

PART 1

Chapter 6 — OTHER AIRCRAFT CONTROLS AND FLIGHT INSTRUMENTS

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1 Rudder pedals adjustment and rudder trim

(a) Each pair of rudder pedals is adjustable for leg reach by means of a control at the bottom centre of each pilot's instrument panel. When the control is pulled out, a plunger is dis-engaged from a hole in the adjusting shaft, thus allowing the rudder pedals to be pushed forward against the pressure of a spring, or to swing aft by spring pressure. When adjustment is complete, releasing the control to allow the plunger to engage in the nearest hole fixes the rudder pedal in the desired position. Check that the plunger has locked in position by applying pressure to both rudder pedals.

(b) The rudder trim tab is actuated electrically by the pupil's combined aileron/rudder trim control, regardless of the position of the trim lock. (The instructor's control does not provide rudder trim and is used for aileron trim only.) Tab position indicators are forward of the controls.

2 Flying controls locking gear

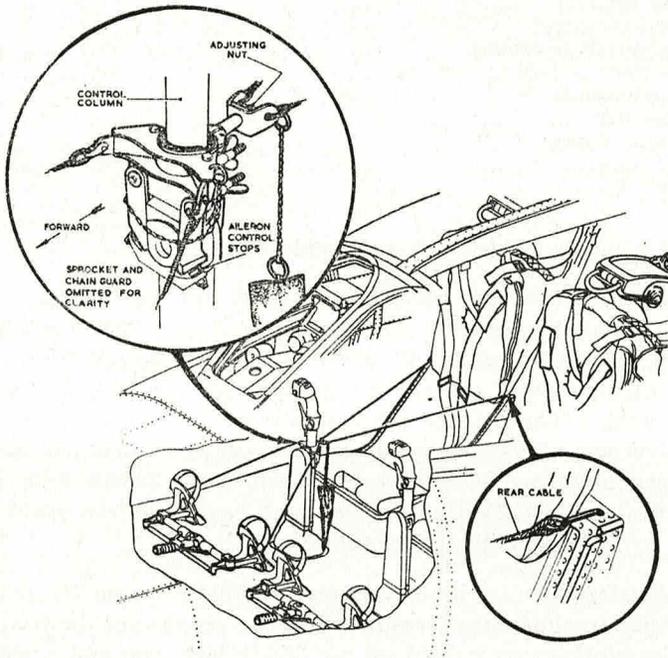
(a) Internal locking

The internal locking devices consist of two clips designed to attach to the control column. One has two tongues on its forward face; this clip should be attached to the control column, pushed down until the tongues are positioned firmly between the aileron stops and secured by tightening its wing bolt. The other clip, which has four cables attached, should then be secured to the control column. The other ends of the cables incorporate hooks which should be attached to holes in the cross member at the top of the appropriate ejection seat pan and to the outboard edges of the rudder pedals.

(b) External locking

Locking clamps are provided for all flying control surfaces.

NOTE: There is no control lock stowage in the aircraft.



FLYING CONTROLS LOCKING GEAR

3 Landing gear control and position indicator

(a) The landing gear is operated hydraulically after electrical selection. Two selector buttons UP and DOWN, are on the port side of the pupil's instrument panel. Three selector buttons, two labelled UP and DOWN and one coloured red, are on the starboard side of the instructor's instrument panel. When the red button is pressed in, landing gear selection is controlled by the pupil's buttons and the instructor's buttons are both in the out position. A selection of UP or DOWN by the instructor causes the red button to release, thereby cutting off the electrical supply to the pupil's buttons which remain in their selected positions. The instructor then has full control of the landing gear but may pass control back to the pupil at any time by pressing in the red button. This action is only possible if both pairs of selector buttons are similarly selected and the battery master switch is on.

WARNING: To prevent inadvertent landing gear operation if malfunction of the selector interlock occurs, it is essential that the instructor first ensures that the pupil's buttons are similarly selected to his own before passing control of the landing gear selector back to the pupil.

(b) A standard position indicator is fitted to the left of the buttons on the port panel. A warning light below the buttons comes on if the throttle is less than one-third open with the landing gear not locked down.

4 Landing gear emergency operation

(a) Should electrical or hydraulic failure occur, the landing gear may be lowered irrespective of the position of the normal selector buttons by pulling the landing gear emergency lowering control on the port shelf, after first pushing in the central knob. This admits air from an emergency bottle to the wheel unit jacks, by-passing the landing gear sequence valves, forcing the jacks to lower and lock. The available air pressure is shown on a gauge at the aft end of the port shelf (2000 PSI min).

