GROUP D1 RUDDER AND AILERON TRIM CONTROL AND INDICATORS (CODE R, A, RD AND AD)

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Introduction

1. This group contains a brief description, including the method of operation, of the rudder and aileron trim control and indicators circuit installed in this aircraft, together with the necessary servicing information required to maintain the equipment in an efficient condition. A routing and theoretical diagram of the circuits is also included. For a description of the electrical system of the aircraft as a whole, including system wiring details, referencing of components and general servicing, together with the location and removal of the major equipment, reference should be made to Groups A1, A2 and A3 of this chapter. Detailed information on the standard components used will be found in the appropriate volumes of A.P.4343 series.

DESCRIPTION

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2. A trim tab in the trailing edge at the bottom of the rudder and another in the inboard trailing edge of the port aileron enable adjustments of trim to be made during flight. Each tab is operated by a rotary Type C.5021/2 actuator, mounted in the rudder and aileron structures, respectively. These actuators are of the permanent magnet field type and are controlled by a Mk. 8/2 combined rudder and aileron trim switch located on the forward portion of the cockpit port shelf. The control box contains two double-pole micro switches, which are used to select port wing up or down, and a rotary switch used to select the rudder trim to port or starboard. The switches are operated by a knob, projecting from the top of the unit, which is moved from side to side in the required direction for aileron trim and turned in the required direction for rudder trim. As the knob cannot be turned and moved sideways at the same time, it must be released and allowed to return to neutral after the desired trim has been obtained before further operation is possible. Returning the knob to neutral switches off the actuator, the tab position being then maintained by the load of the actuator gear train.

3. The setting of each tab is shown on a combined rudder and aileron tab position indicator, Type 501.FL, which is located just forward of the trim switch and operated by Desynn transmitters actuated by Bowden

cables connected to levers on the appropriate actuator. The Type 470FL Desynn transmitter for the rudder tab is bolted to nose rib F in the leading edge of the fin, while the Type 553FL or 568FL transmitter for the aileron tab is located adjacent to the actuator in the aileron structure.

Operation

4. When the trim switch knob is turned anti-clockwise, the two-pole rotary switch P is made and current from the fuse is conducted through one set of the switch contacts to pin K of the trim switch unit. From the trim switch the current is conducted to the rudder trim tab actuator, the negative return being through the contacts of a limit switch in the actuator and back to pin L of the trim switch unit. At the trim switch the negative return is conducted through the other set of contacts of the rotary switch, and so to earth, via pin 1 of the unit. The actuator will rotate anti-clockwise when the current is passing in this direction and so move the tab to starboard, until it is switched off either by returning the trim switch knob to the neutral position or by opening of the limit switch when the actuator completes its full travel.

5. When the trim switch knob is turned clockwise, the two-pole rotary switch S is made and current from the fuse is conducted through one set of the switch contacts to pin M of the trim switch unit. The current now passes to the rudder trim tab actuator in the opposite direction to that described in para. 4; the negative return passing back to the trim switch at pin 2, through the other contacts of the rotary switch and so to earth, via pin 1 of the trim switch as before. The actuator will now rotate in a clockwise direction and so move the tab to port, until switched off either by returning the knob to the neutral position or by the limit switch being opened when the actuator has completed its full travel.

6. When the trim switch knob is moved from side to side, the double-pole micro switches D and U are made and control the aileron trim tab actuator in a similar manner as for the rudder tab actuator described above. For information on the Desynn transmitters and tab position indicators, together with the principle of operation, reference should be made to A.P.1275A, Vol. 1.

SERVICING

GENERAL

7. Servicing of the electrical system, as a whole, is described in Group A1 of this chapter, while the standard serviceability tests to be applied to the Desynn transmitters and tab position indicators will be found in A.P.1275A, Vol. 1. Apart from keeping all the components clean and carrying out the normal routine tests of security and serviceability, the only other servicing necessary is the tab actuator tests as described in the following paragraph.

TAB ACTUATOR TESTING

8. These actuators should be tested periodically for correct functioning over their full travel and their range checked on the indicators by operation of the trim switch on the cockpit port shelf. As these actuators have permanent magnet field motors, it is preferable to use a pure d.c. supply when testing, since, with a rectified a.c. supply, it is possible for the field of the actuator to become demagnetized. If a d.c. supply is not available, however, it is permissible to use an a.c. supply which has been rectified by a transportable rectifier Type 37 (*Stores Ref.* 5P/2908). Spare rudders and port ailerons are supplied without actuators, and these must have actuators assembled to them before they are fitted to aircraft. Before fitting a new rudder or port aileron, it is recommended that the actuators are tested to ensure that they function correctly by use of the test rig Pt. No. SE483JD for rudders and Pt. No. SE484JD for ailerons. It is most important that these rigs are used when testing, as incorrect connection or the use of a supply other than that specified will cause serious damage.

