switch (Mod. 2593).
◀ (7) With the tail lamps switch at OFF the tail ▶ lamps should be off although all other navigation lamps should be flashing or steady according to the position of the flash/steady switch (Mod. 2593).

◄ **Navigation lamps (post-Mod. 2638 and 2871)**

86. (1) Check the circuit fuses and connect an external 28-volts d.c. supply to the aircraft.

(2) Select the 24-volt battery switch and the external lamps master switch to ON.

(3) With the flash/steady switch selected to FLASH and the tail lamp switch at ON select the navigation lamps switch to BRIGHT and check that the upper and lower anti-collision lamps are alight and flashing and that the wing tip and tail lamps are alight and steady.

(4) Select the navigation lamps switch to DIM and check that the anti-collision lamps are flashing dimly and that the tail wing tip lamps are dimly alight and steady.

(5) Select the tail lamp switch to OFF and check that tail and anti-collision lamps only are extinguished. Select tail lamp switch to ON. Remove the flasher motor fuse and check that the anti-collision lamps are alight and steady.

(6) Replace the fuse, select the flash/steady switch to STEADY and again check that the anti-collision lamps are alight and steady.

(7) Select all switches to OFF. ►

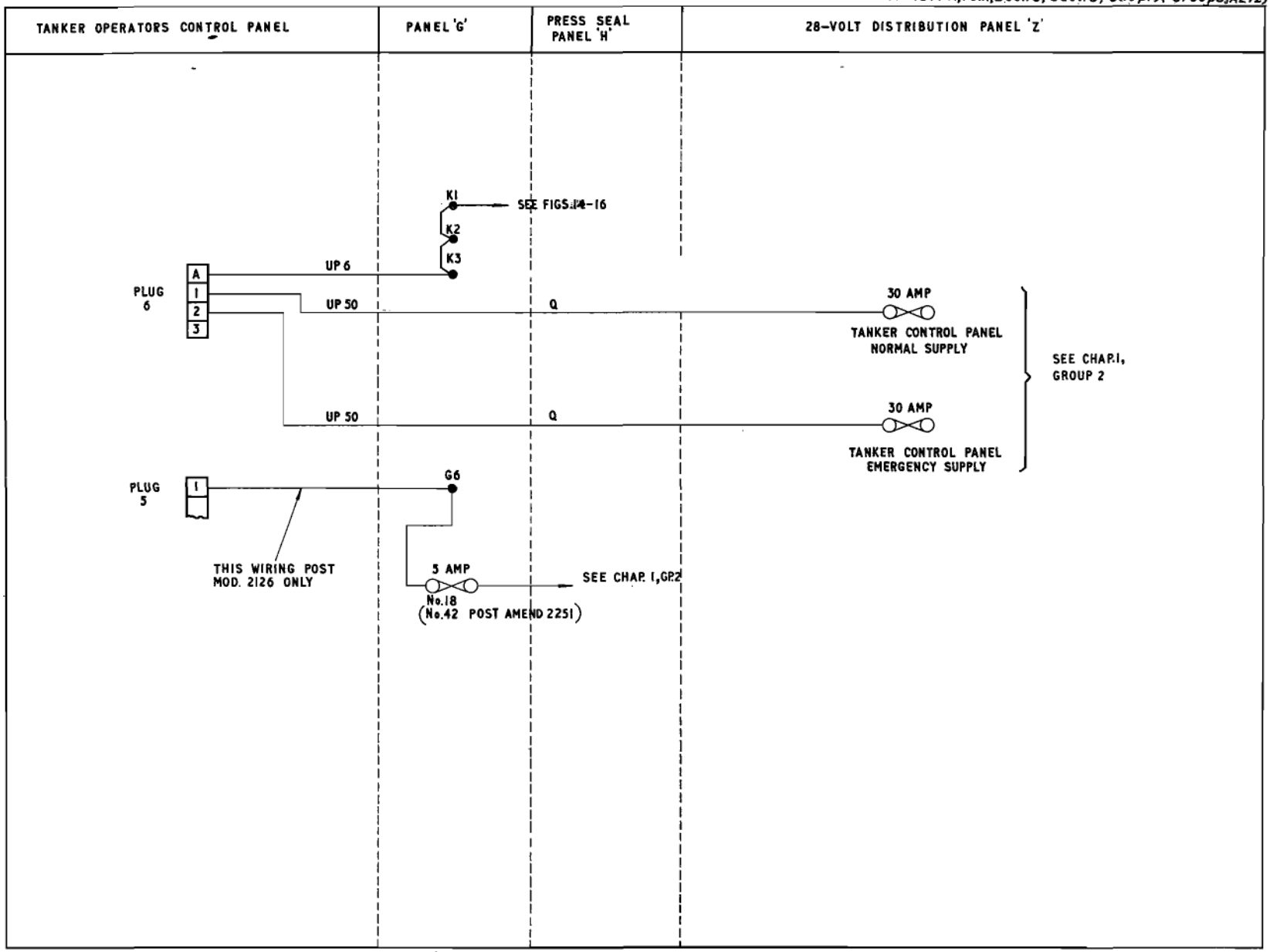

Fig. 17. Control panel supplies

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PP8674 473781/6319 7/60 631 C & P Gp. 924 (4)

(A.L. 12. Feb, 60)

73336 SHT. 422-8
75836 SHT. 422-E

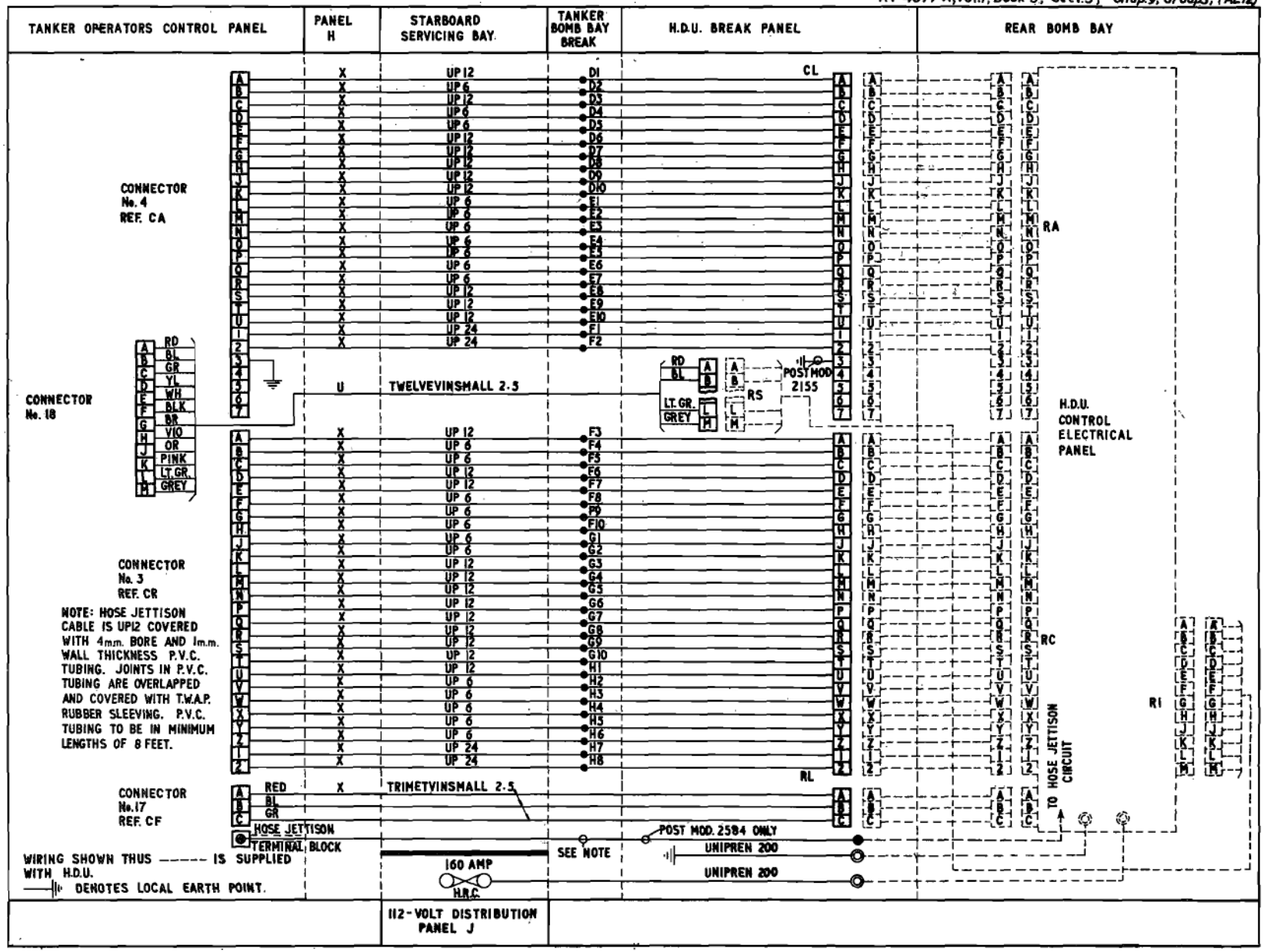

Fig.18 Hose drum unit control

RESTRICTED

PP8674 473781/6319 7/60 631 C & P Gp. 924 (4)

(A.L.12.Feb.60)

