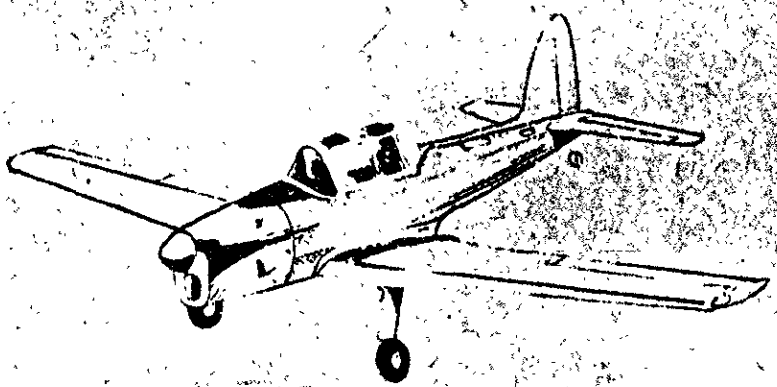
THE WILTSHIRE SCHOOL OF FLYING LTD. HANTS.



PILOT'S NOTES

CHIPMUNK 10.

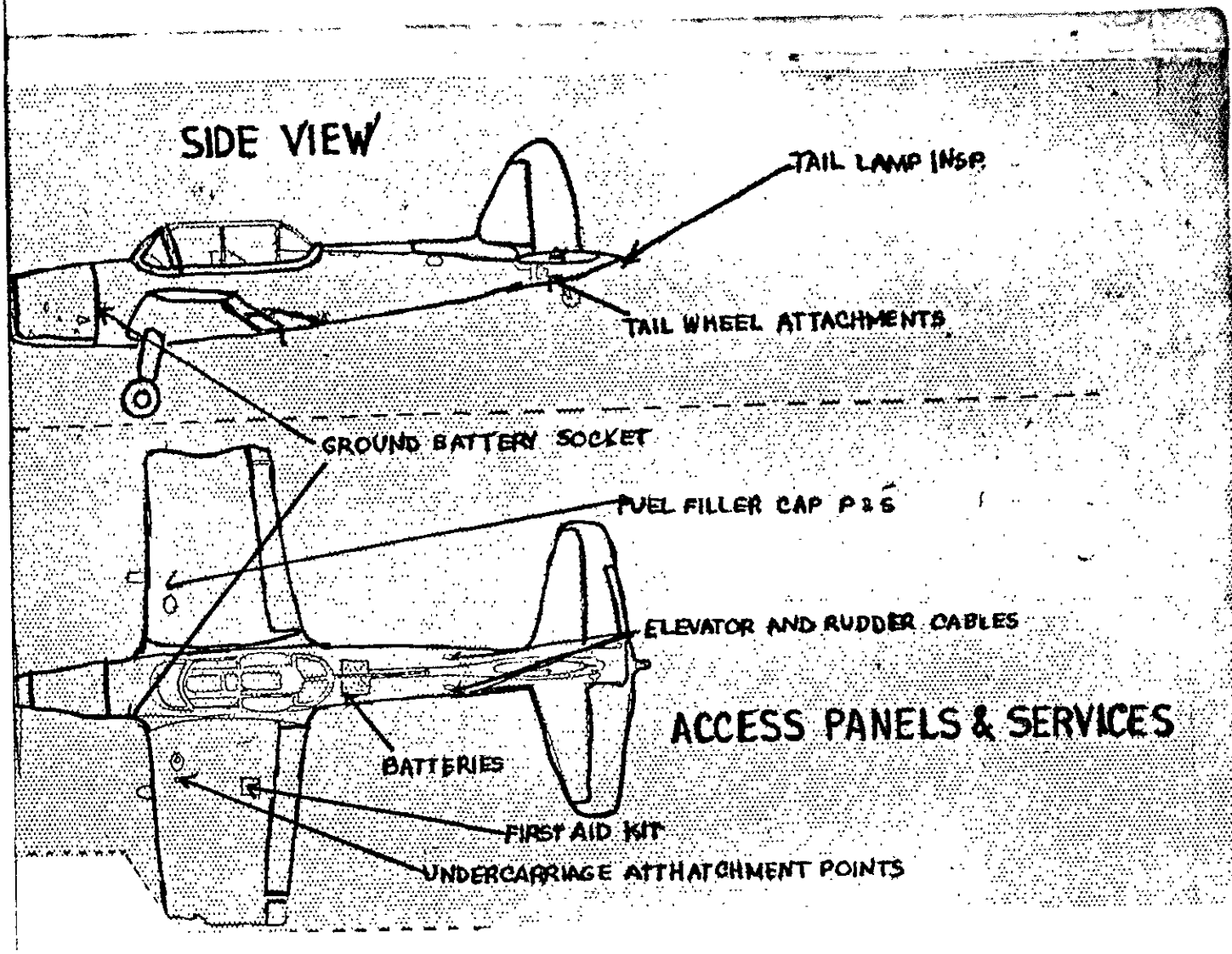
THE WILTSHIRE SCHOOL OF FLYING LTD.
THRUXTON AERODROME. THRUXTON.
ANDOVER HAMPSHIRE

De.Havilland Chipmunk. Trainer. T.10.

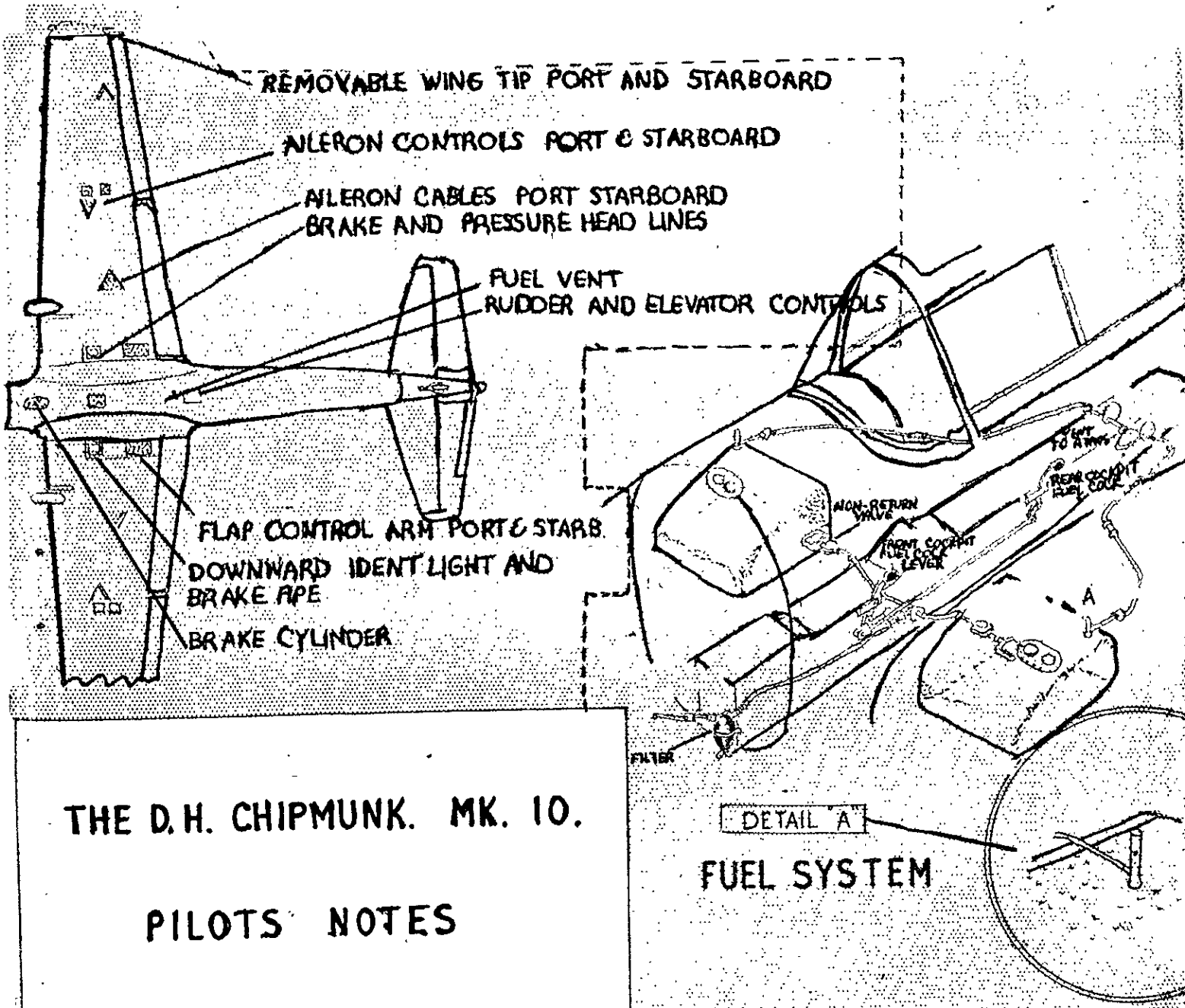
list of contents

PART III – H A N D L I N G

Errata :- In Part V. - Read at end of this Section all turns whilst towing are not to exceed Rate 2.


