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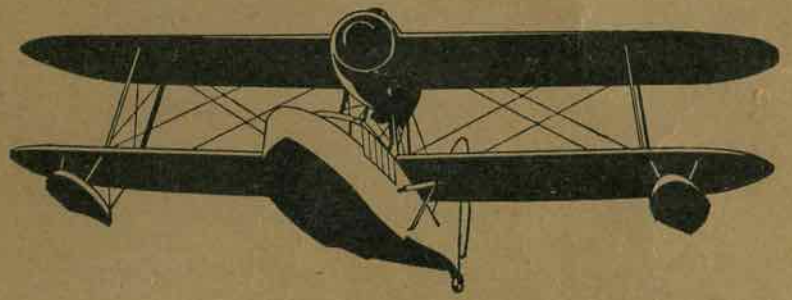
PILOT'S NOTES

FOR

SEA OTTER I

MERCURY 30 ENGINE



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AMENDMENTS

Amendment lists will be issued as necessary and will be gummed for affixing to the inside back cover of these notes.

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NOTES TO USERS

THIS publication is divided into five parts: Descriptive, Handling, Operating Data, Emergencies, and Illustrations. Part I gives only a brief description of the controls with which the pilot should be acquainted.

These Notes are complementary to A.P. 2095 Pilot's Notes General and assume a thorough knowledge of its contents. All pilots should be in possession of a copy of A.P. 2095 (*see* A.F.O. 3467/44).

Words in capital letters indicate the actual markings on the controls concerned.

Additional copies may be obtained from S.N.S.O., 191A, Askew Road, Shepherd's Bush, London, W.12, by application on Royal Navy Forms S134D or D397, or on R.A.F. Form 294A, in duplicate, quoting the number of this publication in full—A.P. 2209A—P.N.

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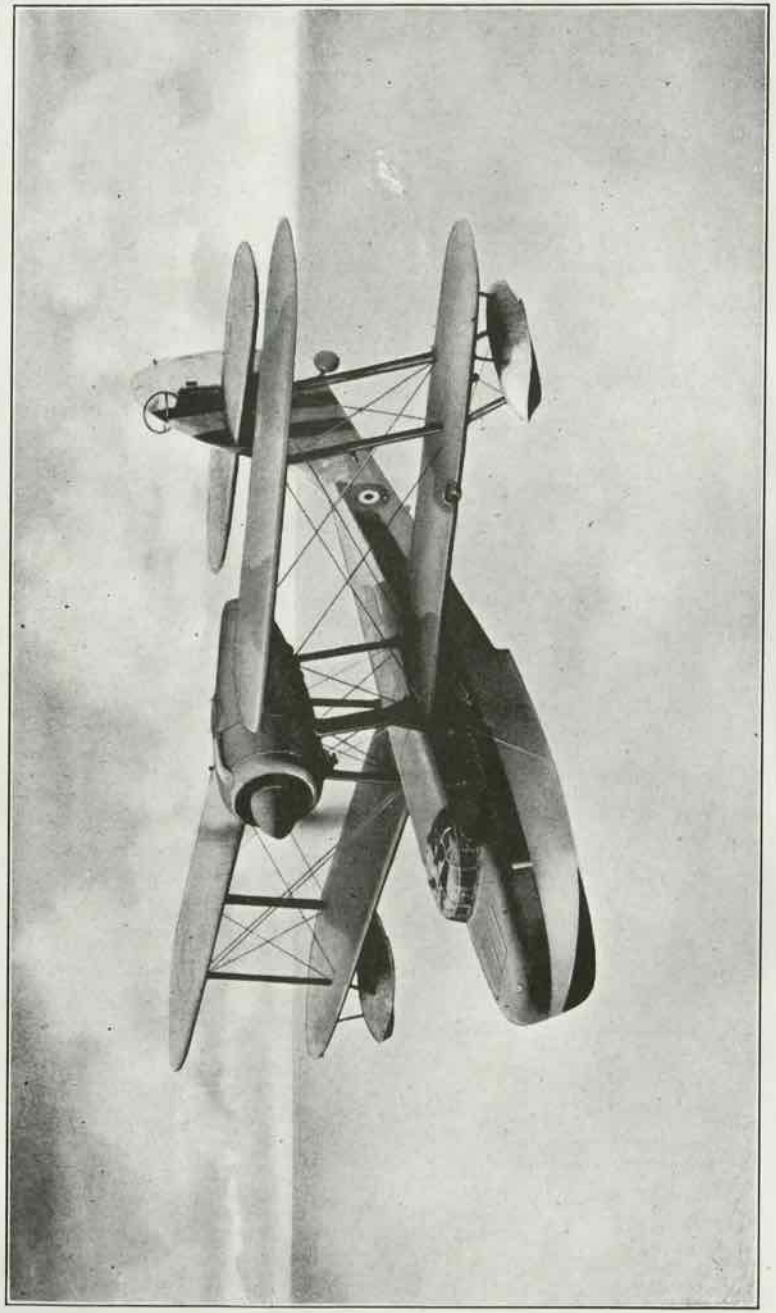