73336 SHT. 421-E
75836 SHT. 421-E

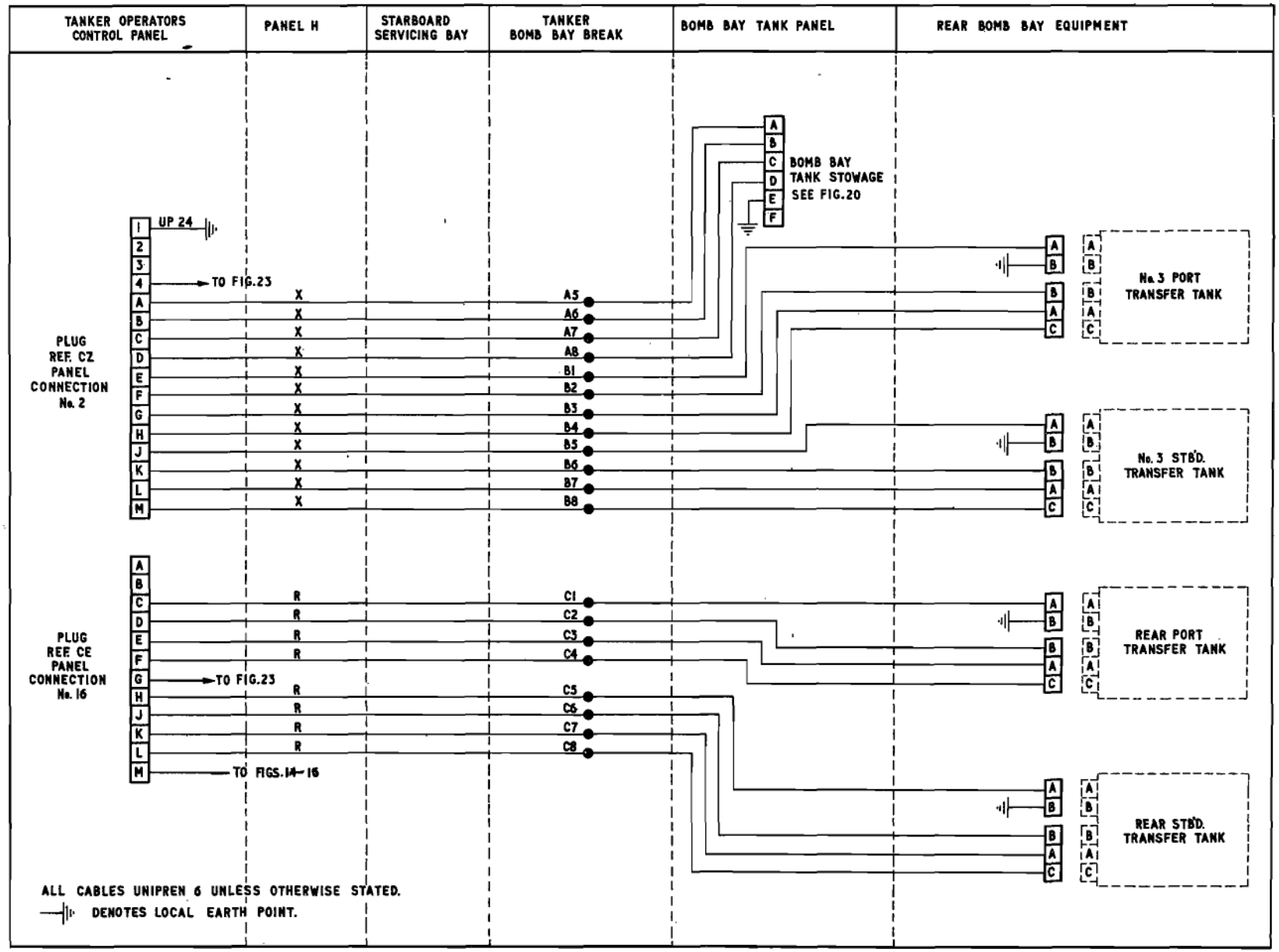

Fig. 19 Turbine pump solenoid valve and pressure switch control

RESTRICTED

73336 SHT. 416-6
75836 SHT. 416-8

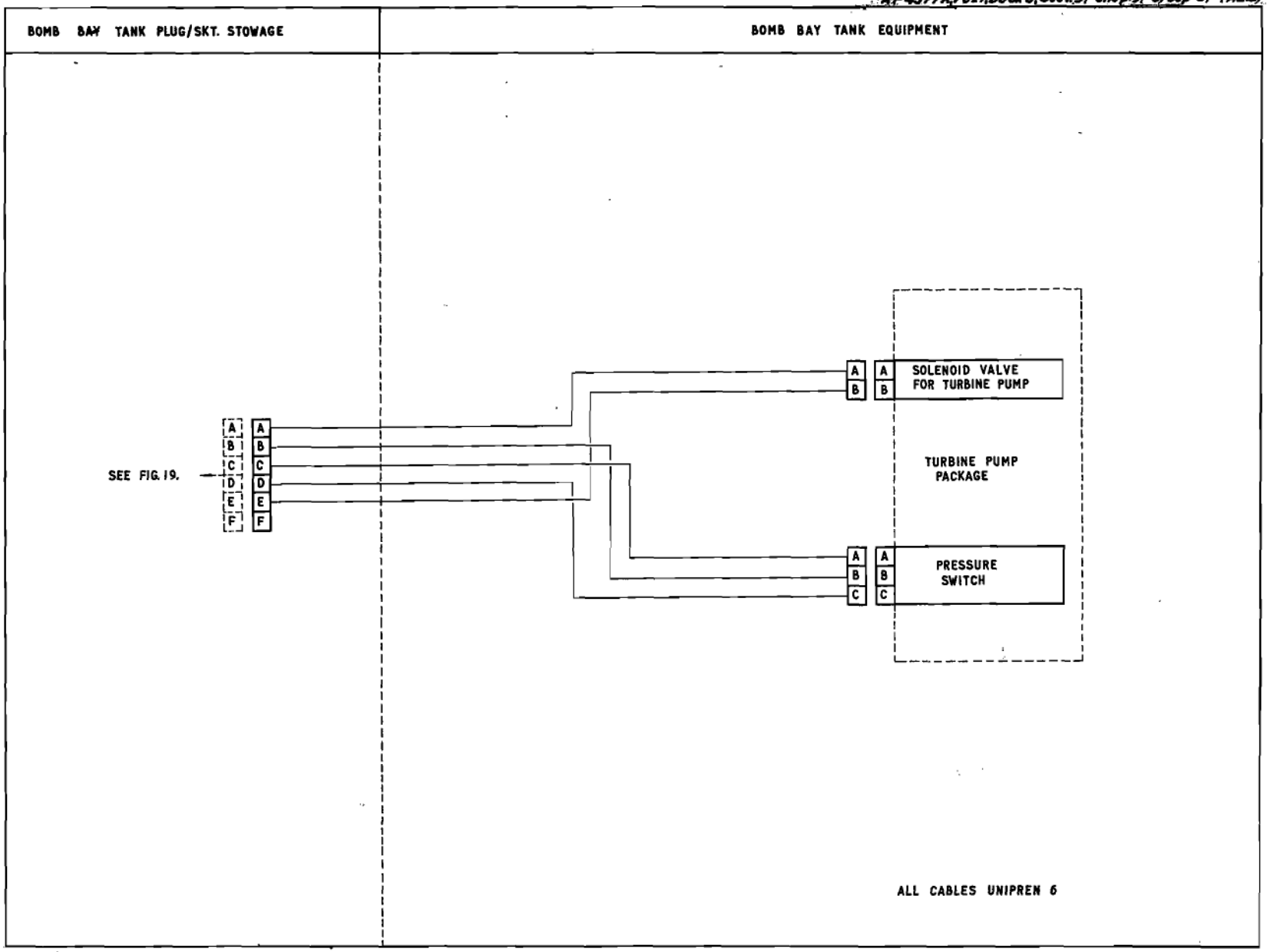

Fig. 20 Turbine pump wiring on bomb bay tank

PP8674 473781/6319 7/60 631 C & P Gp. 924 (4)

RESTRICTED

(A.L.12.Feb.60)

73379 SHT. 409-C

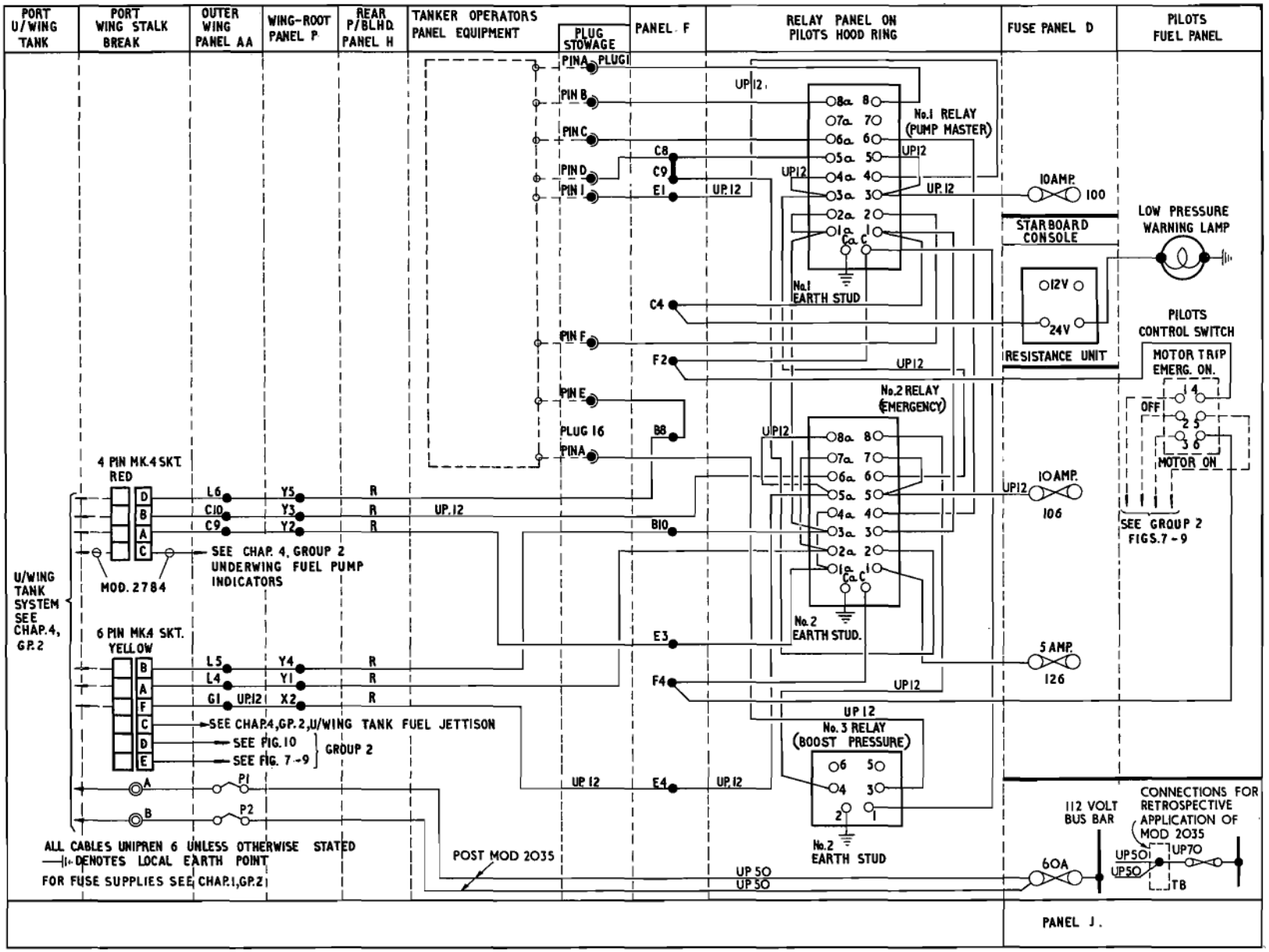

Fig.21 (1) Underwing tank fuel pump and air valves control (post Mods 2449 & 2466)