SIDE VIEW
TAIL LAMP INSP.
TAIL WHEEL ATTACHMENTS
GROUND BATTERY SOCKET
FUEL FILLER CAP P & S
ELEVATOR AND RUDDER CABLES
ACCESS PANELS & SERVICES
BATTERIES
FIRST AID KIT
UNDERCARRIAGE ATTHATCHMENT POINTS

4



THE D.H. CHIPMUNK. MK. 10.

PILOTS NOTES

FUEL SYSTEM

PART I.

DESCRIPTIVE

NOTE. – Throughout this publication the following conventions apply:–

(1) Words in capital letters indicate the actual markings on the controls concerned.
(2) The numbers quoted in brackets after items in the text refer to the illustrations in Part VII.
(3) Unless otherwise stated, all speeds quoted are indicated airspeeds.

1. introduction.

(a) The Chipmunk T.Mk. 10. is designed as a basic trainer aircraft. It has a fixed undercarriage, fully catoring tailwheel, brakes, and tatally enclosed tandem cockpits with full dual control. The fuselage, tail fin, tailplane and leading edges of the wing are metaled covered; the remainder of the wings and the control surfaces are fabric covered.

(b) The aircraft is powered by a Gipsy Major Mk. 8. engine, driving a two bladed fixed pitch, metal propeller. The engine has a self indexing cartridge starter.

(c) When flown solo, the pilot must occupy the front cockpit.

(d) The principal dimensions are as follows:–

Span	34ft. 4in.
Length	25ft. 5in.
Height	7ft. 0in.

2. electrical system.

(a) A 500 watt engine driven generator supplies the aircraft 24-volt system, and charges the 2 X 12-volt aircraft batteries.

(b) A GROUND/FLIGHT switch(11) is on the port side of the front cockpit, below the instrument panel. This switch when set to GROUND, isolates the batteries from the electrical system and should be moved to flight before starting the engine. If left at GROUND, the electrical services will, after starting the engine be running direct from the generator and if the throttle is closed during flight, the services will fade out. The switch should be left at GROUND when the aircraft is parked.

(c) An external battery socket is fitted on the port side of the fuselage for testing purposes. When an external battery is plugged in, the ground/fligh should be set to Ground.

(d) A generator power failure warning light(14) is mounted on the top left-han corner of the instrument panel in the front cockpit and comes on when the generator is not charging provided that the ground/flight swithch is set t FLIGHT.

(e) On some aircraft, a voltmeter socket and switch marked NORMAL–GEN TEST, ar are on the combined switch and fuse box on the front cockpit port wall.

3. vacuum system.

An engine driven vacuum pump provides suction for the gyro-driven flight instruments, i.e. the artificial horizons, the directional gyros and the

4. fuel system.

Fuel is carried in two flexible 9-gallon tanks, mounted one in each wing, and is fed to the engine from both tanks simultaneously. Non return valves are incorporated in the system to prevent the contents of one tank transferring to the other.

5. fuel venting

On pre-Mod H.207 aircrafrt, each tank is vented to the atmosphere independently, the vents being on the upper surfaces of the wings. When Mod. H.207. is incorporated the two tanks have a common vent on the underside of the fuselage. The vent fairing on the upper surface of the wing has a small hole in the starboard side, to prevent siphoning action; if this hole becomes blocked in any way, siphoning may occur during aerobatics and will continue for the remainder of the flight.

6. fuel contents gauges

A direct-reading fuel contents guage is fitted in the top of each tank, next to the filler cap. When the aircraft is in the ground attitude, the contents are given by the RED figures and when in the flying attitude, by the WHITE figures. In flight the guages can only be read accurately from the front cockpit.

7. fuel pumps and priming.

(a) Two engine-driven fuel pumps are installed and priming of the engine before starting is effected by a carburettor flooder-control and a hand priming lever on the rear fuel pump.

(b) The use of the hand-priming lever, which may be reached and operated through an opening in the engine port side cowling panel, ensure that the pumps, the pipe line to the carburettor and the carburettor float chamber are all filled with fuel.

(c) The carburettor flooder control, which is operated by a pullwire through the second opening in the port side cowling panel, enables the carburettor to be flooded, thus providing the necessary rich mixture for starting. The fuel cock should be ON and the flooder control pulled out, while the priming lever is operated.

8. fuel cocks.

A fuel cock lever, (28) and (43), marked On (fully forward) and Off (fully back) is to the left of the base of the control column in each cockpit.

9. oil system

The oiltank situated forward of the bulkhead has a capacity of 2½ gallons, of which ½ gallon is air space. A dip-stick is embodied in the filler cap, which is under the starboard cowling. The oil is cooled by air, scooped in from the port cowling, which passes through a cooler in the tank. Oil tempreture guages ,(15) and (45), and oil pressure guages, (16) and (46) are on the instrument panel in the cockpit.

10. ENGINE CONTROLS. throttle and mixture controls.

(a) A throttle lever (9) and (36), is in a quadrant on the port side of each cockpit and each quadrant is divided into two ranges, marked ECON CRUISING and POWER JET In.

(b) A mixture control lever, (8) and (37), is in each throttle quadrant and is so linked with the throttle that the latter cannot be closed without moving the mixture control to rich (fully aft).

(c) A common friction nut (7) and (38), is provided on each quadrant for both throttle and mixture control levers.

11. carburettor air intake control.

The carburettor air-intake is controlled by a lever, (24) and (47), marked CARB AIR, on the starboard side of each cockpit. When the lever is in the COLD (forward) position, air is fed to the carburettor through a duct in the starboard cowling. To select HOT air, the lever is moved aft and then down, being retained in this position by a slot in the front cockpit. Heated air is then fed to the engine from inside the cowling. On some aircraft this control may be wired HOT, when the air tempreture is below 30°C.

12. engine starting controls.

(a) The engine may, if necessary, be started by hand swinging the propeller.

(b) Ignition switches, (12) and (35), are on the port wall of each cockpit and both sets of switches must be ON for the engine to run. The engine may, therefore, be switched OFF from either cockpit. The magneto controlled by the starboard switch (marked No.2.) is an impulse magneto. When starting the engine by hand swinging, this magneto only should be switched on, the other being switched on as soon as the engine fires.

AIRCRAFT CONTROLS

13. flying controls

(a) The rear control column can be detached after removing two safety pins and withdrawing the two retaining pins at the base of the column.

(b) The rudder pedals can only be adjusted on the ground. They may be moved to any on e of three positions by raising the spring clip and pin and adjusting the tubes to which the pedals are attached.

14. flying controls locking gear.

The flying controls locking gear consists of two rods which are fitted over the controls in the front cockpit. One hooked rod is fitted with the larger end over the port end of the rudder bar and the smaller end on the red bobbin on the port side of the control column base. The clip on the other rod is fitted to the control column and tightened by means of a wing nut, while the two ends are secured in spring clips in the fuselage walls.

15. trim tabs.

The elevator trim tab is controlled by a wheel, (29) and (31), in each cockpit. The control is labelled UP-NOSE-DOWN and is so marked that all positions forward of neutral are black and those aft of neutral are white. The setting is read at the top of the wheel casing. Trim tabs on the rudder and the starboard aileron are adjustable on the ground only.

16. flap controls.

The flaps are controlled by a lever,(20) and (48),on the starboard side of the cockpit. The lever has three positions, UP (fully forward), 15° flap(mid position), and 30°flap (fully aft). To raise the flaps from either the down or the mid position a spring loaded trigger at the top of the lever must first be operated to release a pawl in the front cockpit quadrant. Each lever has a guard to prevent accidental movement of the trigger. The use of the trigger is not necessary when lowering the flaps. No position indicator is fitted, as the flaps are easily visible from both cockpits.

17. wheel brakes

The wheels are fitted with hydraulic brake units and the system uses a master cylinder for each wheel, supplied with fluid from a resivoir mounted on the forward face of the firewall. The brakes are controlled by a lever (10) and (39), on the port side of each cockpit. The lever is spring loaded and may be set to any position by pressing down the collar on the lever to engage a pawl on the quadrant. Slight backward movement of either lever releases the pawl so that the lever can be moved to the OFF position. Straight parking is obtained with the lever in the fully AFT position (ON) while the lever at any intermediate position, differential braking is obtained by movement of the rudder pedals.

18. flight instruments.

(a) A.S.I. AND ASSOCIATED INSTRUMENTS.
The dynamic and static pressures for the A.S.I., V.S.I. and Altimeter are obtained from a combined pressure and static head on the underside of the port wing. A pressure head heater is provided, and is controlled by a switch and fuse box on the front cockpit wall. The heater will only function when the engine-driven generator is charging.

(b) GYRO OPERATED INSTRUMENTS.
The artificial horizon, directional and turn-and-slip indicator gyros are operated by suction from the vacuum pump.

(c) A magnetic compass is installed, forward of the control column on the floor of each cockpit.

GENERAL EQUIPMENT

19. hood

(a) A single sliding hood covers both cockpits. There are two external handles, one for each cockpit, on the top port side of the hood;these are connected to corresponding levers inside.Twisting any of the handles allows the hood to be pulled rearwards to either of two intermediate positions(in which it is locked when the lever is released) or to the fully open position. Handgrips are provided internally to facilitate moving the hood.

