GROUP D.6

CABIN PRESSURIZATION AND TEMPERATURE CONTROL

(CODE CP)

LIST OF CONTENTS

Equipment employed

1. The major components employed in the cabin pressurization and temperature control circuit are quoted below, together with the appropriate Air Publications to which reference should be made for a detailed description and the necessary servicing required to maintain them in an efficient condition:-

Control switches, Rotax Type D.5406	A.P.4343C,	Vol.1,	Sect.1, Chap.28
Flood switch, Rotax Type D.5406	A.P.4343C,	Vol.1,	Sect.1, Chap.28
Temperature control switch, Type C.1223Y. Mk.12	A.P.4343C,	Vol.1,	Sect.1, Chap.24
Temperature selector, Type FHK/A/7 or /26	A.P. -	Vol.1,	Sect.- Chap. -
Air Supply valve actuator, Type CZ.64581	A.P.4343D,	Vol.1,	Sect.16,Chap.28
Air extractor valve solenoid, Type ES/A/390	A.P.4343E,	Vol.1,	Sect.2, Chap.2
Temperature control valve actuator, Type CZ.54709/10/A	A.P.4343D,	Vol.1,	Sect.16,Chap.10
Relays, Type S, No.3...	A.P.4343C,	Vol.1,	Sect.3, Chap.8
Altitude switch, Type KB.562/01	A.P.1275A,	Vol.1,	Sect. Chap.
Suppressor, Type P. No.1	A.P.4343B,	Vol.1,	Sect.24, Chap.10
Magnetic amplifier, Type FIM/A/1, Mod.518 or FIM/A/5	A.P.1469E,	Vol.1,	Sect.1, Chap.3
Follow-up resistor, Type FLJ/A/2	A.P. -	Vol.1,	Sect. - Chap.-
Warning lamp, Type B	A.P.4343E,	Vol.1,	Sect.18, Chap.8
Cabin element, Type FJH/A/7	A.P. -	Vol.1,	Sect. - Chap.-
Pressure warning test switch, Rotax Type D.5505	A.P.4343C,	Vol.1,	Sect.1, Chap.28
Ductstat,Type FHG/A/49	A.P.-	Vol.1,	Sect. - Chap. -

DESCRIPTION

Cabin pressurization and temperature control

2. The cabin pressurization and temperature control installation of this aircraft is controlled by a cabin pressurization control switch consisting of three ganged ON/OFF switches, a flood switch marked AUTO and MANUAL, a temperature control switch, which is marked AUTO, COLDER, EMERGENCY and HOTTER and a temperature selector marked COOL, NORMAL and WARM. All these switches are situated on the rear portion of the cabin port shelf. The pressurization control switch controls the air supply valve actuator located at the top of the centre fuselage aft of the rear spar frame, the air extractor valve solenoid situated on frame 14 and the temperature control valve actuator located in the hood fairing, via the contacts of the hood interlock and flood control relays, which are both mounted on the undersurface of the cabin port shelf. The hood inter-lock relay is linked with the hood control circuit (Group D.5 of this chapter) and when energized, as the hood opens, it overrides the pressurization control switches to close the air supply valve and energizes the air extractor valve solenoid to open this valve. At the same time, the supply to the temperature control switch is cut off and the temperature control valve actuator is energized to close the hot by-pass. The flood control relay is automatically controlled by an altitude switch, also located on the undersurface of the port shelf, or manually by the flood switch. When energized the relay causes the air supply valve actuator to open to the flood position, and the auxiliary air discharge valve, which is located on frame 14 to open to vent the cabin.

3. To minimize radio interference, the supply to the temperature control valve actuator is taken through a suppressor, mounted in the hood fairing. This actuator is controlled manually when the temperature control switch is in the COLDER, EMERGENCY and HOTTER position, or automatically when AUTO is selected. In this latter position, the cabin temperature is selected by the temperature selector and the selected temperature automatically maintained by a magnetic amplifier. The amplifier operates the temperature control valve actuator in accordance with a cabin element, ductstat and follow-up resistor. The magnetic amplifier and cabin element are located in the cabin, while the follow-up resistor is situated adjacent to the temperature control valve actuator in the hood fairing. The ductstat is fitted in a four-way pressurizing pipe behind the ejection seat, early aircraft (pre Mod.210) are not fitted with the duct-stat.