SEA OTTER I

SEA OTTER I

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PART I—DESCRIPTIVE

PART I

DESCRIPTIVE

1. Introduction

The Sea Otter I is an amphibian biplane powered by a Mercury 30 engine. The Rotol 20° constant speed propeller is tractor driven and this must be remembered when entering or leaving the aircraft. It is equipped for catapulting and is capable of deck operation, but no arrester hook is fitted. The land undercarriage is retractable and removable, and the wings may be folded. Provision is made for a crew of three.

FUEL AND OIL SYSTEMS

2. **Fuel system.**—(*See* Fig. 4)

Fuel is carried in two main tanks, each of 104 gallons capacity, which are mounted in the upper main plane roots. Provision is made for an auxiliary tank of 60 gallons capacity which forms the navigator's seat. Fuel flows from each main tank to the engine pump through cocks in the engine nacelle operated by remote controls behind the second pilot's seat. Should the engine pump fail, fuel feeds to the carburettor under gravity through a by-pass pipe. The fuel from the auxiliary tank is transferred to the port main tank by an immersed pump which is controlled by a switch above the navigator's seat.

3. **Fuel cocks.**—The two levers, one for each main tank, on the starboard side of the hull and immediately behind the second pilot's position, are moved forward to turn the cocks OFF. Tanks may be operated together or independently. For method of using auxiliary tank *see* Part II.

4. **Fuel contents gauges.**—The two gauges on the instrument panel (19 and 20) read up to 60 gallons only and do not indicate the total contents of the tanks when they have been filled (104 gallons each). It will be seen, therefore, that they will not record fuel consumption until 44 gallons have been used from each tank. There are two sets of figures on each gauge, to read contents in the tail up and tail down attitudes respectively; the tail down figures are in red. Provision is made for a hand refuelling pump. If fitted, it is stowed on the starboard side beside the wireless operator's seat and may be attached to four locating studs on the hull, aft of the rear entrance hatch or forward of the pilot's windscreen. The pipes are stowed under a hinged panel in the upper surface of the lower starboard main plane.

5. **Oil system.**—The tank has a capacity of 15½ gallons of oil, and 3 gallons air space, and is mounted on the port side of the engine nacelle. A pushbutton (23) for operating the oil dilution solenoid valve is on the instrument panel.

MAIN SERVICES

6. **Hydraulic system.**—The undercarriage is raised and lowered hydraulically by a handpump. There is no other hydraulic system. The reservoir is mounted on the bulkhead behind the pilot's seat.

7. **Electrical system.**—A 24-volt system operates the usual lighting services, indicators, bomb release circuits, and the immersed fuel pump. The generator switch (57) is below the right-hand side of the windscreen and a power failure warning light is fitted on the left-hand side of the instrument panel. This light will remain on with the engine stopped so long as the batteries are connected, but the current consumed is negligible. The battery should, however, be disconnected overnight.

8. **Pneumatic system.**—An engine-driven compressor feeds an air cylinder which is normally charged to 300 lb./sq.in. Both brakes and flaps are operated by this system. The cock on the cylinder should be turned off when leaving the aircraft overnight.

AIRCRAFT CONTROLS

9. **Flying controls.**—The flying controls are of the conventional type. The control wheel incorporates the brake lever for the main landing wheels. The rudder pedals are adjustable on the ground only by removing the treads and replacing them with attachment pins through setting holes.

10. **Trimming tabs.**—The elevator trimming tabs are operated in the natural sense by a handwheel (52) on the left-hand side of the cockpit, the indicator being on the left-hand lower corner of the instrument panel. The rudder trimming tab is operated by a small handwheel (53) on the left-hand side of the cockpit behind the pilot's seat and is not provided with an indicator. The aircraft tends to turn to starboard when the handwheel is rotated clockwise. Full rudder trim movement is two complete turns. For take-off, turn trimmer fully left or right and centralise by turning one complete turn. There is no aileron trimmer.

11. **Undercarriage controls.**—The undercarriage selector lever moves in a quadrant at the right of the pilot's seat and after selecting RAISE or LOWER the hydraulic hand-pump, just forward of the selector lever, must be operated until the wheels are locked in the required position. The selector must not be moved from LOWER while the aircraft is resting on the wheels.

12. **Undercarriage indicator.**—The electrically operated visual indicator (31) has two semi-transparent windows on which the words UP and DOWN are printed. The appropriate word is illuminated when both wheels are locked in that position.