(b) The hood is not jettisonable but there is a spring loaded door in the roof to assist opening, particularly at high speeds. Normally the hood can be opened in flight without assistance up to a speed of 100 Knots. In addition, the port side panels of the hood may be jettisoned to provide an emergency exit(see para. 29(b)-

20. seats and harness.

The seats are not adjustable for height. Z-type harness, (26)and(30),is provided in each cockpit.

21. instruments

INSTRUMENT FLYING PRACTICE EQUIPMENT.

(a) Amber screens which may be fitted in flight are stowed in a pocket(21) on the starboard side wall of the front cockpit. There is one central screen hinged about the vertical line,and two side screens, which should be fitted first. The screens are held in position by rotating the catches on the canopy frame.

(b) The amber canopy side screens, which are not remavable, can be slid forward to contact narrow amber strips at the front of the canopy. The forward portion of the canopy roof is also amber.

(c) A bag(22) for stowing the special goggles is on the front of the cockpit starboard wall.

22. lighting.

(a) The combined switch and fuse box is on the front cockpit port wall and carries the following switches: morse push button (6),and switch (5),for the identification light, OFF and dimmer switches (4),for the front cockpit lamps, navigation lights switch (3), taxying lamp switch (2) and front cockpit emergency lamp switch (1). The compass has a lamp controlled by a switch (42) on the pedestal.

(b) Both front and rear cockpit emergency lamps are run off the same 2-volt battery which is aft of the switch and fuse box. The switches for these lamps are identifiable in the dark by luminous spots.

23. stowage

A double stowage for maps and Pilot's Notes is in the front of the seat in each cockpit.

24. luggage stowage.

A luggage locker is provided aft of the seat in the rear cockpit.

25.

A four or ten channel V.H.F. set, which incorporates intercommunications, is controlled from either the front or the rear cockpit. The front cockpit channel selector (18) is on the starboard side, just below the cartridge starter control. The master V.H.F. control in the rear cockpit incorporates a channel selector (50), a muting switch (51) (which may be guarded) and a selector switch (49) marked FRONT and REAR. Movement of the selector switch to FRONT or REAR allows channel selection to be made from the appropriate cockpit only. There is a press to transmit button, (19) and (41), at the top of each control column

26. *cockpit ventilation*
A ventilator shutter is forward of the windscreen and is operated by a push-pull control at the top right hand side of the front cockpit instrument panel. The control is marked AIR VENT-PUSH.

EMERGENCY EQUIPMENT

Note.- ALL EMERGENCY CONTROLS ARE MARKED WITH YELLOW AND BLACK STRIPES, WITH THE EXCEPTION OF THE COCKPIT EMERGENCY LAMPS AND SWITCHES, WHICH CAN BE IDENTIFIED BY LUMINOUS SPOTS ON THE SWITCH TOGGLES.

27. *fire-extinguisher*
A hand fire extinquisher(23) is on the floor of the starboard side of the cockpit.

28. *first aid*
The first aid kit is in the port mainplane, near the root end, and is clearly labelled. It is retained in position by a rip panel, which has a tag for quick opening. A perspex window may be fitted in the rip panel to enable the kit to be seen.

29. *emergency exits*
(a) The hood is not jettisonable but, to assist rapid opening in flight, the roof is fitted with a small door, hinged at the aft end, when this door is opened into the slipstream, it overcomes the normal suction of the hood and enables it to be opened. The door is held closed by a spring catch loaded by a bungee cord, and is released by pulling either of the yellow and black knobs inside the hood , on the starboard side of each cockpit.

(b) To enable the crew to get clear or be released, if the hood is jammed in a crash two break out panels are fitted on the port side of the hood. The operating levers for internal or external operation are painted yellow and black and are clearly labelled to show the direction of operation.

PART II. LIMITATIONS

NOTE.- The limitations quoted in Part II are mandatory and are not to be exceeded. The contents of Parts III and IV are mainly advisory but instructions containing the word"must"are to be regarded as mandatory.

30. ENGINE LIMITATIONS - Gipsy Major Mk.8. (fitted with fixed pitch propeller)

	R.P.M.	Oil temp °C.
Max. take-off (5 minutes limit)	Full Throttle	100
Max. Continuous (Rich Mixture)	2,400.	85.
Max Continuous (Weak Mixture)	2,300.	85.
Max diving one third throttle (Maximum duration 20 seconds)	2,675.	-

OIL PRESSURE
Normal .... 40-45 lb./sq. in.
Emergency Minimum .... 30 lb./sq. in.
MINIMUM OIL TEMPRETURE.
For take-off ....15°C.

31. FLYING LIMITATIONS.
(a) Maximum permissable diving speed ..... 173 knots.
Maximum speed for operating flaps between 0° and 15° ..... 93 knots.
Maximum speed for operating flaps between 15° and 30°. ..... 71 knots.

Speeds for flap operation also apply to flight with the flaps lowered.

(b) The aircraft is cleared for practice spins of up to eight turns.
(c) When flying solo the pilot must occupy the front cockpit.
(d) When towing a glider the aircraft must be flown solo, the minimum cruising speed should be 50 knots and turns should not exceed rate 2.

32. WEIGHT and CENTRE OF GRAVITY LIMITATIONS.

Maximum all-up weight for all permitted forms of flying and landing except for glider towing.

Maximum all-up weight for glider towing.

Maximum permissable load in luggage locker.

The C.G. datum point is on the port side of the fuselage and the C.G. limits are as follows. :-

Forward limit .... 6.48 ins forward of the datum.
Aft limit .... 0.257 ins aft of the datum.

The C.G. moves aft as fuel is gradually consumed.

PART III. HANDLING.

33. management of the fuel system.

The fuel cock should be set fully on before starting, and remain in in this position at all times when the engine is running. On pre-Mod-H.207. aircraft, the slipstream effect on the fuel vents may cause uneven empting of the tanks. If one tank empties completely, the second tank may fail to supply the engine. On post-Mod. H.207. aircraft this effect is eliminated.

34. external checks.

On approaching the aircraft check:-

General position	Clear of other aircraft. Not in front of hangar doors.

Ground Fire Extinquisher in position for starting.
Chocks in position.

(a) Before commencing external check of the aircraft, check:-

Brakes	OFF.
Ignition switches	Both sets off.
Flying Controls	Unlocked, Locks safely stowed away.
Ground/Flight switch.	GROUND.
Flaps.	UP.
Starter safety cover.	Over starter toggle.
Hood.	Condition and operation. Runners clear. Windscreen clean. Break out panels secure. Jettison Levers wire locked in the vertical position.

NOTE.- THERE SHOULD BE NO LOOSE ARTICLES IN EITHER COCKPIT.

PORT MAINPLANE.

(b)	Upper Surface	Condition.
	First Aid	Rip Panel Secure. Pack in position(If perspex window fitted).
	Panels.	Secure.
	Flap.	Condition and position.
	Aileron..	Condition of upper and lower surfaces, hinges and linkage. Full and free movement. Drain holes clear.
	Navigation light and Wing Tip.	Condition.
	Pressure Head	Cover removed.
	Leading Edge and Lower Surface.	Condition, Panels Secure, and zip fasteners wired closed.
	Fuel Tank Cap..	Secure.
	Fuel contents guage,	Contents.
	Fuel Vent.	Condition, vent hole clear.

(c) PORT UNDERCARRIAGE.

Fairing	Condition and security.
Taxying lamp.	Condition.
Undercarriage Leg	Condition and extension (approx 7inches).
Brake lead.	Condition and security.
Tyre.	No cuts or creep, Pressure correct, Valve free.
Chock.	In position.

(d) ENGINE.

Port Cowling.	Security.
Propeller.	Undamaged, Check paticularly for stone damage.
	Security, (Recheck switches, both cockpits OFF).
Spinner.	Condition and security.
Oil leaks.	Check visually.
Exhaust pipe.	Condition and security.
Oil filler cap.	Security.
Starboard cowling.	Security.
Plessey Starter Exhaust.	In line with cowling vent(Usually military machines)

(e) STARBOARD UNDERCARRIAGE.

As for port undercarriage except for the taxying lamp.

(f) STARBOARD MAINPLANE.

As for port mainplane omitting the pressure head and adding:-

Identification light.	Condition.
V.H.F. aerial.	Security.
Aileron trim tab.	Undamaged, and secure.

(g) STARBOARD FUSELAGE.

Main area of the fuselage.	Condition.
Inspection panels.	Security.

(h) TAIL UNIT.

Fin and tailplane	Condition of surfaces.
Elevators and Rudder.	Condition of surfaces, hinges, linkages, and tabs. Check for full and free movement and clearance of rudder above the tailplane. Check drain holes clear.
Tail fairing.	Security.
Tail Light.	Condition, Security.
Tail wheel.	Extension of strut. Tyre for cuts, creep, pressure and valve free.

(j) PORT FUSELAGE.

Main area of the fuselage.	Condition.
Inspection panels.	Security.

NOTE.- If the aircraft is to be flown solo carry out the following checks in the rear cockpit:-

Baggage locker.	Closed, contents secure.
Safety harness.	Secure.
Control Column.	Removed (as required).
Front cockpit lamps overide switch.	All OFF.
Ignition switches.	ON.
Throttle friction nut.	Loosened.
Direction Indicator.	caged.
V.H.F. changeover switch.	FRONT.
Muting switch.	OFF (Up).
Hood.	Freedom of movement, Set half closed.