(b) If it is required to retract the landing gear *on the ground only*, the UP selector button which has control should be rotated clockwise and then pressed; the button may rotate through 60° or 90° according to the type fitted. This is inoperative if the landing gear emergency lowering system has been used.

5 Flaps control and position indicator

(a) The flaps are selected electrically, and operated hydraulically. Selection is by means of a lever on the outboard side of each instrument panel which provides UP, DOWN (80°) and six intermediate positions (15°, 23°, 30°, 38°, 45°, 60°).

(b) A safety catch is provided on the instructor's selector lever which must be released to move the lever upwards into a gate beyond the fully UP position and downwards from that position. Only when the lever is in the gate is the pupil's selector operative. Any selection by the instructor cancels a selection made previously by the pupil.

(c) The flaps may be selected to any of the above positions but the extent to which they lower depends upon the air loads. If speed is increased with the flaps extended, the angle is adjusted according to the air loads; however, the flaps may not be fully retracted (see Part 3, Chapter 2, para 3 (f)).

(d) When the aircraft is being flown solo, or when the pupil is in control, the instructor's selector lever must be gated beyond the UP position. If the instructor wishes to take control or to override a pupil's selection, movement of his lever out of the gate cuts off electrical supply to the pupil's selector. When the instructor hands back control to the pupil, it is essential that he ensures that the pupil's selector is in the fully UP position otherwise the flaps will move to the position selected by that lever.

(e) A flap position indicator is on the port instrument panel.

6 Flaps emergency operation

Should electrical or hydraulic failure occur, the flaps may be lowered *fully down* by air from an emergency air bottle. When the FLAPS EMERGENCY LOWERING control on the port quarter panel is pulled, after first pressing in the central knob, the air is directed to the lowering jacks. The available pressure is shown on a gauge at the aft end of the port shelf (2000 PSI min).

7 Airbrake control

(a) An under-fuselage airbrake is provided; it is electrically selected and hydraulically operated and extends fully at any speed.

(b) Control of the airbrake is by means of a three-position switch, spring-loaded to the central off position, on each throttle lever. Momentary selection of IN (forward) or OUT (aft) retracts or extends the airbrake fully; no intermediate positions are available in flight. A magnetic indicator on the port instrument panel shows black only when the airbrake is fully in.

(c) The airbrake is automatically inoperative when the landing gear is lowered. If the landing gear is lowered when the airbrake is out, the airbrake automatically retracts. *Airbrake retraction must not normally be obtained by selecting landing gear down.*

(d) A spring-loaded switch on the centre pedestal enables the airbrake to be tested on the ground. When the switch is held to TEST the airbrake extends through 10° only and then retracts with a slight bump. The indicator shows white momentarily when the airbrake is out.

8 Wheelbrakes control

(a) The wheelbrakes are operated hydraulically by means of a lever attached to the forward face of each control column and a differential relay controlled by the rudder pedals. The lever incorporates a parking catch.

(b) The live-line pressure ($2850 \pm_{50}^{150}$ PSI) is shown on a triple pressure gauge together with the pressure at each main wheel (1500 — 1650 PSI).

(c) Should the hydraulic system fail, the pressure in the wheelbrakes accumulators, which, if fully charged should provide sufficient pressure for about 40 operations of the units, is sufficient for landing but leaves little in hand for subsequent taxiing. The available accumulator pressure is shown on a gauge at the forward end of the port shelf. The brakes function with reducing effectiveness until accumulator pressure drops to 750 PSI, when no further braking is available.

(d) Maxaret brake units are fitted. The units can come into operation only if the wheels are rotating and in no circumstances should the brakes be applied at touchdown.

9 Braking parachute control

(a) The braking parachute, stowed in a container above the tail cone, is controlled either by the pupil's two-position OFF, JETTISON/

STREAM switch or by the instructor's three-position JETTISON/off/STREAM switch. The two-position switch should normally be at OFF, JETTISON and the three-position switch in the mid (off) position. Mod 1111 introduces a guard for the pupil's switch.

(b) Selection of the two-position switch to STREAM ejects the parachute. Returning the switch to OFF, JETTISON disconnects the parachute from the aircraft. The switch is only operative when the three-position switch is in the mid (off) position.

(c) Selection of the three-position switch to STREAM ejects the parachute. Returning the switch to off disconnects the parachute from the aircraft. The JETTISON position is for emergency jettisoning by the instructor if mal-operation of the parachute follows streaming action by the pupil.

(d) A STREAM caption is on a red warning panel on the coaming above the centre panel. The caption is illuminated by two lights which come on under any of the following conditions:

(i) When the parachute is streamed normally. The caption remains illuminated after jettison action is taken.