RESTRICTED

73336 SHT408-H
75836 SHT408-G

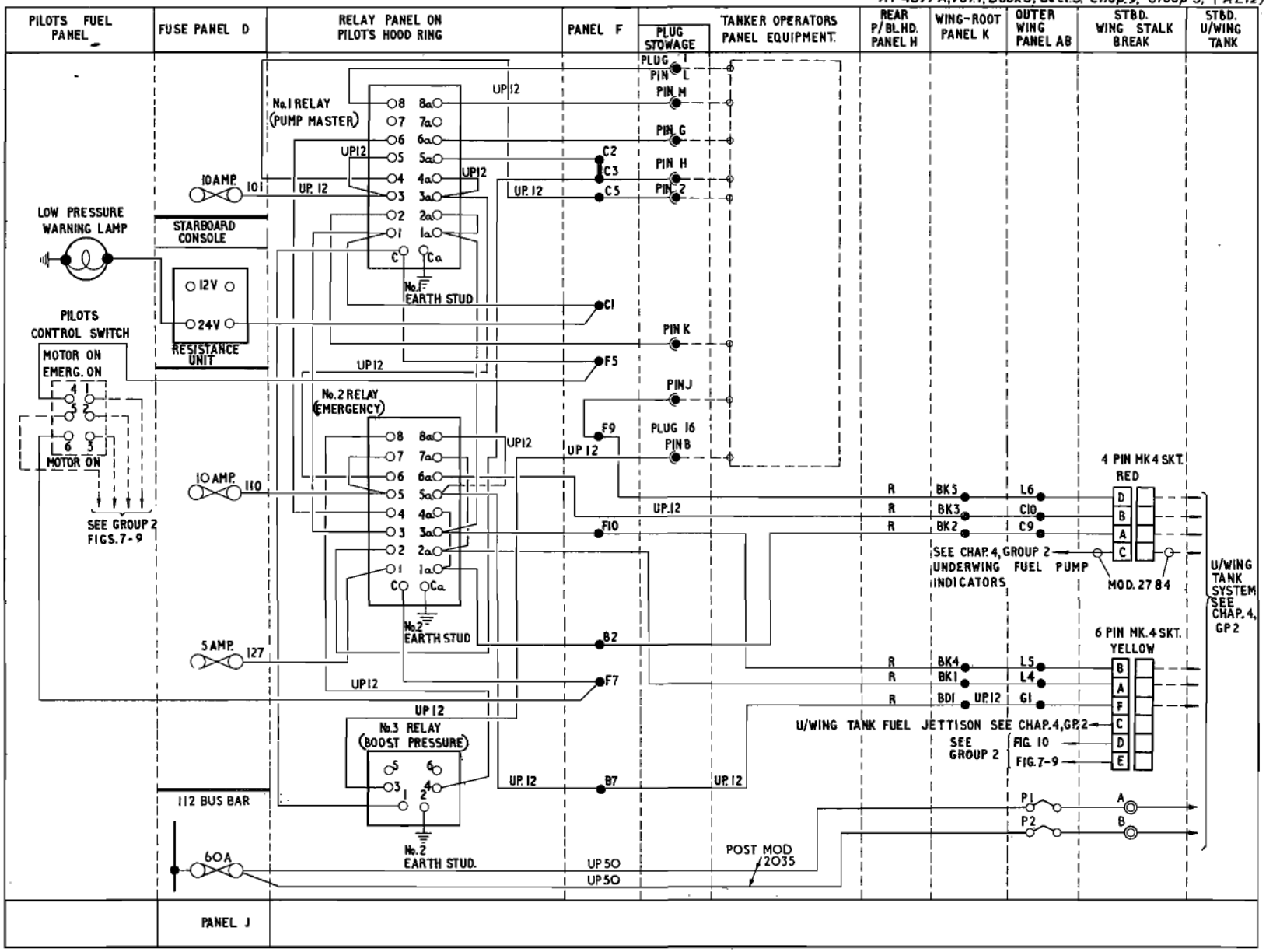

Fig. 2.1 (2) Underwing tank fuel pump and air valves control (post Mods 2449 & 2466)

(A.L.12. Feb 60)

RESTRICTED

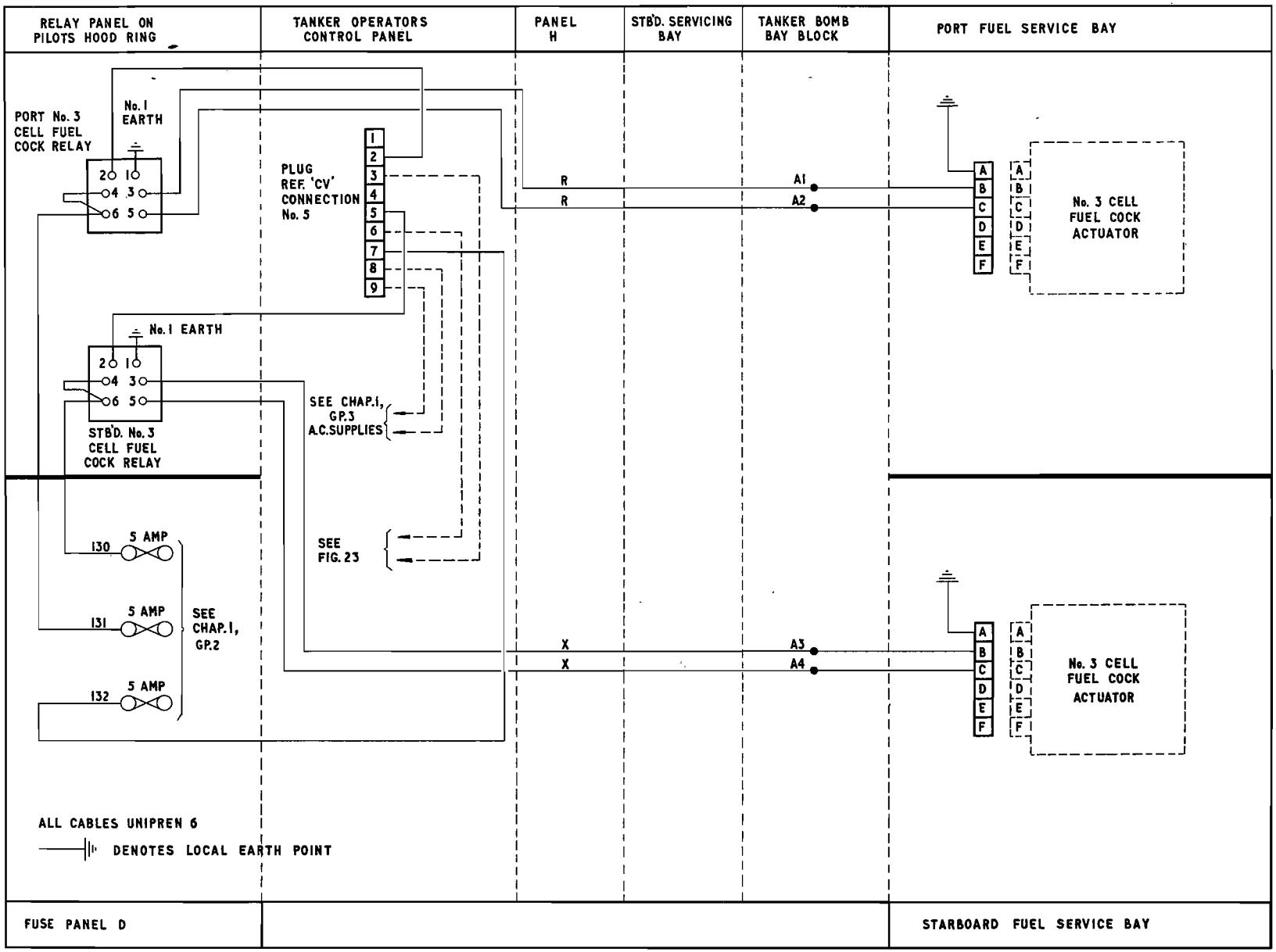

Fig. 22. Fuselage tanks No. 3 cells fuel cocks

RESTRICTED

73336 SHT. 419-C
75836 SHT. 419-B

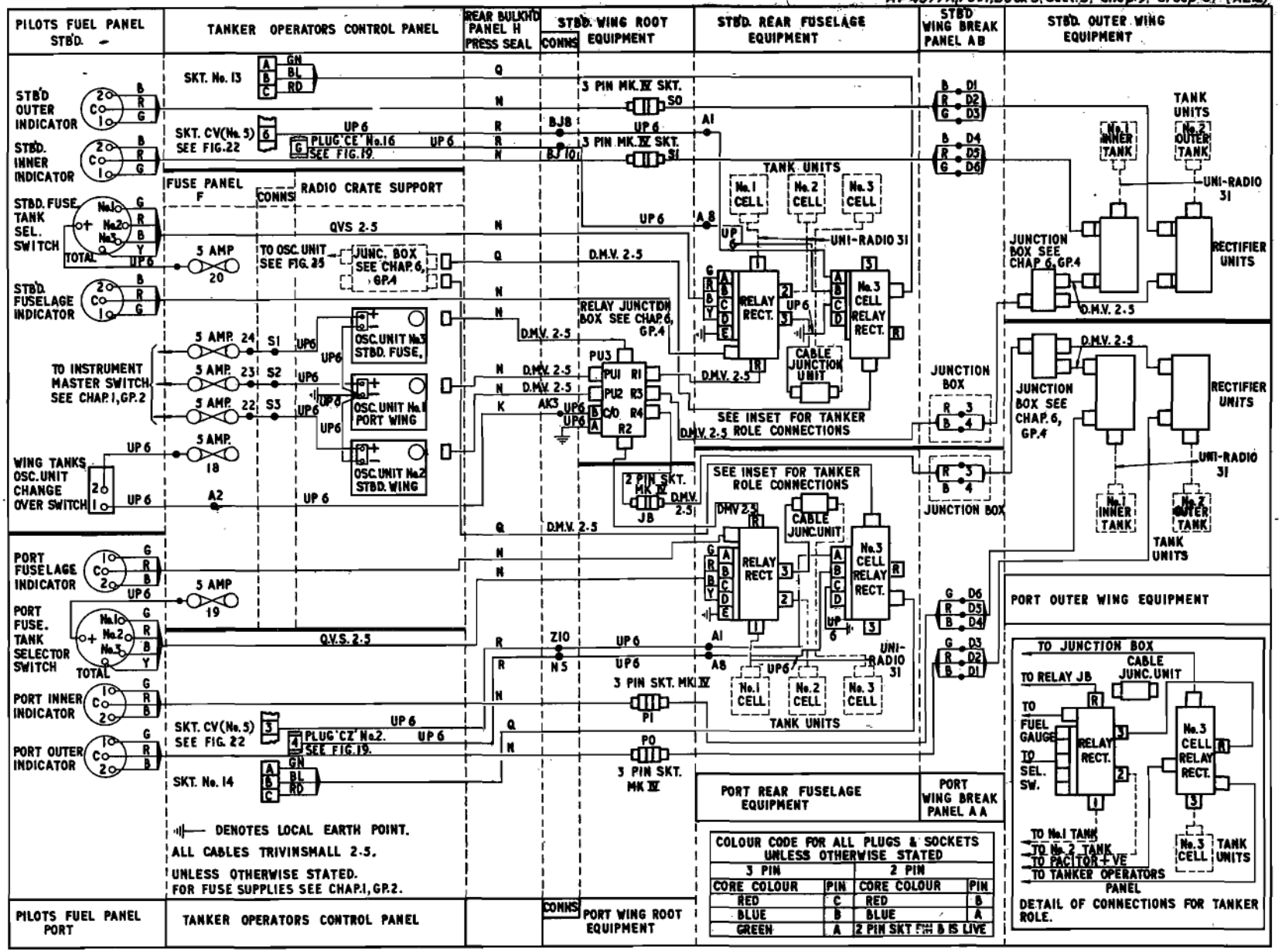

Fig. 23 Fuselage and wing tanks fuel contents gauges (B/K/P.R. Mk.I) (post Mod. 2485, pre Mod. 2296)
(A.L. 12, Feb. 60)