13. **Undercarriage warning horn.**—The warning horn is operated by the throttle lever (46) and sounds irrespective of the position of the undercarriage whenever the throttle is more than three-quarters closed. It may be silenced by depressing the pushbutton (42) on the rear side of the throttle quadrant. As soon as the throttle is again advanced beyond about one quarter of its travel, the push-button is automatically released and the horn will sound again on the throttle being closed.

14. **Flaps control.**—The upper mainplane flaps are operated pneumatically and are controlled by a finger lever (8) on the instrument panel. There are two positions only: Up and fully down. The flaps may be lowered 20° for catapulting under overload conditions. *See* para. 48, sub-para. (iii) (*b*).

15. **Wheel brakes.**—The control lever (40) for the brakes is on the control column and differential control is provided by a relay valve connected to the rudder bar. A parking catch is fitted. A triple pressure gauge (33) showing the air pressure in the pneumatic system cylinder and at each brake, is mounted on the instrument panel.

16. **Wing locking controls**

(i) *To check for correct locking of mainplanes in spread position:*

(*a*) Top mainplanes: red knobs in the inboard position and the two long levers with black knobs imbedded in their recesses.

(*b*) Bottom mainplanes: bolts in the leading edge in the inboard positions and the handles in line with the leading edge.

17. **Flying control locking gear**

The aileron control locking pin is stowed on the left-hand side of the cockpit, below the instrument panel, and the elevator locking strut and pins are stowed in the roller clips, under the instrument panel. The pin for the rudder control lock is stowed on the left-hand side of the cockpit, forward of the rudder bar. To lock the control column remove the aileron screw from its stowage and the elevator strut from the clips and insert the strut at the forward side of the control column and into the eye bolt directly behind the blind flying panel simultaneously.
Insert the aileron locking screw after centralising the handwheel, and the rudder locking pin in the lugs on the rudder control levers after centralizing the controls.

ENGINE CONTROLS

18. **Throttle control.**—The throttle lever moves in a gated quadrant on the left-hand side of the cockpit. The quadrant is marked SHUT, CRUISING, RATED and TAKE-OFF. A friction nut is provided. There is a similar control on the right-hand side of the cockpit but on most aircraft the handle of this throttle lever is removed.

19. **Mixture control.**—Mixture control is automatic and there are only two positions of the lever (45), NORMAL (aft) and WEAK (forward).

20. **Automatic boost control cut-out.**—The lever (2) is fitted on the left-hand side of the cockpit, above the throttle quadrant and is marked BOOST OVER-RIDE. The lever should be moved fully forward for take-off (but only if 90 octane fuel or higher is used) and gives $+6\frac{3}{4}$ lb./sq.in. boost in this position.

21. **Propeller control.**—The propeller speed control (44) is mounted on the throttle quadrant. The lever is moved aft to decrease, and forward to increase, r.p.m.

22. **Slow running cut-out.**—The toggle (50) for the slow running cut-out control is immediately forward of the elevator trimming handwheel and is operated by pulling the ring up.

23. **Carburettor air intake.**—The lever (47) is forward of the slow running cut-out control and is moved forward for COLD AIR and aft for WARM AIR.

24. **Starter controls**—A hand cranking inertia starter is fitted. The starter handle, which is stowed immediately below the starboard step of the rear hatch, is fitted into a socket under a hinged panel on the port side of the engine nacelle. Under the same panel are mounted the priming pump, together with a 3-way cock, and the starter engaging toggle.

25. **Ignition switches.**—These (15) are on the right-hand side of the instrument panel and cannot be switched on until the master electrical switch has been operated. This switches on the undercarriage indicator and fuel contents gauges.

OTHER CONTROLS

26. **Bomb/depth-charge release.**—The switch panel and fusing switches are at the top of the instrument panel.

27. **Landing lamp.**—The ON-OFF switch (4) is on the left-hand side of the instrument panel and the lever (49) for raising or lowering the beam is to the left of the pilot's seat.

28. **Pressure-head heater switch.**—This switch (10) is on the instrument panel.

29. **Carburettor de-icing pump.**—This is on the starboard side of the hull, opposite the wireless operator's seat, and the tank is below his starboard port hole.

30. **Windscreen wiper.**—This is operated from the pressure side of the vacuum pump and the control (60) marked WIPER and EXHAUST, is on the right-hand side of the cockpit, forward of the second pilot's throttle quadrant. The speed of operation is regulated by a small screw on the body of the windscreen wiper.

31. **Pilot's seat.**—The seat can be adjusted for height by a lever to the left of it.

32. **Second pilot's seat.**—The seat is stowed on the starboard side of the hull and when used should be locked in position to avoid collapse in a rough water take-off. A bar foot rest is stowed below the seat. The back rest is supported by a bar dropped from the starboard side. Dual controls can be fitted, but are not normally carried.