(ii) When the parachute bay doors open because of malfunction. In this event the parachute is ejected from its housing and jettisoned.

(iii) By operation of a TEST switch on the cockpit port wall. This indicates that the braking parachute electrical circuit is complete and the system is ready for use. It is important to ensure that the circuit breaker, adjacent to the TEST switch, is made, otherwise the TEST switch and both control switches are inoperative. The TEST switch may be operated in flight.

(e) When it is ascertained that the parachute has jettisoned after landing, or if the parachute fails to jettison, return the control switch to STREAM immediately, otherwise the release unit may be damaged by the electrical overload.

10 Arrestor hook control

(a) Post Mod 1363 an arrestor hook is provided for emergency use when normal braking is inadequate. The hook is hydraulically operated and is controlled by one of two UP/DOWN switches (spring-loaded to UP) one (guarded) on the left of the port GGS and the other on the centre panel. Adjacent to the latter switch is a red light which comes on after the hook has lowered through 30°.

(b) The hook is lowered by the pressure in a self-contained ground-charged accumulator. Once the hook is lowered it can only be raised with ground crew assistance.

11 Flight instruments

(a) Pitot and static pressures are provided by a pressure head, Mk 9 series, on the leading edge of the port wing tip. The pressure head is electrically heated and the heater element is controlled by a PRES HEAD — ON/OFF switch below the centre of the port instrument panel.

(b) The pressure-operated flight instruments are:

- (i) Airspeed indicator Mk 12A.
- (ii) Machmeter Mk 3A.
- (iii) Vertical speed indicator Mk 3Q.
- (iv) Altimeter Mk 22F (port panel).
- (v) Altimeter Mk 19F (starboard panel).
- (vi) Cockpit altimeter Mk 18 or 21 (centre panel).

(c) The Mk 22F altimeter and the vibrator fitted to the Mk 19F altimeter are operated by AC from No 2 group inverters. Loss of AC power is shown by the failure flag on the Mk 22 altimeter. If AC power is subsequently regained it is possible for the altimeter to remain off because an internal override switch has operated. In this case wind the millibar scale to maximum and then, if necessary, to minimum to reset the internal switch.

(d) The electrically-operated flight instruments are:

- G4FT compass
- Artificial horizon Mk 4 (port panel)
- Artificial horizon Mk 6C (starboard panel)
- Turn and slip indicator Mk 2

(e) The G4FT compass is operated by DC from the main busbar and AC from the No 1 group inverters. A compass correction panel is at the rear of the starboard shelf.

(f) (i) The pupil's Mk 4 artificial horizon is operated by AC from the No 2 group inverters. Power failure indication is shown by an OFF

flag. The fast erection button must not be used until 15 seconds after switching on, and it must not be depressed longer than 1 minute or after the instrument has erected.

(ii) The instructor's Mk 6C artificial horizon is also operated by AC from No 2 group inverters. The fast erection button of this instrument must not be used until 30 seconds after switching on and must not be depressed longer than 1 minute or after the instrument has erected. The power failure indicator shows an orange and black disc when electrical power is lacking.

(iii) With both Mk 4 and 6C artificial horizons, the fast erection button must only be operated in unaccelerated flight.

(g) The turn and slip indicator is operated by DC whenever electrical supply is available. If electrical supply is lacking an OFF flag appears on the face of the instrument. Below the instrument is a TURN & SLIP—NORMAL / EMERGENCY switch. With NORMAL selected, the supply is taken from the aircraft main busbar and with EMERGENCY selected the supply is from the two series connected standby batteries.

12 Accelerometer

The accelerometer on the centre panel indicates, by means of three concentrically-mounted pointers, all vertical accelerations imposed on the aircraft. One pointer indicates instantaneous G, the other two register the maximum and minimum G readings respectively until re-set by pressing the knob on the instrument case.

13 Windscreen wipers

A windscreen wiper is fitted to the windscreen in front of each pilot. The wipers are hydraulically operated and are controlled by a single, PARK/TURN TO RUN, knob located on the port instrument panel. Speed of operation of the wipers may be varied by adjustment of the control knob in the TURN TO RUN range. The wiper blades are of the parallel motion type. The wipers must not be used when the windcreens are dry nor should they be used at speeds in excess of 300 knots. The knob must be turned *fully* to PARK when the wipers are not in use to avoid any possibility of hydraulic pressure loss.

14 Standby compass

The E2B standby compass is on the windscreen arch above the centre panel. Large deviations must be expected when the GGS master switch is on, the GGS recorder is fitted, the canopy is open or the generators are off line.

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