PP8674 473781/6319 7/60 631 C & P Gp. 924 (4)

RESTRICTED

73379 SHT. 406-B
73336 SHT. 136-M

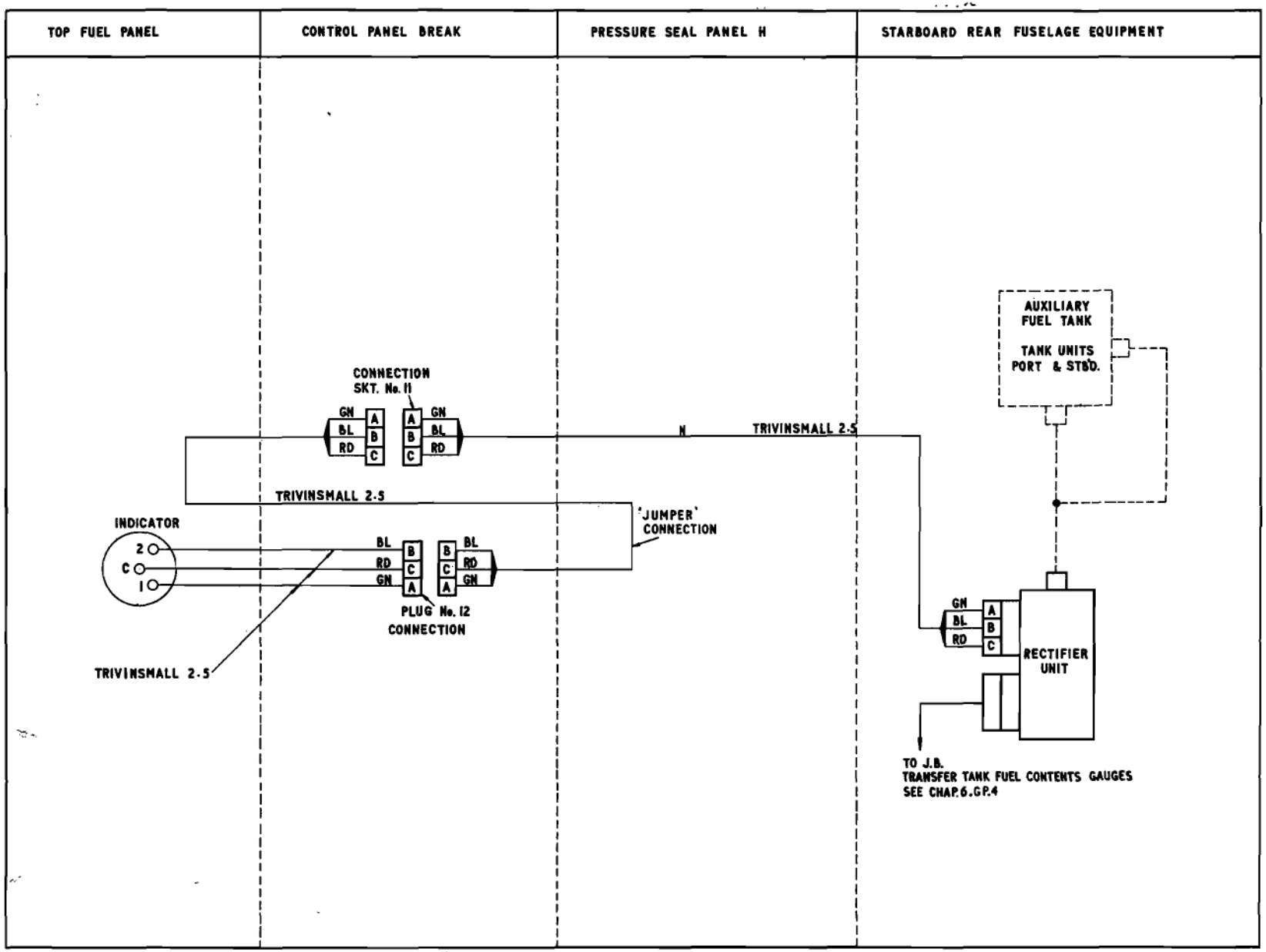

Fig. 24 Transfer tank fuel contents gauge (B/K/P.R.Mk.I) (pre Mod. 2296)

RESTRICTED

73336 SHT. 412-E

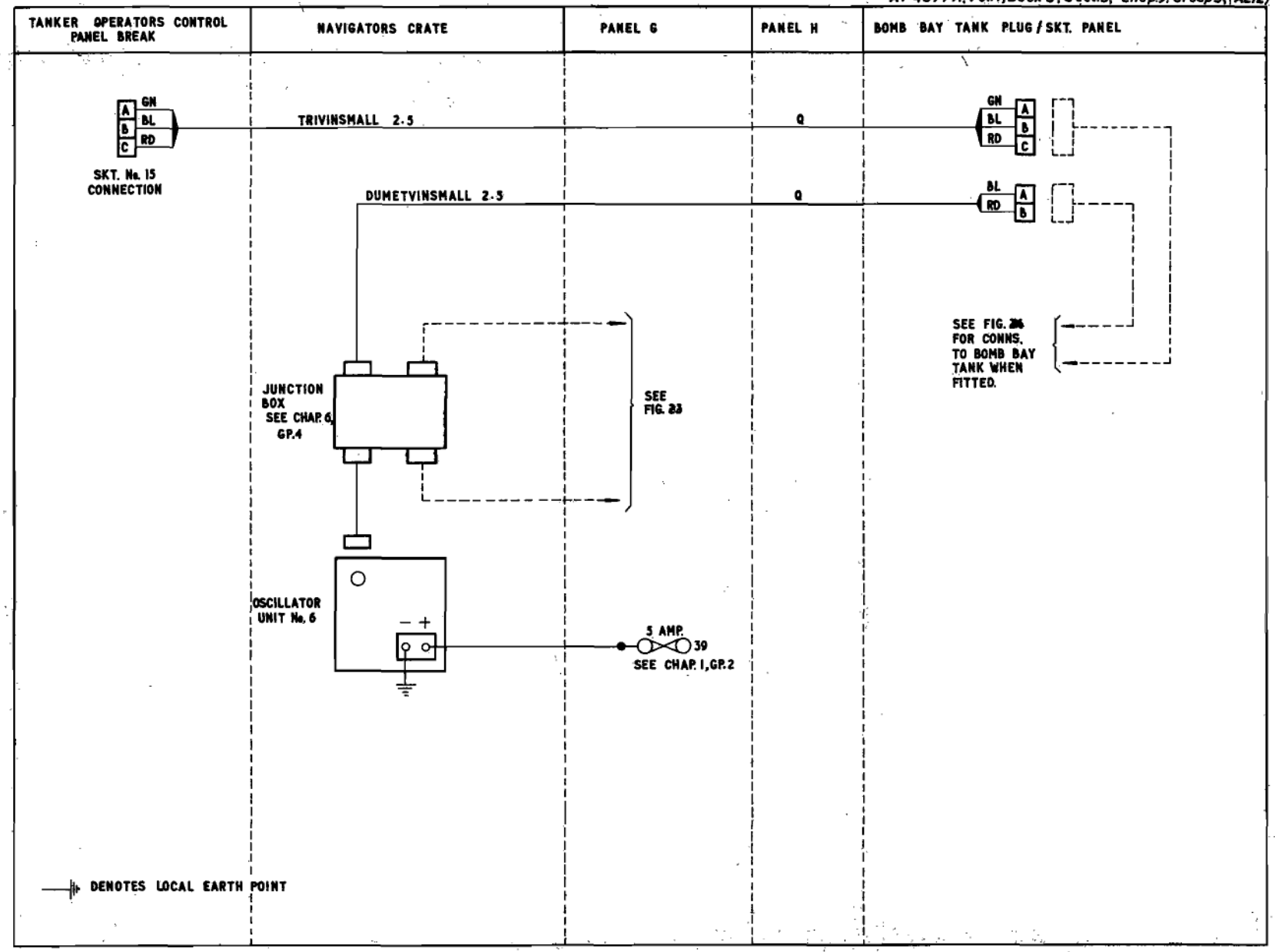

Fig. 25. Bomb bay tank fuel contents gauges (B/K/P.R.Mk.I) (pre Mod. 2296)

(A.L.12. Feb. 60)