35. COCKPIT CHECKS.

Enter the cockpit, check amber screens, adjust rudder pedals and strap in. Check the flying controls for full, free, and correct movement. Set the Ground/flight switch to FLIGHT. Check from left to right. around the cockpit.

Pressure head heater	OFF.
Emergency lamp switch(1).	OFF.
Taxying lamp switch (2).	OFF.
Navigation lights switch. (4)	As required.
Identification light switch. (5)	OFF.
Elevator trimming control. (29)	Full and free movement, set two divisions Nose Down.
Brake lever (10).	Freedom of movement, Set fully On.
Mixture Control (8).	Fully Rich (to rear)
Throttle (9).	Freedom of movement, Closed, Adjust friction Nut.
Ignition switches (12).	OFF.
Generator power failure warning light. (14)	On.
Direction Indicator.	Gaged.
V.H.F. Controller (18)	OFF.
Carburettor Air Intake, Control. (24).	As required.
Flap lever (20).	Operation. Check visually with flap position. Select flaps up.
Fire Extinquisher (23).	In position, Security.
Fuel Cock (28).	ON.
Magnetic compass.	Servicability, Lamp switch(27) as required.

36. STARTING THE ENGINE.

(a) Indicate readiness and initiate the starting drill by calling:-

Fuel on.
Brakes on.
Throttle closed.
Switches OFF (give a clear thumb down signal.

(b) The crewman repeats as above.

(c) The ground crewman primes and waits until fuel draining ceases. If, due to the position of the operating cam on the pump, there is insufficient leverage on the hand priming pump lever, the cam position should be altered by rotating the propeller through 180°.

(d) If the engine is cold, the propeller should be turned through about six revolutions by hand in order to prime the cylinders. A hot engine should not require priming.

(e) Section E consists of a description of the Starter cartridge, This has been omitted from this publication.

(f) STARTING THE ENGINE BY HAND SWINGING.

(i) The ground crewman grasps the propeller and calls "CONTACT" giving the"thumbs up signal".

(ii) Set the throttle lever about half an inch forward from the fully closed position, switch ON the impulse magneto (No.2.), call "CONTACT" and give the thumb up signal.

(iii) The ground crewman swings the propeller cleanly through the compression stroke to start the engine. When the engine starts switch on (ON) No. 1 . magneto.

(iv) If the engine fails to start switch the ignition OFF calling "switches off" and giving a "thumbs down" signal. The propeller is then positioned by the ground crewman for a further starting swing.

(v) Drill will then recommence as in sub-paras.(i) to (iii) above.

(vi) Overpriming should be dealt with as in para. (e)(iv) above.

(g) If the oil pressure does not rise almost immediately to 30 to 40 lb./sq.in. the engine should be shut down and the cause investigated.

(h) Warm up at 1,000 to 1,200 r.p.m.

37. CHECKS AFTER STARTING THE ENGINE.

Generator warning light	Out.
Instruments.....	Serviceability. Check altimeter setting.
Directional Indicator.....	Set up with magnetic compass Uncage.
Ignition switches.....	Check for dead cut at 1,000.r.p.m.

38. TESTING THE ENGINE AFTER STARTING.

After warming up to 15°C. oil tempreture.

(a) Check that the generator power failure warning light is out and open up to 1,500 r.p.m., then test each magneto in turn. The single ignition drop should not exceed 75 r.p.m. If it does and there is no undue vibration, the full power check at (b) below should be carried out. If however there is a marked vibration, the engine should be shut down and the cause investigated.

(b) The following full power check should be made after repair, inspections other than primary, when the single ignition drop at 1,500 r.p.m. exceeds 75, or at the discretion of the pilot. Except in these circumstances, no useful purpose will be served by a full power check.

(i) Open up steadily to full power and check that r.p.m. which should be 2,000 to 2,100.

(ii) Check each magneto in turn. If the single ignition drop exceeds 120 r.p.m. or if there is excessive vibration the aircraft should not be flown.

(iii) The full power check should not be unduly prolonged.

(c) After completing the checks either at 1,500 r.p.m. or full throttle, steadily move the throttle lever to the fully closed position, and check the minimum idling r.p.m. (approx 650), then open up to 1,000 to 1,200.

39. use of brakes

(a) the following proceedure should be used for setting the correct amount of brake:-
Close the throttle and wave away the chocks,
When the chocks are clear, release the brakes.
Open the throttle, allow the aircraft to move forward, close the throttle and apply the brakes.

(b) Release the brakes and apply full rudder in either direction, then move the brake lever backwards until pressure is felt on the rudder. The amount of to be found sufficient for light winds will be at about this pressure, but in stronger winds it may be necessary to use more brake.

(c) The number of notches required can be accounted for by applying finger pressure to the brake lever collar during the operations described.
If differential brake is required for landing in a strong crosswind condition, the correct of amount of brake can then be set in the air.

40. taxying

Whilst taxying, check the direction indicator, artificial horizon, and turn and slip indicator for operation.

41. checks before take-off

ELEVATOR TRIM	Two divisions NOSE DOWN.
THROTTLE FICTION NUT.	Adjust.
MIXTURE	FULLY RICH.
	Carburettor air intake as requir
FUEL	FULLY ON. Check Contents.
FLAPS.	Up (15° for the shortest run).
GYRO.	Direction indicator synchronised with Magnetic Compass.
GAUGES.	Oil tempreture, and pressure cor for take-off.
HARNESS.	TIGHT.
HOOD.	CLOSED AND LOCKED.
PRESSURE HEAD HEATER.	As required.

42. take-off

(a) Align the aircraft carefully with the take-off path, release the brakes and then open up the throttle slowly to the full forward position.
(b) Keep straight by the use of rudder. There is a tendency to swing to starboard if the throttle is opened up to quickly.
(c) The aircraft should be flown off at approximately 45 knots.
(d) For a short take-off, half flap should be used and a speed of 55 knots maintained until clear of obstacles. Raise the flaps at a safe height.
(e) The following proceedure is recommended for a crosswind take-off:-
  (i) Open up the throttle slowly, keeping straight initially as in sub-para. (b) above, with the additional use of differential brake and by holding the control column into wind.
  (ii) Hold the aircraft on the ground until 50 knots is reached, then unstick with a positive movement.
  (iii) Release the brakes when airborne.

43. climbing.

(a) The speed for maximum rate of climb is 65 knots, but 70 knots is recommended as a more comfortable speed.
(b) Climb at full throttle. The mixture control should normally be left at the fully rich position, as a rich mixture is desirable for assistance in cooling the engine. At altitude, however, it should be moved forward only sufficiently to eliminate rough running due to over richness.

44. general flying.

(a) FLYING CONTROLS.
The controls are well harmnized and the aircraft is easy and pleasant to fly. They remain light and effective throughout the speed range, except the ailerons tend to become heavier as the limiting speed is approached.

(b) CHANGES OF TRIM.
Flaps down — Slightly Nose-down.
Flaps up — Slightly Nose-Up.
There is no change of trim with the operation of the hood. Changes of power and speed promote slight changes in directional trim.

(c) STABILITY.
The aircraft is easy to trim under all conditions of flight, and holds it trimmed speed well.

(d) REDUCED FLYING SPEEDS.
Reduce speed to about 75 knots and then lower 15° of flap, then at about 65 knots. The stalling condition at about this speed is 35 knots.

(e) CARBURETTOR ICING.
As the engine is prone to carburettor icing, it is recommended that the air-intake heat control should be wired in the HOT position in tempretures below 30°C. If the control is not wired in the Hot position, and Cold air is used, icing may occur and this will be indicated by rough running after loss of power. If icing does not clear shortly after selecting HOT air, manipulation of the throttle may assist.

(f) MIXTURE CONTROL.

(i) The mixture control should be fully rich for starting, ground-running and take-off. Its use in climbing is given in Para.45(b). and in cruising flight in para. 45(C-ii).

(ii) Changes in altitude will require corresponding adjustments of the mixture control. It should always be returned to the fully rich position before commencing to dive.

(iii) The engine should never be allowed to run for any length of time at reduced r.p.m., where the reduction of r.p.m. is obtained by use of the mixture control.

45. *cruising.*

(a) The speed for normal cruising is 90 knots.

(b) The maximum weak mixture cruising r.p.m. are 2,300 but is recommended that 2,100 r.p.m. are not exceeded in cruising flight. At or below 2,100 r.p.m. a weaker mixture is obtained and the possibility of rough running at the higher r.p.m. is eliminated.

(c) FLYING FOR RANGE.

(i) The recommended speed is 90 knots.

(ii) The range speed should be obtained by adjusting the throttle to obtain the recommended speed at the required altitude. The mixture control should then be moved forward towards the weak position until the r.p.m. are observed to drop or rough running commences. It should then be moved back until the original r.p.m. and/or smooth running commences/restored. The control will then be set in the correct position for all throttle settings at that altitude.

(d) MAXIMUM ENDURANCE.

The recommended speed for maximum endurance is 60-65 knots, but in bumby conditions speed should be increased to 70 knots.

46. *gliding.*

The following speeds are recommended for the optimum glidepath: clean aircraft 70 knots, half flap extended 65 knots.

