

GROUP D.4

FLAP CONTROL AND POSITION INDICATOR

(CODE F & FD)

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Equipment employed

1. The major components employed in the flap control and position indicator circuits 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:-

- Selector switch, Type C.1223Y, Mk.15 ... .. A.P.4343C, Vol.1, Sect.1, Chap.24.
- Drum switch, Type C.1220Y, Mk.111 .. ... A.P.4343C, Vol.1, Sect.1, Chap.23.
- Control valve, Type C.5709Y, Mk.D .. ... A.P.1803D, Vol.1, Book 3, Sect.8, Chap.12.
- Position indicator, Type 473FL . ... .. A.P.1275A, Vol.1, Sect.1, Chap.12.
- Desynn transmitter, Type C . ... .. A.P.1275A, Vol.1, Sect.1, Chap.12.
- Micro switch, Type 1A .. ... .. A.P.4343C, Vol.1, Sect.1, Chap.4.

## DESCRIPTION

### Flap control and position indicator

2. The electrical control circuit for the hydraulically-operated flaps consists of a lever operated multi-position selector switch located on the port instrument panel in the cabin. This switch controls an electro-hydraulic selector valve, which is mounted on the front spar in the port wheel bay, via a multi-position follow-up drum switch located in the port wing root. The position of the flaps is shown on a Desynn indicator, which is situated on the port side of the centre instrument panel and operated by a Desynn transmitter located in the port wheel bay and linked with the drum switch and flap interconnecting levers.

### Operation

3. To understand the operation of the flap control circuit it must be noted that the drum switch is not in circuit to control the flap electro-hydraulic selector valve when the selector switch is in either the fully UP or fully DOWN positions. In these positions the current is conducted from the fuse and through the selector switch to the appropriate solenoid of the selector valve via common terminals on the drum switch. This arrangement is to ensure that the flaps are held in the up or down position by hydraulic pressure. The action of the drum switch in all intermediate positions is to direct current from the selector switch to either the UP or DOWN solenoids of the selector valve according to the position of the centre spindle at the time of operation and to break the circuit when the selected position is attained. The drum switch spindle is rotated to make and break the contacts by a mechanical linkage from the flaps and the flaps are thus raised or lowered in a series of steps corresponding to the position of the selector switch.

4. The theoretical presentation of the circuit shown in fig.1 of this group is drawn in the intermediate position, corresponding to that found when the flaps are  $37\frac{1}{2}$  deg. down. It will be seen that contact 6 of the selector switch is made to feed contact 1 of the drum switch, but as the flaps have attained their selected position the contact arcs on the drum switch have rotated until contact 1 has been lifted clear of the cam, thus breaking the circuit to the flap selector valve. If the selector switch is moved either up or down in its gate it will make contacts 5, 4, 3 and 2 or 7, 8, 9 and 10, in turn, depending on the direction in which it is moved. Should it be moved up to raise the flaps, contact 7 will be made first and feed contact 6 of the drum switch, which is in contact with the contact arc feeding terminal 8 of the unit. The current will now be conducted from the fuse, through the selector switch and drum switch to the up solenoid of the flap selector valve. When this solenoid is energized, it allows the hydraulic pressure to move the slide within the valve in such a direction as to supply hydraulic pressure to the flap jacks and raise the flaps. As the flaps move up, the drum switch spindle and its contact arcs are rotated by the mechanical linkage, until contact 6 is lifted clear of the contact arc by the cam to break the circuit and de-energize the up solenoid of the selector valve. The valve will cut off the hydraulic pressure to the flap jacks, which will thus be stopped at the selected position. A similar sequence of operations occurs at all intermediate positions. On aircraft with Mod. H.428 incorporated, the earth return for the electro-hydraulic selector valve is taken through the normally closed contacts of a micro switch which is operated to open circuit the earth return when the flap emergency lowering control is used. This is to prevent the valve being energized, as the flaps lower, with the resultant loss of hydraulic oil via the jettison valve in the hydraulic emergency system. With the valve de-energized, the slide adopts a neutral position thus blanking off both ports so