4. Visual warning of loss of cabin pressure is given by a lamp located on the starboard instrument panel. The warning lamp is controlled by a switch in the cabin pressure control valve, Type A, which is mounted on the rear face of frame 6. The warning system, together with the flood operations of the air supply valve actuator, may be tested on the ground by a pressure warning and flood control test switch, located on the rear portion of the cabin port shelf.

Operation

5. The cabin pressurization and temperature control circuit is interconnected with the hood control circuit (Group D.5 of this chapter) either directly, as in the case of the hood seal valve solenoid, or via the hood interlock relay, which is energized when the hood is open. This interconnection prevents the supply of pressurizing air to the cabin, hood seal and air extractor valve, until the hood is closed. Further, the interlock relay ensures the return of the various valves to the neutral, or closed, position on selecting "hood open", irrespective of the pressuri-zation control switch position. With the hood open, the interlock relay is energized, thus a supply is made to the close field windings of the air supply

valve actuator to close this valve and the air extractor valve solenoid is energized to open the extractor valve. The supply to the temperature control switch is also cut off and the close field windings of the temperature control valve actuator are energized to close the hot by-pass.

6. With the hood closed, the interlock relay is de-energized thus, when the pressurization control switches are placed in the ON position, a supply will be made to the open field windings of the air supply valve actuator, via contacts of the interlock relay and flood control relay and this valve will move to the normal open position to supply pressurizing air to the cabin. The air extractor valve is closed under this condition. The pressurization control switches will also supply the temperature control switch, via contacts of the interlock relay.

7. When the cabin altitude exceeds 38,000 ft., the contacts of the altitude switch are made and energize the flood control relay, which in turn will energize the auxiliary discharge valve and change the supply to the air supply valve actuator causing the valve to open to the flood position, thus preventing low cabin pressure occurring at this altitude.

8. To de-mist the windscreen and hood, in flight, flood operation may be obtained irrespective of the altitude switch, by placing the flood switch in the **MANUAL** position. Under these conditions the flood control relay is energized, the auxiliary discharge valve is opened and the air supply valve actuator operated to open the valve to the flood position, as during flood operation, described in para.7.

9. Should the cabin differential pressure drop by $\frac{1}{2}$ to 1 lb. per sq.in., below normal, the switch in the cabin pressure control valve will close and illuminate the warning lamp to indicate failure. The pressure warning and flood control test switch operates the warning lamp, and flood control relay in a similar manner to that of the cabin pressure control valve and altitude switches.

10. The action of the temperature control switch is such that, when in either the COLDER or HOTTER position, the temperature control valve actuator is energized to close or open the valve respectively, permitting manual control of the cabin temperature; the intermediate **EMERGENCY** position is used to stop the actuator to maintain the valve in any chosen condition. In the **AUTO** position of the temperature control switch, the temperature control valve actuator is automatically operated by the magnetic amplifier, cabin element and follow-up resistor in accordance with the temperature selector.

11. The magnatic amplifier consists of a Wheatstone bridge network wherein the selected temperature(i.e. equivalent resistance) and the actual cabin temperature are compared. The error signal current arising from their difference is amplified by means of a pair of transductors (saturated transformers) and this amplified and rectified a.c. output is then made to actuate one of a pair of electrically interlocked relays, according to the direction of bridge unbalance. The operated relay supplies d.c. to the appropriate side of the split field series actuator operating the temperature control valve. The actuator moves, carrying with it the sliding contact of the follow-up resistor, until the bridge network is re-set at the new equilibrium, when the error current is cancelled and the relay contacts drop out. In this way, progressive alterations in the control valve opening are timed to damp out or suppress deviations from the selected setting of cabin temperature.