47. PRE-STALLING, SPINNING AND AEROBATIC CHECKS.

(i)(a) Height must be sufficient to recover by 3,000 feet above ground level

(b) Brakes fully OFF.

(c) Mixture Fully Rich.
Carburettor air as required.

(d) Flaps, As required for stalling
UP for aerobatics and spinning.

(e) Gyro, Direction indicator caged, spinning and aerobatics,

(f) Harness, Tight.

(g) Hood, Closed and locked.

NO LOOSE ARTICLES IN THE COCKPIT.

(ii) Ascertain aircraft is clear for spinning, is clear of airfields, built up areas and other aircraft. Select a pinpoint.

48. *stalling.*

(a) The approximate stalling speeds in knots are:-

Power off, Flaps up.	45 knots.
Power off, Flaps down 15° or 30°	38 "
Power on, under typical approach conditions	35 "

(b) In all cases warning is given by slight elevator buffeting some three knots before the commencement of the stall. With power off at the stall the nose drops gently accompanied by elevator buffeting and there is a slight tendancy for the nose to pitch. If the stick is hels hard back, the elevator buffeting is increased and a wing may drop. With power on, the pre-stall buffeting is increased and wing drop at the stall is more pronounced.

(c) Stalling speeds are reduced by about two to three knots with one pilot only in the aircraft.

(d) With the hood open, stalling speeds and characteristics remain unaltered.

(e) The stall in a steep turn is indicated by buffeting but there is no tendancy to flick out of the turn.

(f) Recovery in all cases is straightforward and easy.

49. *spinning.*

(A) ENTRY

(i) Before practice spinning, complete the checks as given in Para.47.

(ii) At about 50 knots initiate the spin by applying full rudder in the required direction and moving the control column fully back.

(iii) The aircraft may be reluctant to enter a spin, especially to the left and at forward c.g. It may instead, fall into a spiral dive, particularly if the control column is not kept fully back. The spiral dive can be recognised by an increase in the stick forces and a fairly rapid rise in the airspeed during the first two turns.

NOTE. - If the stick is not moved fully back until after the spin has been entered, a manoeuvre similar to a spin may be encountered. The speed will remain stable at about 70 knots and normal recovery action will be immediately effective.

(iv) IN THE SPIN.

After a half roll in the direction of the spin, the aircraft nose drps sharply and rotation commences immediately, sometimes accompanied by pitching for about 5 turns. The spin will then become stable with the nose steady at about 30° below the horizon, with the rate of rotation slightly slower than in the initial stages and the airspeed steady at some low figure.

(c) RECOVERY.

(i) Recovery is effected in the normal way by centralising the control column laterally, applying full opposite rudder and then, after apause, moving the control column firmly and proggressively forward until the rotation ceases. A moderate push-force is required to move the control column forward and care is necessary to ensure that it is maintained in the laterally central position throughout. If full recovery action is initiated before the spin has become stable, recovery is immediate on the moving of the control column forward. Up to three turns may be required for recovery from a stable spin, during which time the rate of rotation will increase and the angle of the nose to the horizon will become steeper, until the rotation ceases and then the elevators will become suddenly more effective.

(ii) When rotation ceases, centralise the rudder, level wings and recover from the resultant dive.

(iii) If the aircraft is to be found slow to recover from the spin, the application of aileron in the direction of the spin will assist normal recovery action.

(d) When Mod. H.231 (fuselage strakes) is fitted, entry is uneffected but recovery from a stable spin in either direction is quicker. The recommended recovery action and the spin characteristics are unchanged.

50. *diving.*

(a) Before commencing the dive , the mixture control should be in the fully rich position.

(b) As the speed increases, the aircraft becomes progressively tail-heavy but can be held in the dive to the limiting speed without retrimming. Directional trim should be maintained by progressively using application of right rudder.

(c) In the dive, the throttle should be at least one third open and the use maximum r.p.m. limited to 20 seconds. With a larger throttle opening, as the maximum speed is approached it will be necessary to throttle back to keep the r.p.m. within limitations.

51. *aerobatics.*

NOTE.- On aircraft with Mod. H.207(balanced type vents) incorporated aerobatics should not be attempted after flying in icing conditions, as there is a risk of fuel siphoning.

(a) Complete the checks as given in Para.47.

(b) Until experience is gained the following speeds in knots are recommended:-

Roll	120
Barrel Roll	120
Stall turn	120
Loop	130
Half roll of the loop	140

(c) For manoeuvres in the looping plane, care should be exercised not to exceed the r.p.m. limitations at high speed.

52. circuit and landing proceedure.

(a) Before joining the circuit, ensure that there is sufficient fuel for landing and possible overshoot, synchronise the direction indicator, select the correct V.H.F. frequency and unmute. Maintain normal cruising speed.

(b) CHECKS BEFORE LANDING.

MIXTURE	RICH. Carburettor air as required.
FUEL	CONTENTS.
FLAPS	AS REQUIRED.
HARNESS	TIGHT.
HOOD	CLOSED.
BRAKES	OFF or as required (i.e. Cross wind landing)

(c) FINAL APPROACH.

(i). A speed of 70 knots should be maintained on the base leg and the initi approach.

(ii) The runway threshhold should be crossed at the following speeds in knots :-

	Flaps down.	Flaps up.
Engine Asisted	55	60
Glide.	60	65

(iii) Without the use of flap the approach is long and flat and very little power, if any, is required.

(iv) For a short landing, an initial approach with full flap under power at 55 knots is recommended aiming to cross the runway threshold at 50 knot

(d) GOING AROUND AGAIN.

(i). At full throttle the aircraft will climb away easily with the flaps down.

(ii) Open the throttle and retrim if necessary, Climb at 60 knots with the flaps lowered.

(iii) At a safe height raise the flaps, in two stages if full flap is used. There is little change of trim and no sink. Allow the speed to build up to 70 knots.

53. checks after landing

When clear of the runway, or after stopping and turning through 90° away from th take-off path on a grass airfield check :-

BRAKES..... .... Set for taxying.
Flaps .... Up.
Pressure head heater ..... Off

54. stopping the engine

(a) If the servicabilty of the engine is in doubt, such items as may be necessary of the run-up given in Para. 38. should be carried out. In all cases, however, the engine should be idled at 800-900 r.p.m. for three minutes, when the magne -s should be tested for a dead cut.

(b) The engine should be stopped by closing the throttle, switching off the igniti from either cockpit, and finally opening the throttle fully when the propeller speed has dropped to 200 - 300 r.p.m.

(c) When the engine has stopped close the throttle, and close the fuel cock to the OFF position.

55. checks on shut down of engine

FUEL COCK	OFF.
Electrical Services	ALL OFF.
Ground Flight switch	GROUND.
Directional Indicator	GAGED.
Internal Control Locks	IN POSITION.
Chocks	IN POSITION.
Brakes	OFF.
Pressure head Cover	ON.

PART IV EMERGENCY HANDLING

56. action in the event of fire

NOTE.- No engine fire extinquisher is fitted.

(a) IN THE AIR.
- (i) Warn the crew.
- (ii) Close the throttle.
- (iii) Turn the fuel cock OFF and raise the nose to reduce airspeed and r.p.m.
- (iv) Switch OFF the ignition when the engine cuts.
- (v) If the fire does not go out abandon the aircraft if there is sufficient height available, otherwise make a forced landing. If the fire does go out, do not restart the engine but make a forced landing immediately.

(b) ON THE GROUND.
- (i) Close the throttle.
- (ii) Switch off (OFF) the ignition.
- (iii) Turn the fuel cock OFF.
- (iv) If necessary release the brakes to allow the aircraft to be pushed away from burning fuel on the ground.

(c) FIRE IN THE FRONT COCKPIT.
Use the hand-fire extinquisher.

57. abandoning the aircraft.

(a) Disconnect the R.T.lead.
(b) Open the hood.
(c) Reduce spedd as much as possible.
(d) Abandon the aircraft by diving head first towards the trailing edge of the mainplane.

58. forced landing.

In the event of an engine failure necessitating a forced landing :-

(a) Close the throttle, gain height if possible, while reducing speed, then glide at 70 knots and retrim.

(b) Select proposed landing area, turn towards it and plan approach.

(c) Check for the cause of failure.

(d) If an obvious permanent failure proceed as follows :-

(i) Fuel OFF.
(ii) Ignition OFF.
(iii) Make R.T. Distress Call.
(iv) Check approach plan.

(e) Make the following vital checks :-

Brakes	OFF as required.
Flaps	As required.
Hood	Closed, side panels jettisoned.
Harness	Tight.

NOTE.- (i) Flaps should not be lowered fully until it is certain that the selected landing area can be reached.
(ii) When simulating engine failure at altitude the engine should be clear at least every 1,000 feet. during the descent,

59. ditching

Owing to the fixed undercarriage it is expected that the ditching behaviour wil not be good, and it is recommended that the aircraft be abandoned rather than ditched.

PART V. GLIDER TOWING.

NOTE.- Because of the weight and C.G. considerations, the front seat only must be occupied when glider towing. See Part II para. 31 (d).

60. introduction

With the embodiment of Modificatons H.197,M.121 and H.167, Chipmunk T. Mk.1(aircraft are cleared for towing gliders. The maximum all-up weight of the glider must not exceed 1,050 lb.and the glider must have either a C.A. or a A.R.B. clearance for aero towing.