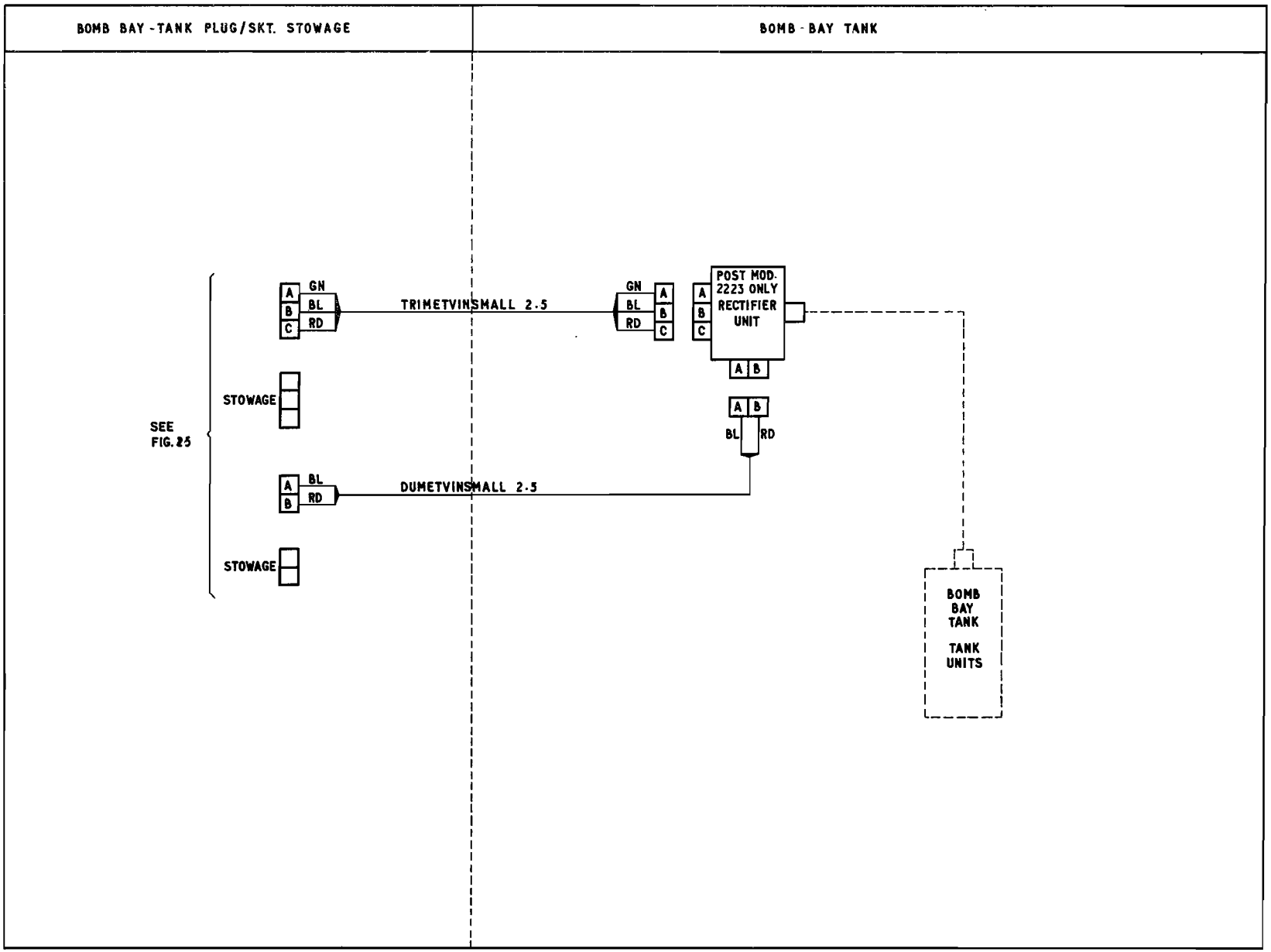

Fig. 26. Wiring on bomb bay tank for contents gauges

RESTRICTED

73379 SHT. 405-H

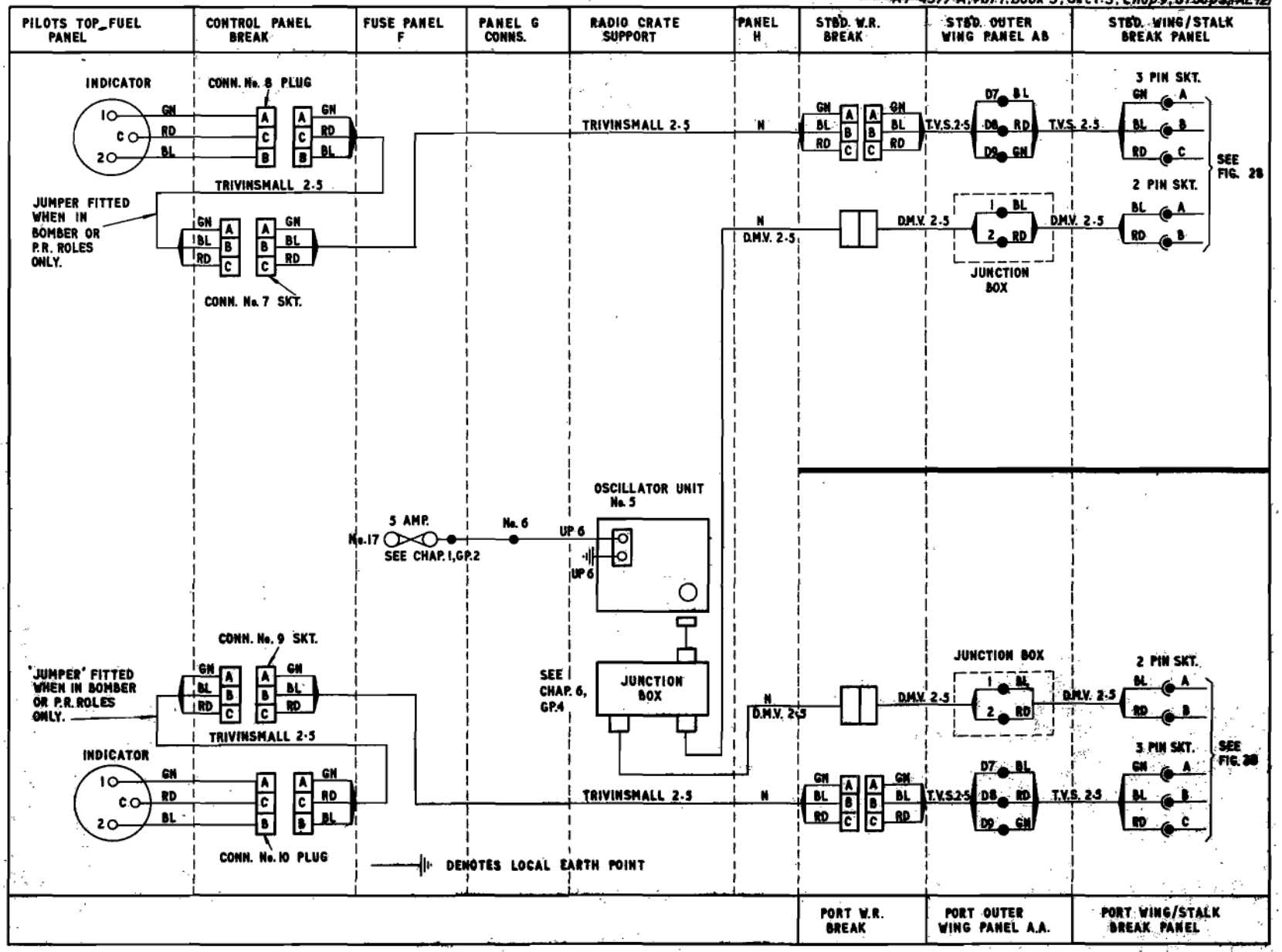

Fig. 27 Underwing tanks fuel contents gauges (B/K/P.R. Mk.1) (pre Mod. 2296)

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PP8674 473781/6319 7/60 631 C & P Gp. 924 (4)

(A.L.12, Feb.60)