33. **Pilot's relief tube.**—This is clipped to the bulkhead at the back of the pilot's seat.

34. **Direct vision panels.**—A panel, opening outwards, is provided on each side of the windscreen.

35. **Entrances.**—Normal entry is made through the rear gunners hatch, which is opened by the key stowed on top of the hull forward of the hatch on the port side. The navigator's starboard window may also be used, but care must be taken when using this entrance if the engine is running.

36. **Fire-extinguisher.**—The pushbutton (30) for operating the Graviner system is on the left-hand side of the instrument panel.

37. **Signal pistol.**—A Very pistol is stowed on the right-hand side of the pilot's seat and there is a stowage for cartridges on the right-hand side of the cockpit.

38. **Navigation and recognition lights.**—The ON-OFF switches (37) for the navigation and recognition lights are on the left-hand side of the instrument panel. The recognition light selector switch (9) and signalling switch-box are at the bottom of the instrument panel.

WATER EQUIPMENT

39. **Water rudder control.**—The control lever (51) on the left-hand side of the cockpit moves in a quadrant marked IN (forward) and OUT (aft). Care must be taken to avoid knocking it out of the gate.

40. **Towing release.**—This (62) is normally on the coaming on the starboard windscreen above the second pilot's throttle quadrant, but on some aircraft it is on the throttle quadrant itself.

41. **Drogues.**—A drogue is stowed on each side of the hull, immediately aft of the rear hatch, in a circular metal container. Before throwing drogues overboard make sure that the trip lines are secured to the cleats at each side of the hull on the floor of the rear hatch; otherwise, recovery will be difficult. The drogue securing line is fitted with a metal ball which is slipped into a slot in the vicinity of the rear footsteps, on the port or starboard side of the hull.

PART II

HANDLING

42. **Management of fuel system**

Take-off on both tanks. If an auxiliary tank is fitted fly on port tank only until about 30 gallons remain, then turn on to starboard tank and turn port tank off. Turn on delivery cock (to port of navigator) and immersed pump (switch above his head). This will transfer all the fuel from the auxiliary tank to the port tank in 18 minutes. Turn off delivery cock and switch off immersed pump. Turn on port tank and continue flight on both tanks.

43. **Preliminaries**

Check for correct spread.

On entering the cockpit check the following:

Ignition switches	OFF
Undercarriage selector lever	LOWER
Undercarriage indicator switch	ON
Flaps	UP
Water rudder	OUT

Check flying controls, and rudder pedal adjustment.
Check contents of fuel tanks.
See that the forward hatch is locked.
Check that battery is connected and switch ON generator.
Turn on air cylinder cock.

44. **Starting the engine and warming up**

Have engine turned through 3 revolutions by hand, then:

(i) *Set the engine controls as follows:*

Fuel cock levers	ON
Throttle	½ inch open
Mixture control	NORMAL
Propeller control	Fully forward
Carburettor air-intake control ..	COLD AIR

(ii) Instruct the starting crew to prime the engine. If an external priming connection is fitted, high volatility fuel (Stores Ref.: 34A/111) should be used for priming at air temperatures below freezing.

The following number of strokes should be given:

Air temperature °C.	+30	+20	+10	0	−10	−20
Normal fuel ..	2	3	4	8		
H.V. fuel ..				3	8	10

(iii) The starting crew will then energize the inertia starter with the starting handle and engage the clutch.

(iv) As soon as the clutch is engaged and the starting crew shout " Contact ", switch ON the ignition.

(v) Open up slowly to 1,000 r.p.m., and warm up at this speed. It is easy to lift the tail if the throttle is opened too far.

45. **Testing the engine and installations**

While warming up:

(i) Make the usual checks of temperatures and pressures, and test each magneto as a precautionary check.
Test operation of the flaps.

After warming up, with three men on the tail:

NOTE.—The following comprehensive checks should be carried out after repair, inspection other than daily, or otherwise at the pilot's discretion. On airfields they may be reduced in accordance with local instructions.

(ii) Open up to maximum weak continuous boost (but with the mixture lever at NORMAL) and exercise and check operation of the propeller.

(iii) Open the throttle fully and check take-off boost and static r.p.m., using the automatic boost control cut-out only if 90 octane fuel or higher is being used.

(iv) Throttle back to maximum rich continuous boost and test each magneto in turn. The drop should not exceed 100 r.p.m.

46. **Taxying**

(i) *Land operation.*—With an amphibian of the Sea Otter type it is necessary to take special care when taxying across wind owing to the possibility of the wing floats touching the ground. When taxying across a wind exceeding 25–30 m.p.h., it may be necessary to have two men holding on to the up wind float.