61. towing mechanism.

The towing hook is positioned on the fuselage, just aft of the tail-wheel, while the pilot's release knob is on the left of the instrument panel, just below the ignitin switches. A $\frac{3}{4}$ inch 9-10 cwt. nylon rope 210 feet long must be used for aero-towing.

62. performance

(a) Towing a glider of the maximum weight, the take-off distance ib IS.A, conditions for the combination to reach a height of 50 feet is approximately 660 yards with flaps up, using an unstick speed of 45 knots and a climb-away speed of 50 knots. The distance can be reduced to approximately 600 yards if 15° of flap are used, with an unstick speed of 40 knots and a climb-away speed of 45 knots. But see handling recommendations in para 63.(a).

(b) Climbing at a speed of 50 knots,with flaps up and full throttle, the sea-level rate of climb is approximately 360 feet/per minute at the maximum glider weight and the service ceiling is approximately 7,700 feet. The rate of climb is slightly decreased if 15° of flap is used.

(c) The comfortable cruising speed is 50 knots and at this speed the maximum still air range is 150 nautical miles and the endurance is about 2½ hours,

63. handing.

(a) TAKE OFF.

After taking up slack, and onreceiving the signal from the Marshaller, the throttle should be opened quickly with the stick held hard back. If the glider has a skid and no wheels, the aircraft will accelerate quickly initially as the nylon rope stretches and then slow down again as the glider starts to move, when the speed will build up fairly rapidly. Considerable left rudder is required to maintain heading and slight use of brakes may be necessary. If the glider isallowed to rise more than 30 feet above the aircraft during the take-off run, full aft-stick will be required to get the aircraft off the ground. The recommended unstick spedd is 45 knots; increase speed to 50 knots for climb-away.

(b) When climbing at 50 knots, approximately one third rudder to the left is required. At this speed with flaps up, the aircraft is in a marked-up-nose attitude and the forward view is noted to be considerably restricted. Using 15° of flap, however the forward view is considerably improved and greater stability is obtained in turbulent conditions,

(c) CRUISING.

The minimum cruising speed should be 50 knots and the maximum spedd must be governed by the limiting spedd of the glider, making allowance for differences in pressure error corrections. The following table gives an approximate relationship between the maximum towing speeds of various gliders and corresponding Chipmunk speeds. It should be noted that these speeds may vary considerably between different gliders of the same make.

Glider Type	Max I.A.S For Towing	Corresponding Chipmunk I.A.S.
Olmpia	52	51
Sedbergh	65	58
Sky and Gull4.	55	55
Eon Baby	55	56
Skylark 1.	63	65
Slingsby T.42.	60	66

PART VI. OPERATING DATA

64. take-off

(a) At the maximum weight of 2,100 lb. the minimum take-off distance to 50-feet in I.S.A. and nil wind conditions using 15° of flap, is 450 yards on a level runway and 485 on grass surfaces.
(b) The above distances are increased by 7½% for each 1,000 feet increase in airfield altitude and by 5% for each 10°C. increase in air tempreture. They are decreased by 10% for each 100 lb. decrease in all-up- weight, and by 22% in a 10 knot headwind.

65. climb

At sea level and a take off weight of 2,100lb. at a speed of 65 knots, the rate of climb in I.S.A. conditions is 840 feet/per min. This rate of climb is reduced by 45 feet/per min. for every 1,000 ft. increase in altitude and by 15feet/per-minfor every 10°C. increase in air tempreture. It is increased by 40 feet/ per-min. for every 100 lb. reduction in the all-up weight. The fuel used for the climb and take-off to 10,000 feet is approximately 10 gallons.

66. cruising flight

PRESSURE ERROR CORRECTION.
The pressure error correction is as follows :-

From	50	60	66	78	93
To	60	66	78	93	120
Clean	+5	+4	+3	+2	+1
Flap15°	+4	+3	+2	+1	-

The optimum speed range is 80 – 85 knots and the optimum endurance speed is 60 – 65 knots.

The following charts show approximate speeds and fuel consumption against r.p.m. for heights of 2,000 and 5,000 feet, these charts assume correct use of the mixture control and are based on the use of cold carburettor air. If hot air is used, the fuel consumption is increased by 5% and the A.N.M.P.G. are similarly decreased. The effect on T.AS. is negligible.

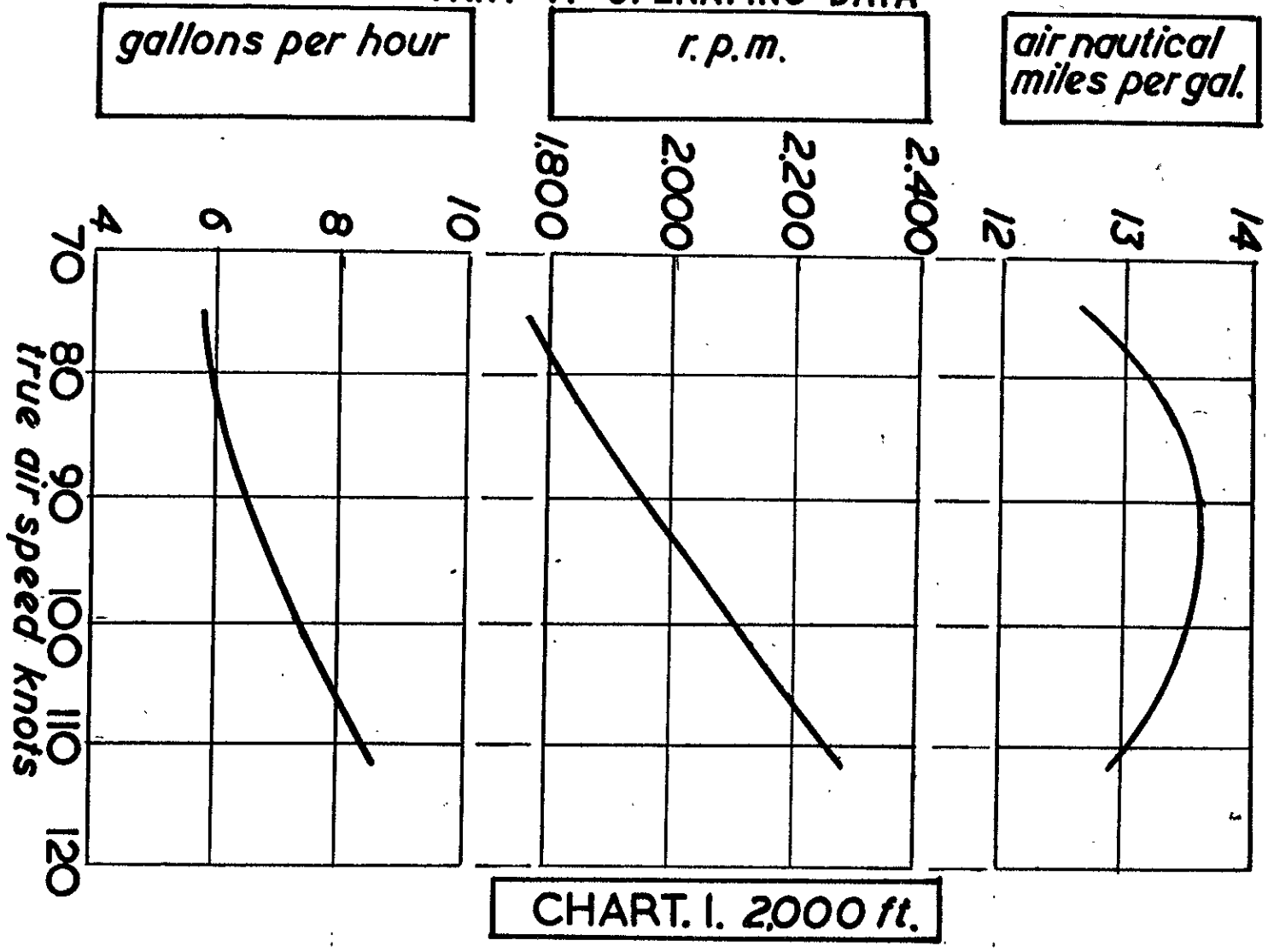


CHART. I. 2,000 ft.