REMOVAL AND ASSEMBLY

9. Once access has been obtained, the removal of the actuators and transmitters should present no unusual difficulties. After removal of the rudder, as described in Sect. 3, Chap. 3 of this volume, access to the rudder tab actuator may be obtained by removing an access door in the rudder nosing. Access to the rudder tab Desynn transmitter may be gained by removing a door on the port side of the upper fin structure. After removal of the aileron, as described in Sect. 3, Chap. 2 of this volume, access to the aileron tab actuator and its Desynn transmitter may be obtained by removing an access door from the upper surface of the aileron nosing. It must be noted that the operating rods from the actuators to the tabs are removed with the actuators, and thus these rods must be disconnected from the tab operating levers before attempting to withdraw an actuator from the structure. The removal of the forward portion of the cockpit port shelf, which carries the trim switch and the tab position indicators, is fully described in Group A2 of this chapter, while the location and access to all the components is indicated in A3 also of this chapter.

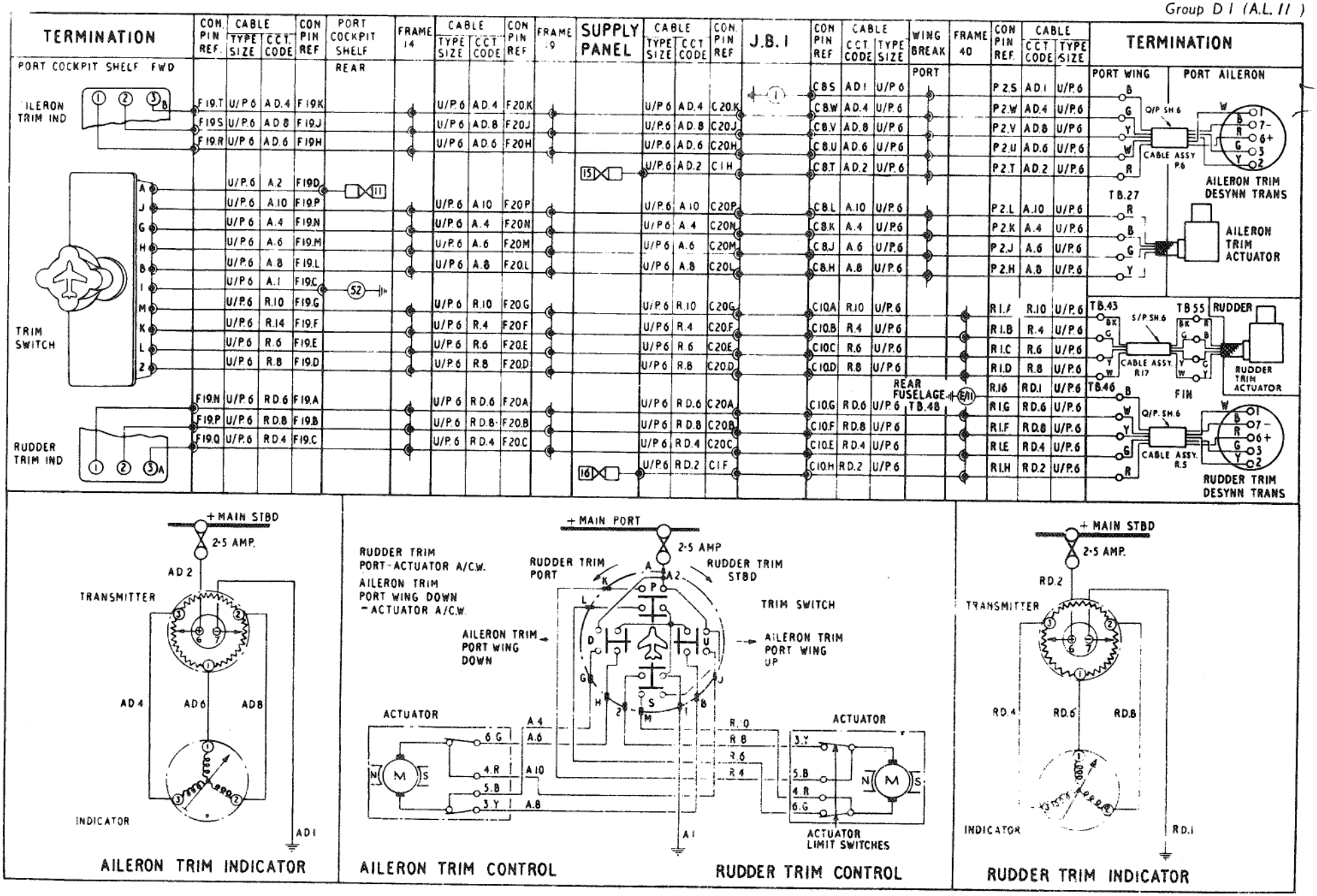

FIG. 1. RUDDER AND AILERON TRIM CONTROLS AND INDICATORS

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