73336 SHT. 410-D

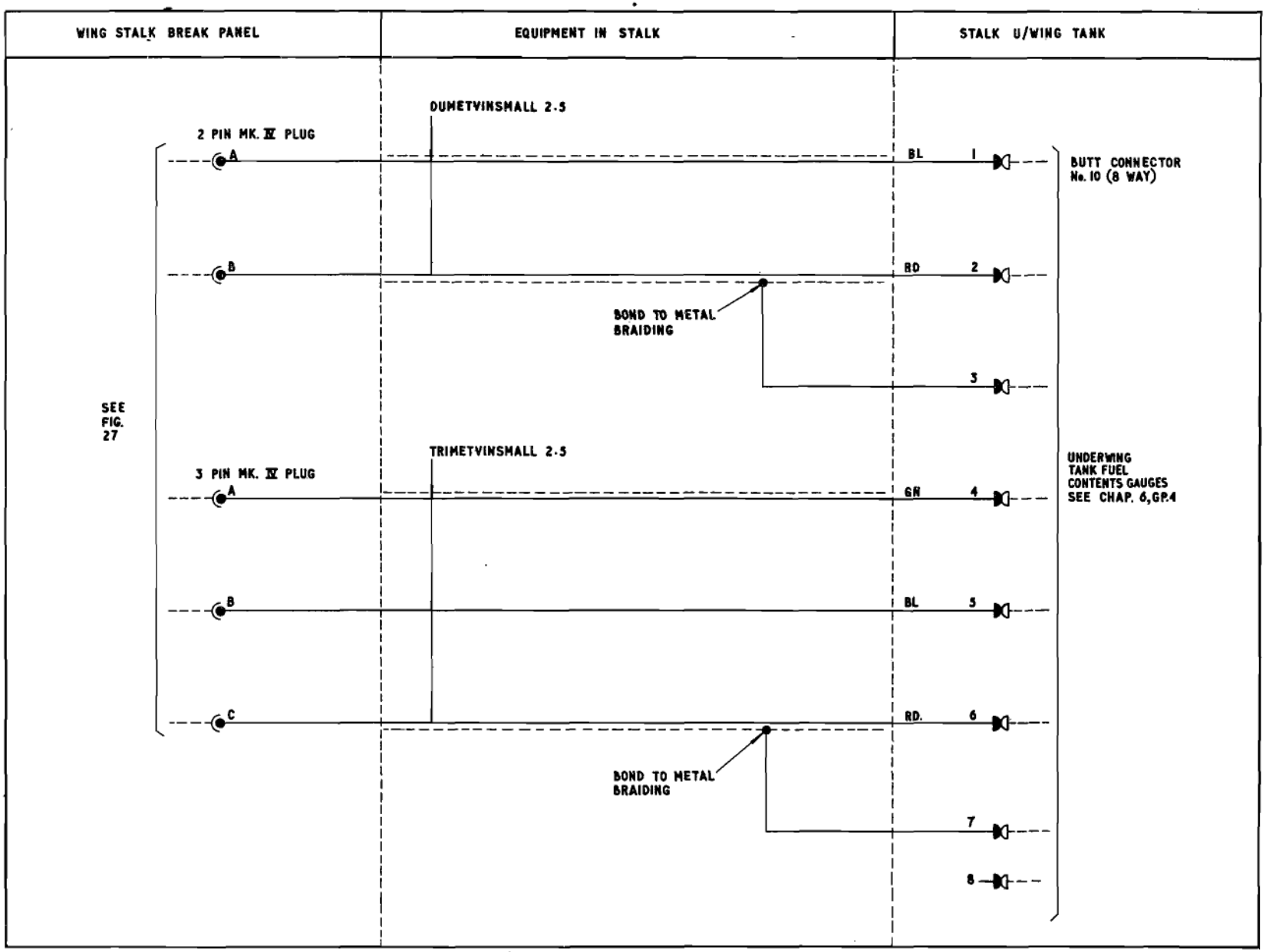

Fig. 28 Under–wing tanks fuel contents gauges–wiring in wing stalk

RESTRICTED

73379 SHT. 401-E

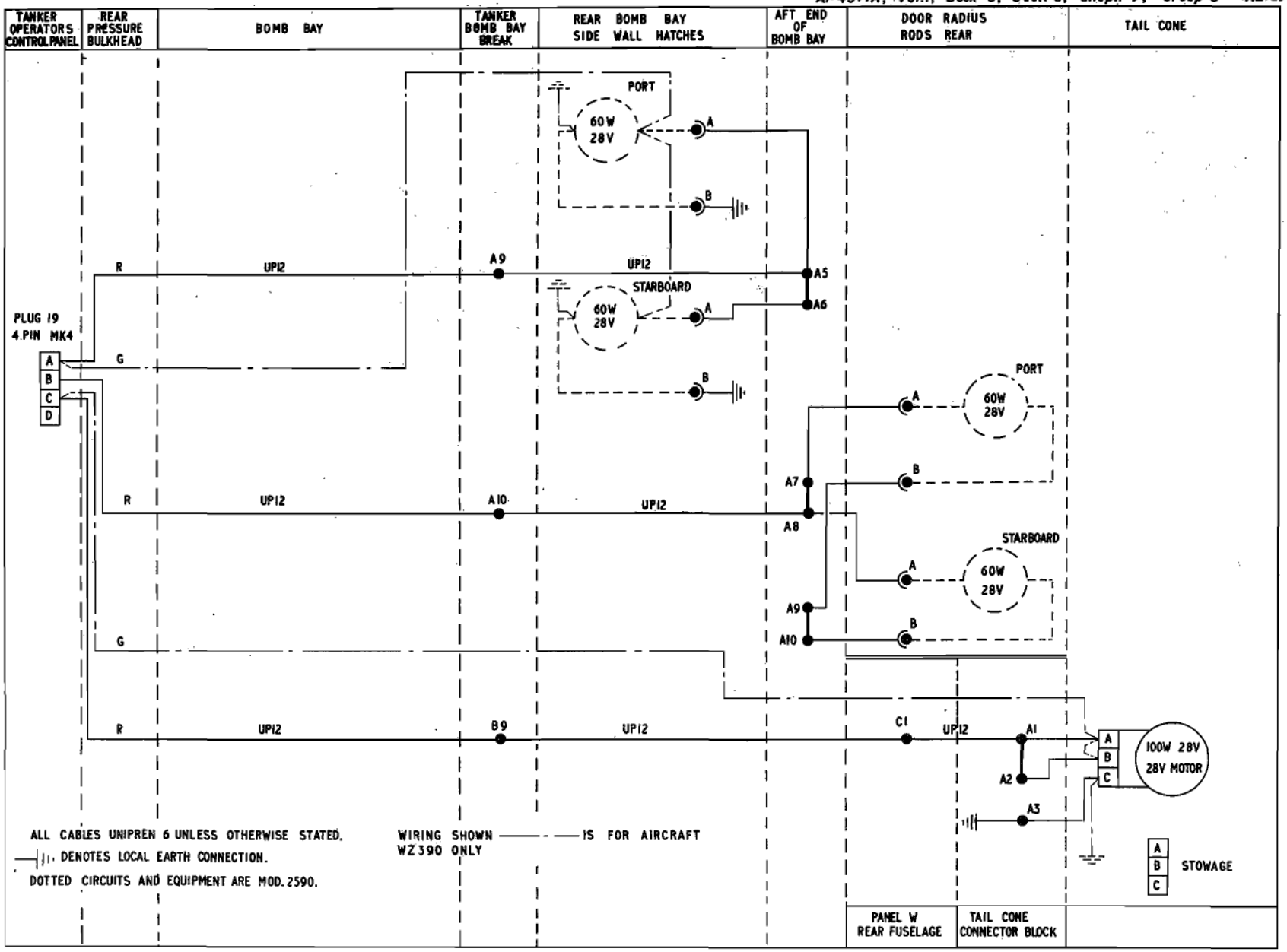

Fig. 29 Tanker external lighting (Mods 2588 & 2590)

(AL.12, Feb.60)
73336 SHT. 509-A, 73336 SHT. 501-A
73379 SHT. 517-A

PP8674 473781/6319 7/60 631 C & P Gp. 924 (4)

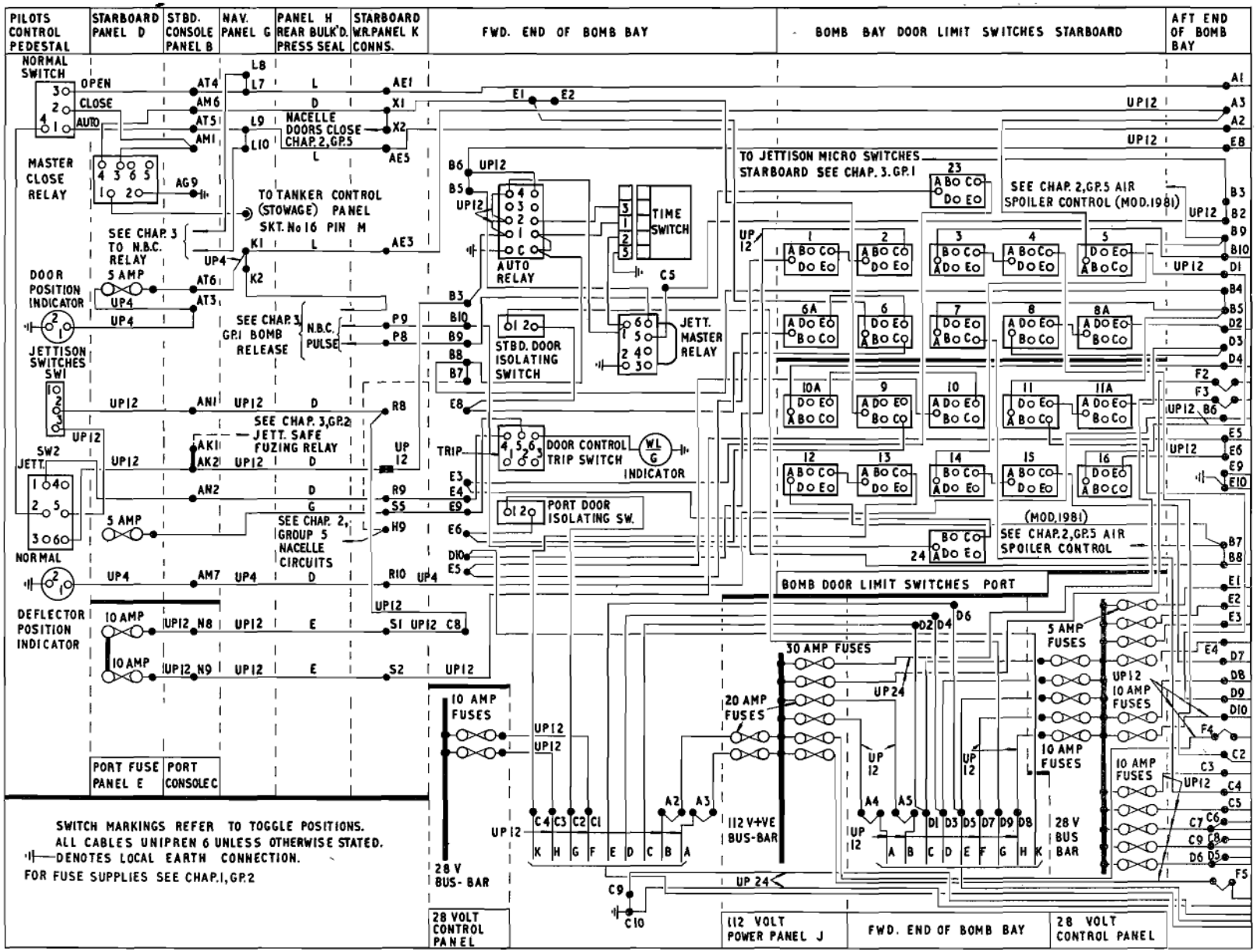

Fig.30(1) Bomb doors and air deflector control (B/K MK.1 Aircraft only)

RESTRICTED

75836 SHT. 143-J

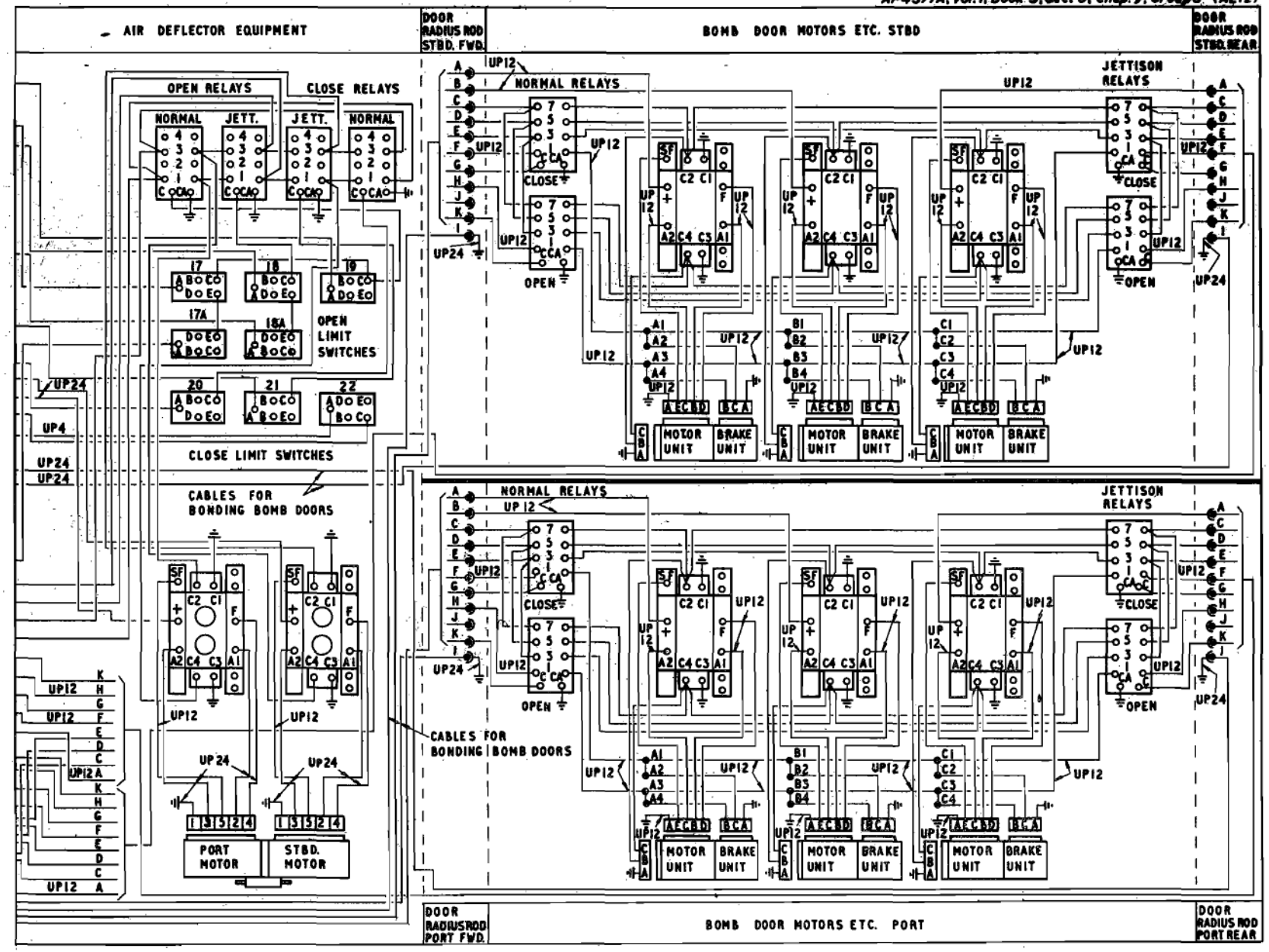

Fig.30(2) Bomb doors and air deflector control (B/K MKI Aircraft only)