(ii) *Water operation.*—On leaving the slipway and becoming water-borne, engage the water rudder. This must be disengaged prior to take-off, and may be used for water taxying only. This aircraft has a pronounced tendency to weathercock. When taxying, the control column should be held well back in order to reduce the amount of water coming over the cabin, also to keep the rudder well submerged. It is advisable to use plenty of engine when changing direction out of wind.

47. **Check list before take-off**

T —Trimming tabs	..	Elevator: 2 dvs. nose up Rudder: neutral.
M—Mixture control	..	NORMAL.
P —Propeller control	..	Fully forward.
F —Fuel	..	Check contents gauges and both cocks ON (fully back).
F —Flaps	..	UP.
Carburettor air-intake	..	COLD AIR.
Boost control cut-out	..	Fully forward (*See* para. 58 (iii)).
Water rudder ..	..	OUT.
Undercarriage ..	..	RAISE (Water take-off).

48. **Take-off**

(i) *Land operation:*

(*a*) Move forward to get the tailwheel straight.

(*b*) Release brakes, open the throttle steadily to take-off boost.

(*c*) Move the control column slightly forward in order to raise the tail and then ease progressively backward until airborne.

(ii) *Water operation (wheels locked up):*

(*a*) *Calm water.*—(At the maximum overload weight of 10,250 lb. the run is long.)

(i) Open the throttle to take-off boost.
(ii) Hold the control column well back.
(iii) Use left aileron as necessary to bring starboard float out of the water as soon as possible.
(iv) As the aircraft rises on to the step ease the control column forward (but do not push it).
(v) There may be a tendency to porpoise at 45 knots I.A.S. which can be corrected by easing the control column forward. The aircraft should be eased off at 70–75 knots I.A.S. (overload).

(*b*) *Rough water or swell.*—(Maximum weight for take-off 9,250 lb.) If hydroplaning is impossible hold the control column well back until the aircraft is thrown off. If porpoising develops, throttle back immediately.
Owing to torque, it is a help to take-off with wind slightly on starboard bow.

(iii) *Catapulting:*

(*a*) *At normal load* (9,250 *lb.*):

(i) Elevator trimming tab: 2 dvs. nose up.
(ii) Flaps up.
(iii) Propeller control fully forward.
(iv) Automatic boost control cut-out fully forward.
(v) Throttle fully forward (friction nut tight).
(vi) Control column slightly back from vertical (but not right back).

(*b*) *At maximum overload* (10,250 *lb.*):

(i) Elevator trimming tab: 3 dvs. nose up.
(ii) Flaps 20° down. This setting is obtained by inserting wooden wedges at the flap hinge points, or, if Mod. 116 is incorporated, by operating the spring-loaded pawls fitted at the hinge points.
(iii) Propeller control fully forward.
(iv) Throttle fully forward (friction nut tight).
(v) Control column right back.

NOTE.—Ensure that the water rudder is disengaged.

49. **Climbing**

(i) Before reducing r.p.m. return the automatic boost control cut-out to normal.

(ii) The speed for maximum rate of climb is 78 knots I.A.S. from sea-level to 4,000 ft. reducing speed by one knot per 3,000 ft. above that height.

50. **General flying**

(i) *Stability.*—The aircraft is stable about all axes, but there is a pendulum effect due to the high. thrust line and centre of pressure in relation to the C. G. This will result in a noticeable reaction in bumpy weather, particularly at heavy loads or when the throttle is opened or closed. It also necessitates careful use of the rudder to make correct turns.

(ii) *Controls.*—The ailerons are very light and the rudder is very sensitive at full throttle.

(iii) *Change of trim:*

Undercarriage down	..	Slightly nose down.
Flaps down	.. ..	Nose down.

(iv) In bad visibility near the ground, propeller should be set to give 2,400 r.p.m. when speed may be reduced to 80 knots. Excellent clear vision panels are provided on both sides of the windscreen.

(v) Undercarriage should always be locked up except for circuits and landings on an aerodrome.

51. **Stalling**

(i) With flaps and undercarriage up there is no warning of the approach of a stall, but with flaps and undercarriage down there is considerable shuddering of the tail surfaces at about 70 knots I.A.S. The stall is gentle and recovery normal.

(ii) *Stalling speeds at* 10,250 *lb.:*

Flaps and undercarriage up	..	63 knots I.A.S.
Flaps down undercarriage up or down		54 knots I.A.S.

52. **Diving.**—It is necessary to trim the aircraft slightly into and out of a dive.

53. **Check list before landing**

(i) *On entering the circuit:*

U—Undercarriage	Land—LOWER. Water—RAISE. (During the final approach a visual check should be made in addition to operating the handpump again until resistance is felt.)
M—Mixture control ..	NORMAL.
Automatic boost control cut-out	Fully forward.
P—Propeller speed control	Fully forward.
Carburettor air-intake	COLD AIR.
F—Flaps	UP or DOWN.
Water rudder	OUT.