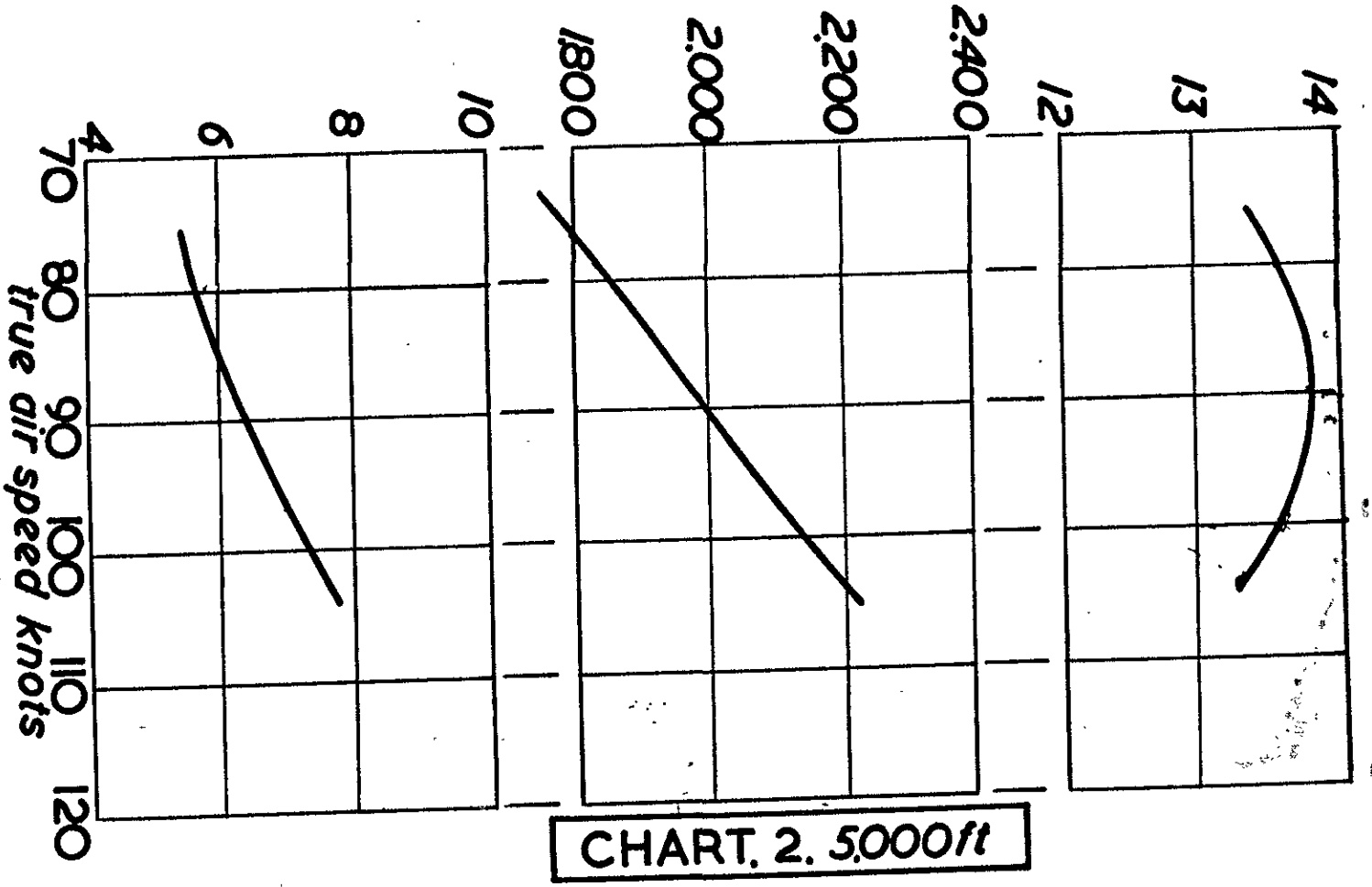


CHART. 2. 5000ft

PART VI - OPERATING DATA GRAPHS

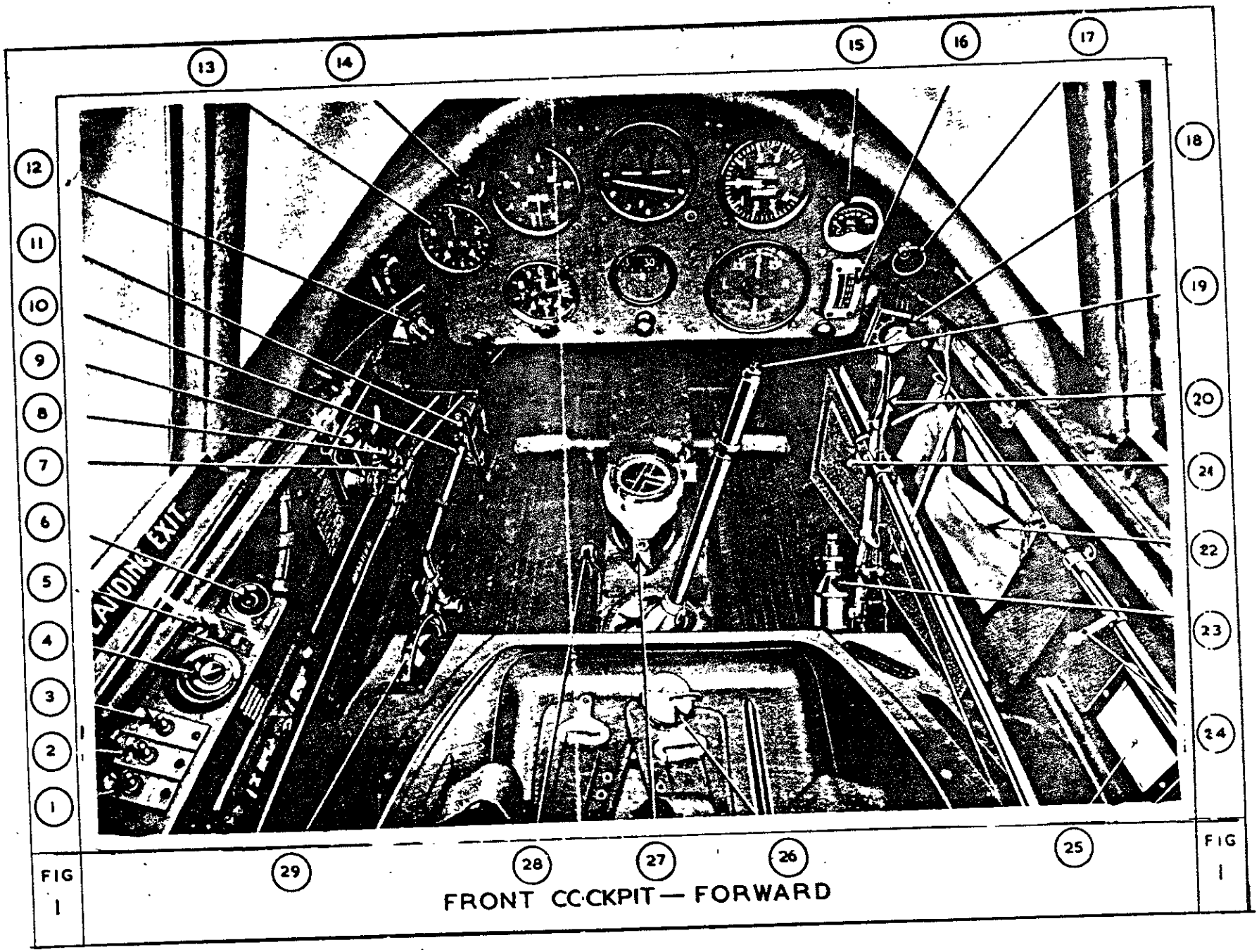


FIG 1

FRONT COCKPIT — FORWARD

FIG 1

PART VII
ILLUSTRATIONS

KEYS TO FIGS. 1, 2 and 3

1. Emergency lamp switch.
2. Taxying lamp switch.
3. Navigation lights switch.
4. Cockpit lamps OFF and dimmer switch.
5. Identification light switch.
6. Identification light morsing pushbutton.
7. Throttle and mixture controls friction nut.
8. Mixture control lever.
9. Throttle control lever.
10. Brake lever.
11. Ground/flight switch.
12. Ignition switches
13. R.p.m. indicator.
14. Generator failure warning light.
15. Oil temperature gauge.
16. Oil pressure gauge.
17. C rtridge starter control
18. V.H.F. radio controller.
19. Press-to-transmit pushbutton.
20. Flap lever.
21. Amber screens stowage.
22. Goggles stowage.
23. Hand fire-extinguisher.
24. Carburettor air-intake control.
25. Compass deviation card holder.
26. Harness release box.
27. Compass lamp switch.
28. Fuel cock control
29. Elevator trimmer wheel.
30. Harness release box.
31. Elevator trimmer wheel.
32. Cockpit lamps OFF and dimmer switch.
33. Front cockpit lamps override switch.
34. Emergency lamp switch.
35. Ignition switches
36. Throttle control.
37. Mixture control.
38. Throttle and mixture controls friction nut.
39. Brakes control.
40. R.p.m. indicator.
41. Press-to-transmit pushbutton.
42. Compass lamp switch.
43. Fuel cock control.
44. Maps case.
45. Oil temperature gauge.
46. Oil pressure gauge.
47. Air-intake heat control.
48. Flaps control.
49. V.H.F. change-over switch.
50. V.H.F. radio controller.
51. V.H.F. muting switch.
52. Compass deviation card holder.
53. Mic-tel socket.

NOTE —(i) In the front cockpit the following items are hidden by the seat: Maps case, Pilot's Notes stowage and Tel-mic socket.

(ii) The following items are not shown: Pressure head heater switch, generator test switch, safety flap over cartridge starter control.