12. Placing the pressurization control switches to the OFF position, energizes the close field coil of

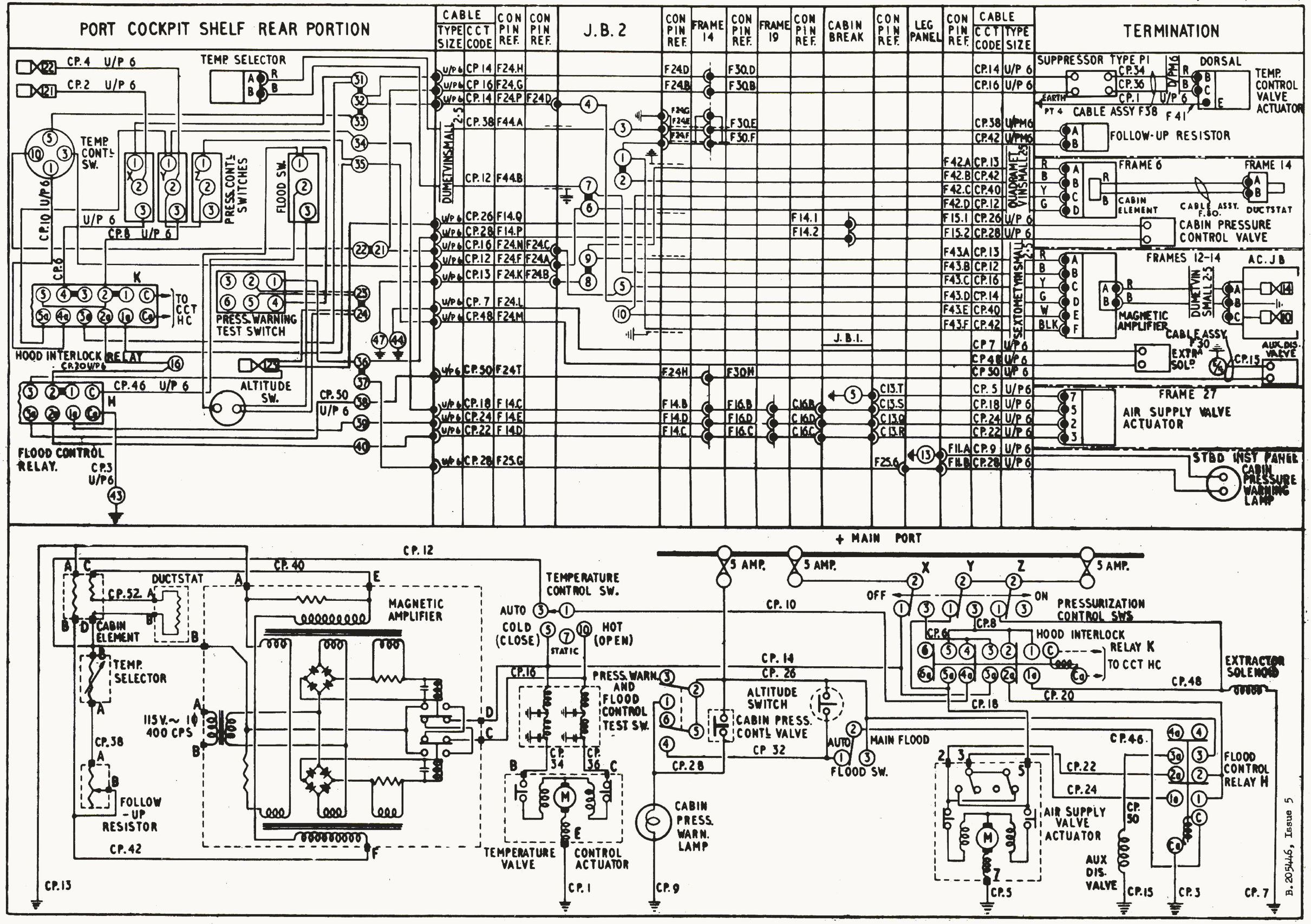

FIG. 1. CABIN PRESSURIZATION AND TEMPERATURE CONTROL