(ii) *Approach and landing:*

Land operation:

Engine assisted (flaps down)	75 knots I.A.S.
Glide (flaps up)	85 knots I.A.S.

NOTE.—On early aircraft not fitted with extended chord elevator trimming tabs it will be difficult to get the tail down when landing from a flapless glide.

Water operation:

(*a*) *Normal engine assisted—Calm sea.*—Carry out an engine-assisted approach at 80 knots I.A.S. straight into wind if possible. Hold off normally and when the aircraft is planing on the step, ease the throttle right back and centralize control column.

(*b*) *Landing at Night or in bad visibility.*—Lower the flaps at about 500 ft., reduce speed to 62 to 65 knots I.A.S. and adjust throttle to maintain a rate of descent of 200 ft./min. Close throttle on touching the water.

(*c*) *Landing in a rough sea.*—Carry out a normal engine-assisted approach as in calm sea conditions. Check rate of descent earlier than normal and allow the aircraft to sink on to the selected patch of water in an exaggerated tail

down attitude at as low a forward speed as possible, using engine to control rate of descent and to maintain the tail down attitude. Close throttle and ease control column back immediately before touching down.

NOTE.—The sea is never so calm as it appears from 1,000 feet, and it is, therefore, recommended that the rough sea landing technique be used for all daylight approaches.

(*d*) *Recovery.*—Recovery should normally be effected by the towed net method. In rough weather, however, the aircraft may become unhooked from the mesh of the net. A responsible person should be stationed to watch for such an eventuality, and give the pilot immediate warning, so that he can avoid fouling the crane hook with the propeller. The rear entrance hatch should be closed behind the air gunner after he has proceeded to the slinging position, to avoid shipping water.

With the towed pendant method the observer must be stationed in the open front cockpit with the consequent risk of shipping a large amount of water in heavy seas.

54. **Mislanding**

(i) The aircraft will climb away easily at +4 lb./sq.in. boost with flaps and undercarriage down at 70 knots I.A.S.

(ii) Raise the flaps at 300 ft. and re-trim. The undercarriage may conveniently be left down while completing the circuit.

NOTE.—Opening the throttle results in a nose heavy change of trim.

55. **After landing**

Raise the flaps before taxying.

Water operation:

The water rudder should be engaged only after alighting and disengaged before beaching. (Disengage when wheels touch slipway but keep it engaged till last possible moment.)

(*a*) *Using slipway.*—Both undercarriage down-locks can be heard engaging and pilots should use this check when pumping wheels down.

(*b*) *Picking up moorings.*—Approach the buoy into wind at low r.p.m. with wheels *and* flaps down. In this way a sufficiently slow approach can be made (blipping the switches, if necessary) in almost any conditions without having to use drogues. In a strong wind the aircraft can be "sailed" backwards (in this case the water rudder must be disengaged).

56. **Stopping engine**

(i) Run the engine at 800–900 r.p.m., for a minute and then pull up the slow-running cut-out control.

(ii) Switch OFF the ignition, turn OFF fuel cocks.

(iii) *Oil dilution:* (*See* A.P. 2095.)
The correct dilution period for this aircraft is 4 minutes.

57. **Wing folding**

(*a*) Lock the flying controls and brakes on.

(*b*) Release the flaps, pull the top ones down, push the lower ones up.

(*c*) With two men at each wing-tip float, release first the upper mainplane locking bolt, and then release the lower mainplane.

(*d*) When the wings are folded, a button on the rear of each wing-tip float locks into a catch at the aft end of the hull. Releases for these catches are operated by remote control toggles, which are fitted under each side of the coaming aft of the rear hatch.

PART III

OPERATING DATA

58. **Engine data—Mercury 30**

(i) *Fuel.*—87 octane or higher.

(ii) *Oil.*—See relevant Admiralty Fleet Order.

(iii) *Engine limitations:*

	R.p.m.	Boost lb./sq.in.	Temp. °C. Cyl.	Temp. °C. Oil
MAX. TAKE-OFF TO 1,000 FEET	2,750	+4½(+6¾)	—	—
MAX. CLIMBING 1 HR. LIMIT	2,400	+4½	210	90
MAX. RICH CONTINUOUS ..	2,400	+2¾	190	90
MAX. WEAK CONTINUOUS ..	2,400	+½	190	90
COMBAT 5 MINS. LIMIT ..	2,750	+4½(+6¾)	235	100

NOTE.—The figure in brackets is permitted only when using 90 octane fuel or higher. The higher boost is obtained by operating the automatic boost control cut-out.