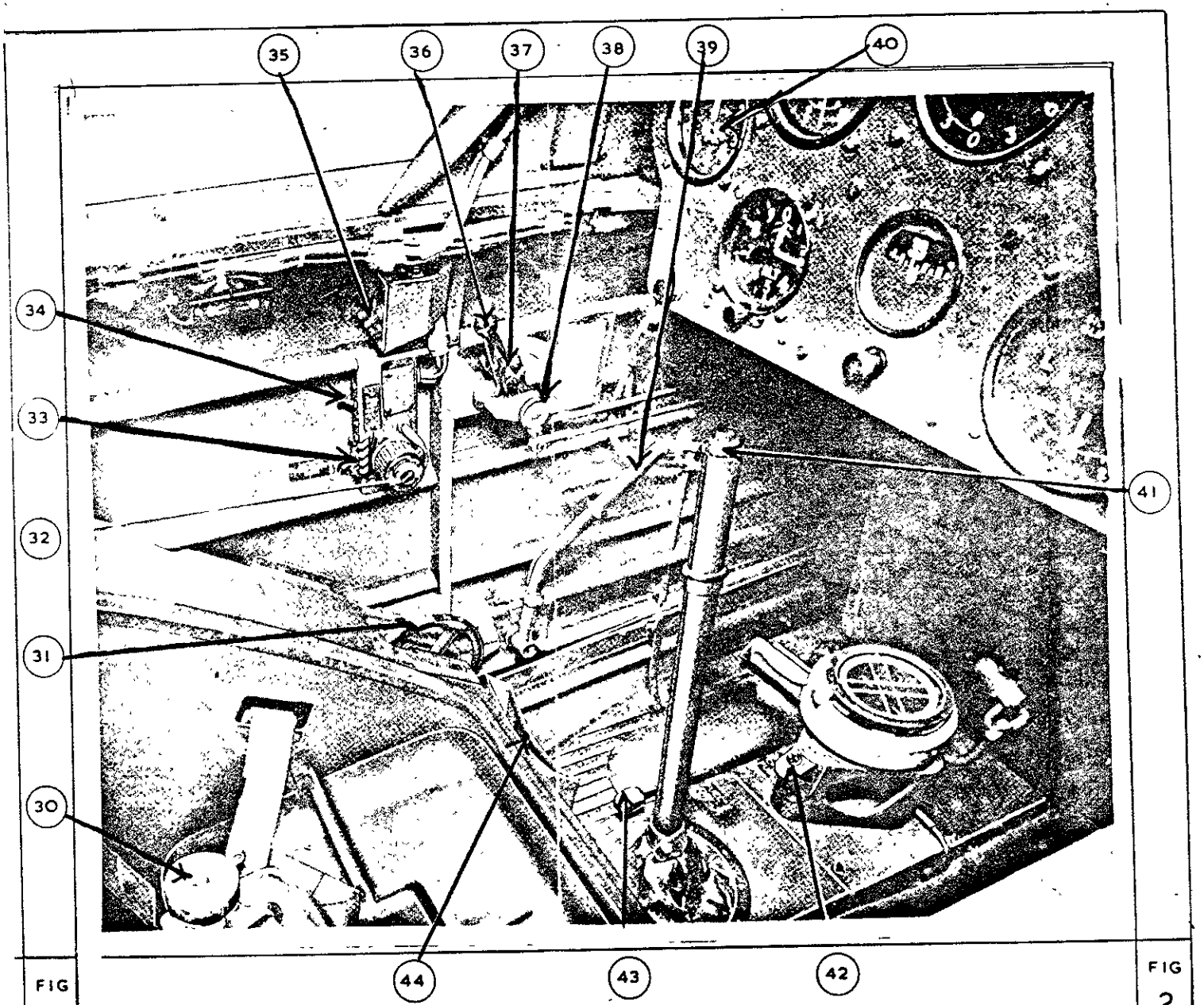


FIG 2

REAR COCKPT— PORT SIDE

FIG 2

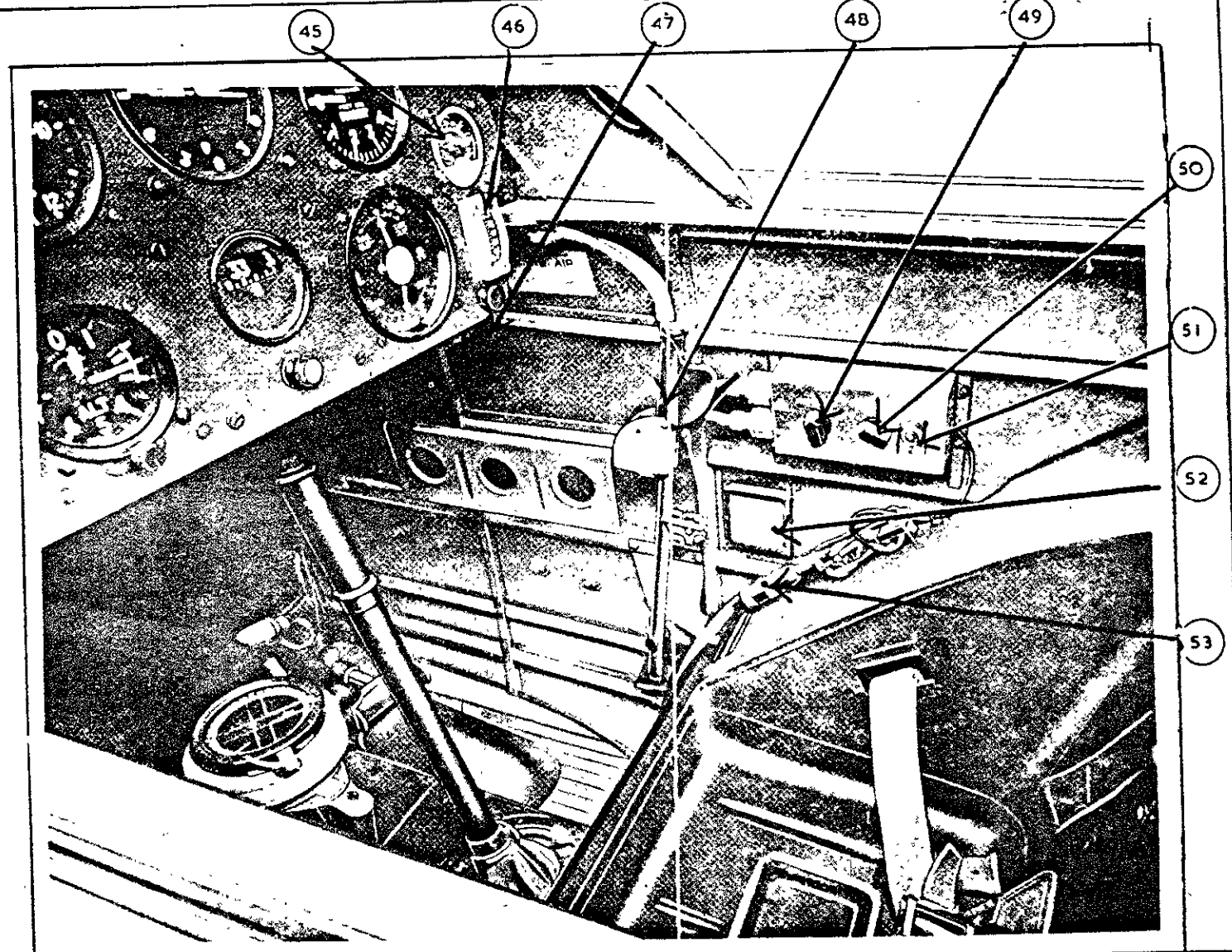


FIG 3

REAR COCKPIT – STARBOARD SIDE

FIG 3

PART VII
ILLUSTRATIONS

KEYS TO FIGS. 1, 2 and 3

1. Emergency lamp switch.
2. Taxying lamp switch.
3. Navigation lights switch.
4. Cockpit lamps OFF and dimmer switch.
5. Identification light switch.
6. Identification light morsing pushbutton.
7. Throttle and mixture controls friction nut.
8. Mixture control lever.
9. Throttle control lever.
10. Brake lever.
11. Ground/flight switch.
12. Ignition switches
13. R.p.m. indicator.
14. Generator failure warning light.
15. Oil temperature gauge.
16. Oil pressure gauge.
17. Cartridge starter control
18. V.H.F. radio controller.
19. Press-to-transmit pushbutton.
20. Flap lever.
21. Amber screens stowage.
22. Goggles stowage.
23. Hand fire-extinguisher.
24. Carburettor air-intake control.
25. Compass deviation card holder.
26. Harness release box.
27. Compass lamp switch.
28. Fuel cock control
29. Elevator trimmer wheel.
30. Harness release box.
31. Elevator trimmer wheel.
32. Cockpit lamps OFF and dimmer switch.
33. Front cockpit lamps override switch.
34. Emergency lamp switch.
35. Ignition switches
36. Throttle control.
37. Mixture control.
38. Throttle and mixture controls friction nut.
39. Brakes control.
40. R.p.m. indicator.
41. Press-to-transmit pushbutton.
42. Compass lamp switch.
43. Fuel cock control.
44. Maps case.
45. Oil temperature gauge
46. Oil pressure gauge.
47. Air-intake heat control.
48. Flaps control.
49. V.H.F. change-over switch.
50. V.H.F. radio controller.
51. V.H.F. muting switch.
52. Compass deviation card holder.
53. Mic-tel socket.

NOTE.—(i) In the front cockpit the following items are hidden by the seat: Maps case, Pilot's Notes stowage and Tel-mic socket.

(ii) The following items are not shown: Pressure head heater switch, generator test switch, safety flap over cartridge starter control.