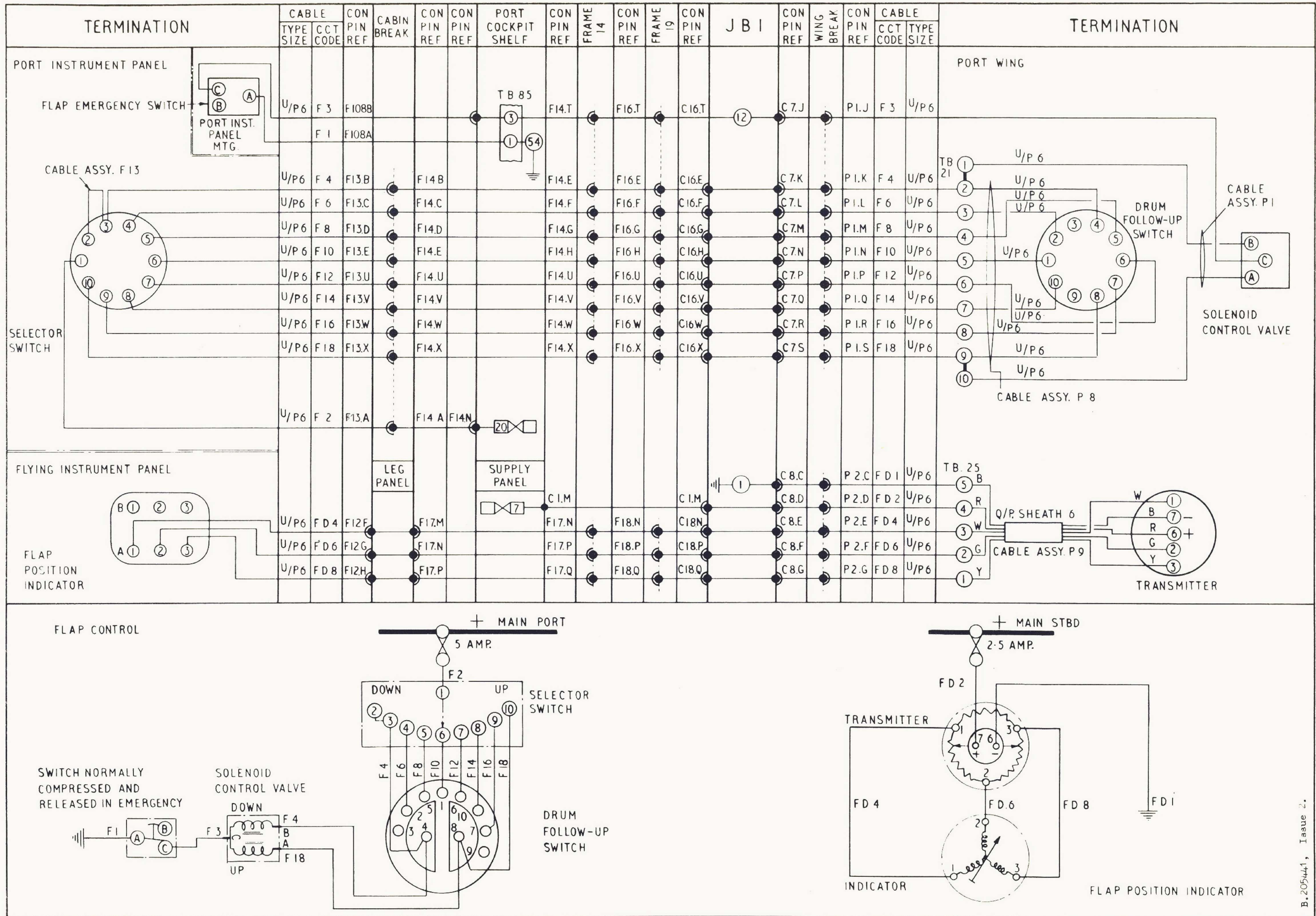


FIG. 1. FLAP CONTROL AND POSITION INDICATOR

RESTRICTED

that only the hydraulic oil in the lower ends of the jacks is jettisoned, thus preventing the possibility of manual reversion of the powered flying controls occurring due to loss of hydraulic oil. For a full description of the flap hydraulic system, reference should be made to Section 3, Chapter 6 of this volume.

5. For a full description of the Desynn flap position indicator, together with the principle of operation, reference should be made to A.P.1275A, Vol.1.

### SERVICING

#### General

6. For general servicing of the electrical system as a whole, reference should be made to Group A of this chapter. 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 electrical test of the electro-hydraulic selector valve and the standard routine

serviceability tests of the Desynn indicator and transmitter as described in the appropriate Air Publications quoted in para.1. The method of adjusting the linkage between the flaps and the Desynn transmitter, together with the drum switch is contained in Section 3, Chapter 4 of this volume.

### REMOVAL AND ASSEMBLY

7. Once access has been obtained, the removal of the components forming the flap control and position indicator circuits, should present no unusual difficulties. The location and access to all the components is indicated in Group A of this chapter.



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