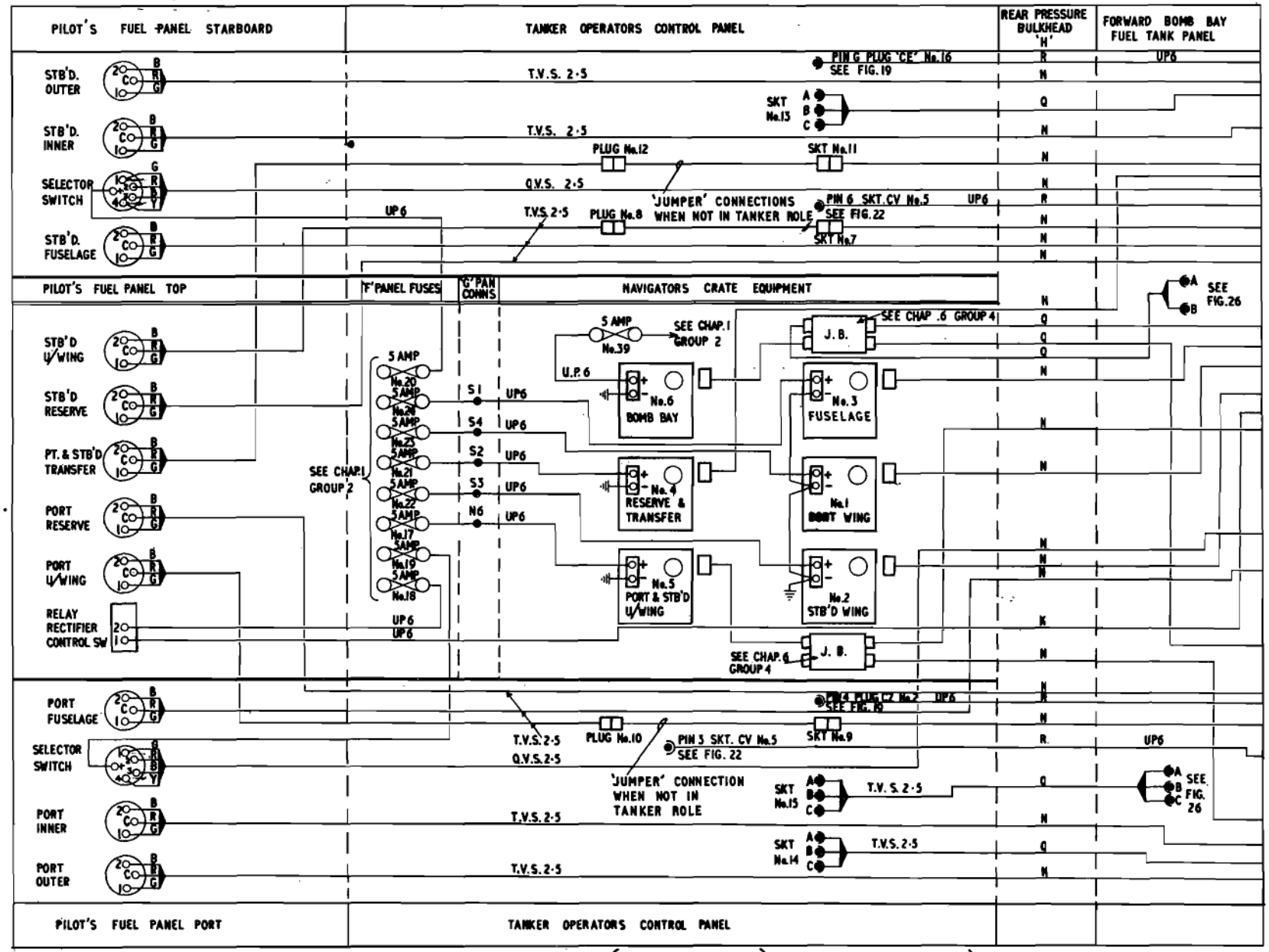

Fig.31.(1) Fuel contents gauges (B/K.MK.1 ONLY) (pre Mod. 2296)

75856 SHT.136-R

RESTRICTED

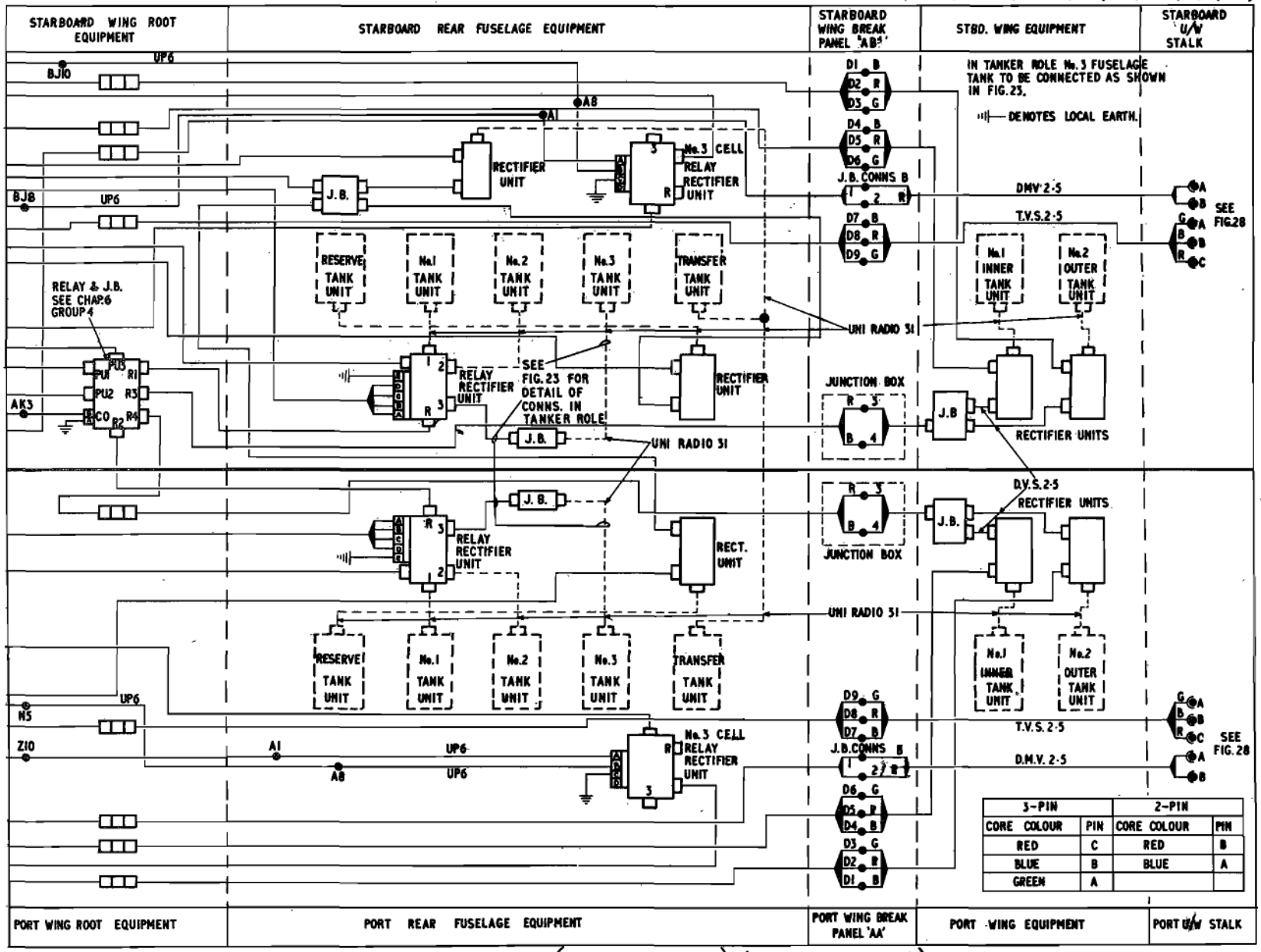

Fig. 31.(2) Fuel contents gauges (B/K. MK. 1 ONLY) (pre Mod. 2296)

(AL12. Feb. 60)