OIL PRESSURE:	
NORMAL	80 lb./sq.in.
MINIMUM	70 lb./sq.in.
MINM. OIL TEMP. FOR TAKE-OFF ..	5°C.
FUEL PRESSURE	2½–3 lb./sq.in.

(iv) *Use of cold and warm air-intake:*

(*a*) *Warm intake should be used:*

(i) For all flying at less than $+2\frac{3}{4}$ lb./sq.in. boost, unless the atmospheric temperature exceeds $+25°$C. when cold air should be used irrespective of boost.

(ii) For all flying (irrespective of boost and atmospheric temperature) in conditions of high humidity, in or just below clouds, and in rain, snow or sleet. (Warm air may be used for warming up in very cold weather.)

(*b*) *Cold intake should be used for all other conditions including:*

(i) Engine starting at all times.

(ii) Take-off.

(iii) Landing, except in conditions as at (*a*) (ii).

59. **Flying limitations**

(i) The aircraft is designed for manœuvres appropriate to an amphibian reconnaissance bomber and care must be taken to avoid imposing excessive loads in recovery from dives and turns at high speeds. Spinning and aerobatics are not permitted.

(ii) *Maximum speeds:*

Diving	240 knots I.A.S.
Wheels down	100 knots I.A.S.
Flaps down	90 knots I.A.S.

(iii) *Maximum weights:*

Maximum permissible weight for all forms of flying, and for rough water take-offs and landings	9,250 lb.
Maximum permissible overload weight ..	10,250 lb.

(iv) The angle of dive must at no time exceed 30°.

(v) *Position error corrections:*

Position error correction is less than 1 knot at all speeds.

60. **Maximum performance**

The speed for maximum rate of climb is 78 knots I.A.S. from sea-level to 4,000 ft., reducing speed by 1 knot per 3,000 ft. above that height.

61. **Economical flying**

(i) *Climbing.*—Climb as for Maximum Performance.

(ii) (*a*) *Cruising.*—Use the hot air-intake unless the atmospheric temperature exceeds 25°C. Fly in weak mixture at $+\frac{1}{2}$ lb./sq.in. boost and adjust r.p.m. to give the recommended speed of 85 knots I.A.S. If, for reasons of control, speed has to be increased above this, use the lowest possible speed.

(*b*) *When carrying* 4×250 lb. *bombs:*

Fly in weak mixture at $+\frac{1}{2}$ lb./sq.in. boost and 2,400 r.p.m. As fuel is used up it may become possible to reduce r.p.m. below 2,400 to maintain the recommended speed of 90–95 knots I.A.S. This will improve economy.

(*c*) *After dropping bombs.*—Fly in weak mixture at $+\frac{1}{2}$ lb./sq.in. boost or full throttle and adjust r.p.m. to obtain a speed of 85 knots I.A.S.

62. **Fuel capacity and consumptions**

(i) *Capacity:*

Port main tank	104 gallons
Starboard main tank	104 gallons
Auxiliary tank (if fitted)	60 gallons
Total ..	268 gallons

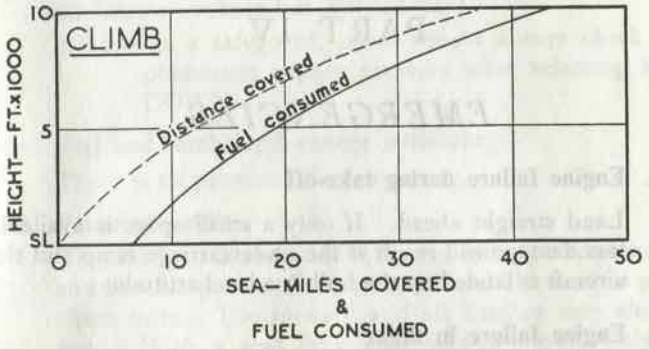
(ii) *Consumptions:*

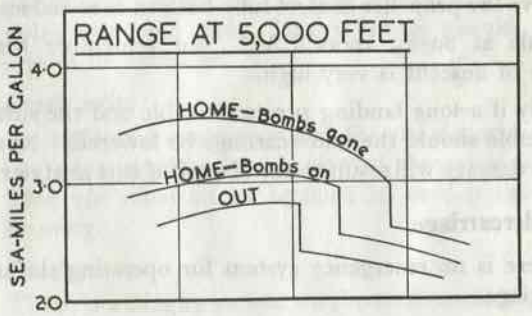
(*a*) *Weak mixture* (at 10,000 feet):