75836 SHT.136-R

RESTRICTED

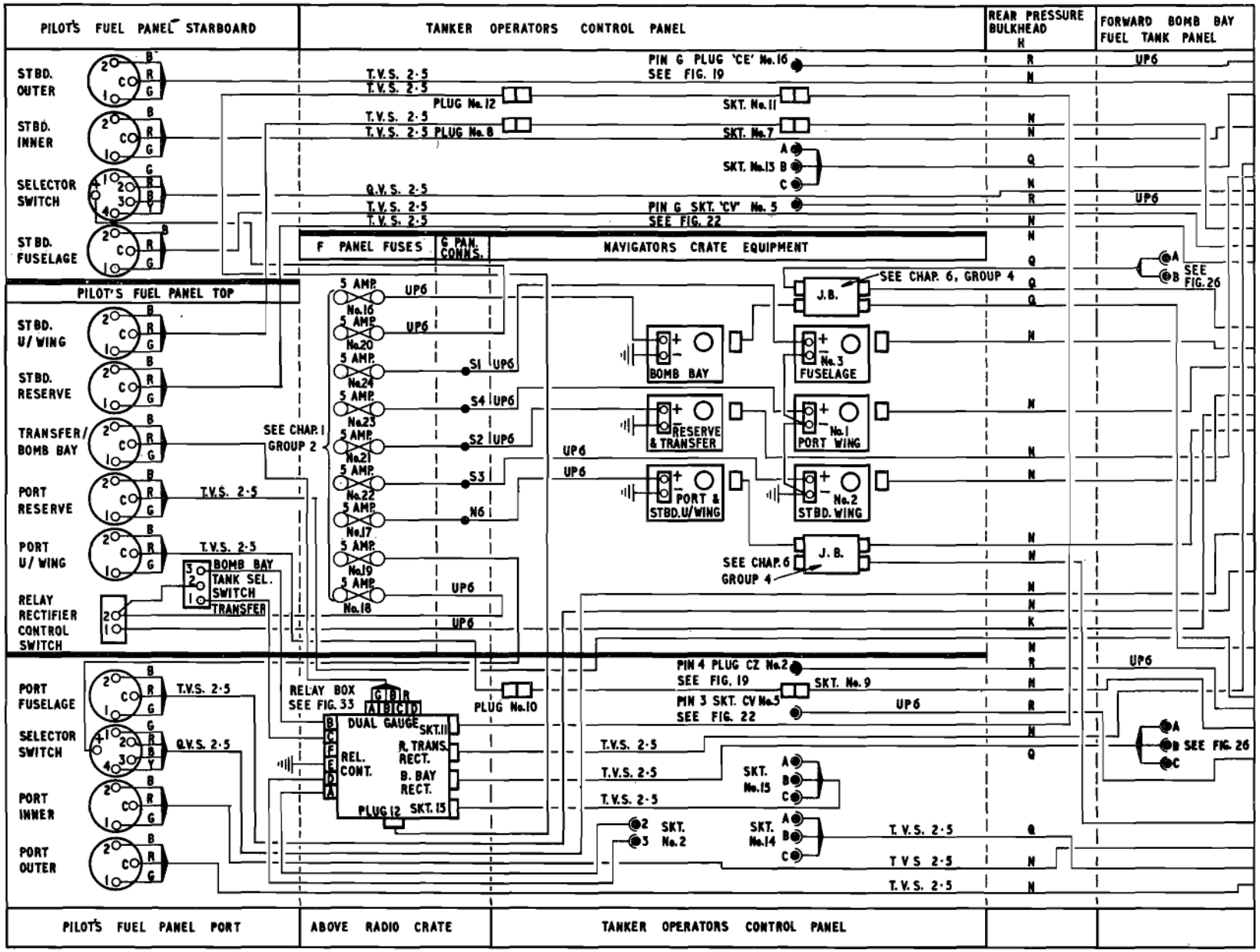

Fig. 32 (1) Fuel contents gauges (B/K Mk. 1 and B/K/PR Mk. 1)(post Mod. 2296)

RESTRICTED

75836 SHT. 136-S

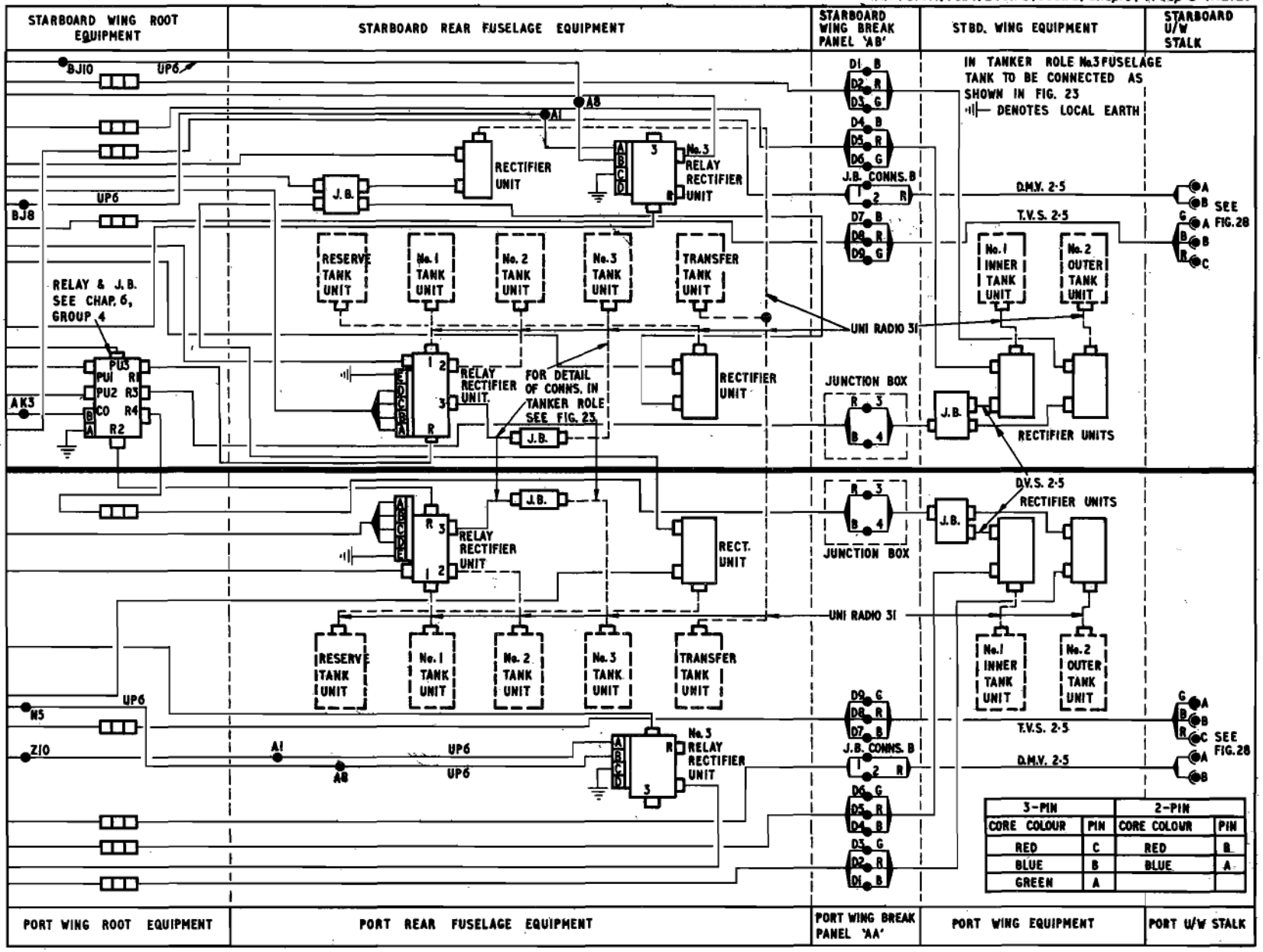

Fig. 32 (2) Fuel contents gauges (B/K Mk. 1 and B/K/PR Mk. 1) (post Mod. 2296)

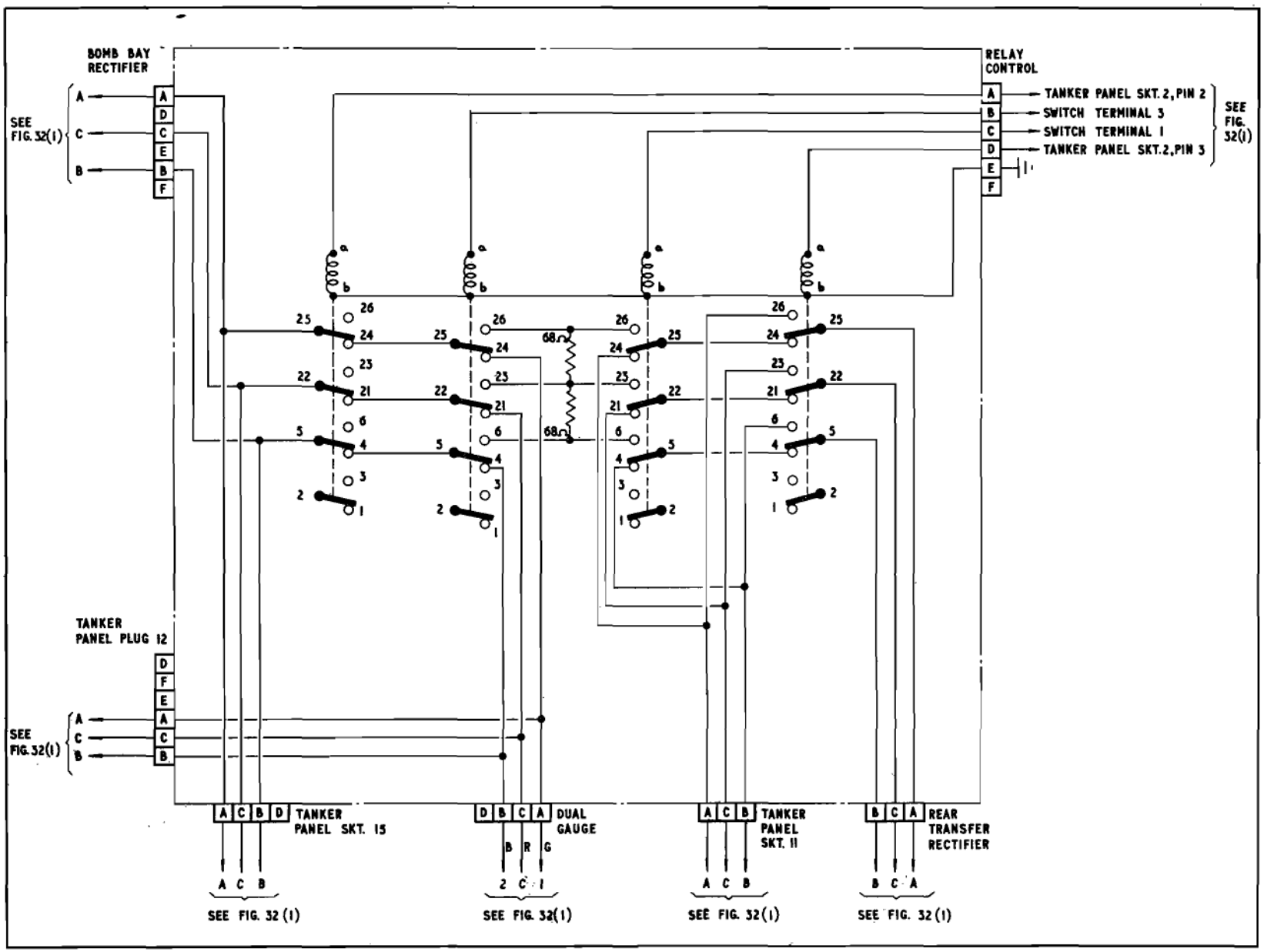

Fig. 33 Bomb bay/transfer tank relay box (Mod 2296)

RESTRICTED