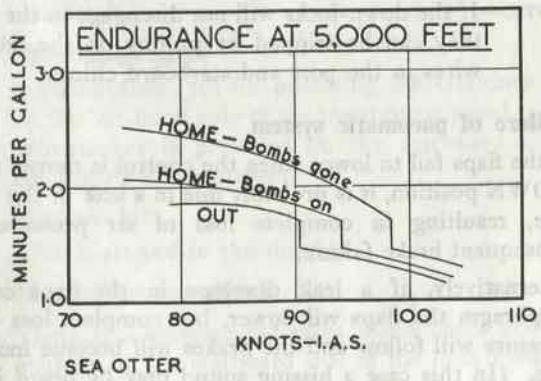
Boost lb./sq.in.	R.P.M.			
	2,400	2,200	2,000	1,900
$+\frac{1}{2}$	36	33	30	29
0	34	32	29	28
−1	32	30	28	27
−2	30	28	26	25
−3	28	26	24	23

(*b*) *Rich mixture:*

Boost lb./sq.in.	R.P.M.	
	2,750	2,400
$+4\frac{1}{4}$	70	—
$+2\frac{3}{4}$	—	60







PART IV

EMERGENCIES

63. **Engine failure during take-off**

Land straight ahead. If only a small space is available less damage will result if the undercarriage is up and the aircraft is landed on the hull in a level attitude.

64. **Engine failure in flight**

(i) Move the propeller control fully back so as to reduce drag.

(ii) Glide at 80–85 knots I.A.S., but remember that the rate of descent is very high.

(iii) Only if a long landing run is available and the surface is suitable should the undercarriage be lowered. Normally less damage will result to the aircraft if it is kept retracted.

65. **Undercarriage**

There is no emergency system for operating the undercarriage.

NOTE.—If the down-locks will not disengage in the water they can be tripped by pulling on the tripping wires in the port and starboard chines.

66. **Failure of pneumatic system**

(i) If the flaps fail to lower when the control is moved to the DOWN position, it is probably due to a leak in the pipeline, resulting in complete loss of air pressure and consequent brake failure.

(ii) Alternatively, if a leak develops in the flaps control diaphragm the flaps will lower, but complete loss of air pressure will follow and the brakes will become inoperative. (In this case a hissing sound may be heard in the cockpit after selecting flaps DOWN.)

(iii) In either case the flaps control should immediately be returned to the UP position in order to allow sufficient pressure to build up, so that a landing can be made with the brakes working but without flaps.

NOTE.—As a safeguard, pilots should always check the pneumatic supply pressure after selecting flaps DOWN.

67. **Fuel and bomb/depth-charge jettisoning**

There is no provision for jettisoning.

68. **Parachute exits**

The windows in each side of the navigator's compartment and the side panels of the cockpit should be used as parachute exits. The forward and aft hatches may also be used. With a seat type parachute it would only be possible to get out by the side panels of the cockpit by going out head first. Undercarriage should, therefore, always be retracted.

69. **Crash exits**

An additional emergency exit for ground or water borne use is the panel in the cockpit roof above the pilot's head. This exit must on no account be used if the engine is running.

70. **Dinghy**

There is a dinghy stowed on the starboard side, aft of the rear hatch.

71. **Fire-extinguishers**

A pushbutton (30) for operating the Graviner system is on the left-hand side of the instrument panel. A manual extinguisher is provided on the starboard side of the navigator's compartment.

72. **First-aid kit**

This is stowed in the dinghy.

73. **Marine distress signals**

There is a stowage for eight flame floats and eight sea markers on the starboard side of the hull, forward of the mainplane.

PART V
ILLUSTRATIONS

KEY TO *Fig. 1*

COCKPIT—
INSTRUMENT PANEL

1. Control column.
2. Boost cut-out control.
3. Navigation lamp dimmer switch.
4. Landing lamp switch.
5. Compass lamp dimmer switches.
6. } Cockpit lamp dimmer switches.
7. }
8. Flaps control.
9. Recognition lamp switch.
10. Pressure head heater switch.
11. Windscreen wiper.
12. Instrument flying panel.
13. Bomb selector switches.
14. Bomb fusing switches.
15. Indicator master switch and ignition switches.
16. Air temperature gauge.
17. Engine-speed indicator.
18. Boost pressure gauge.
19. Fuel contents gauge (port tank).
20. Fuel contents gauge (starboard tank).
21. Oil temperature gauge.
22. Cylinder temperature gauge.
23. Oil dilution pushbutton.
24. Formation lamp switchbox.
25. Identification lamp switchbox.
26. Oil pressure gauge.
27. Downward identification lamps selector switch
28. Control-locking-gear lug.
29. P.4A compass.
30. Fire-extinguisher pushbutton.
31. Undercarriage indicator.
32. Control-locking-gear strut stowage.
33. Triple air-pressure gauge.
34. I.F.F. Radio distress switch.
35. I.F.F. Radio ON/OFF switch.
36. Elevator trimming-tab indicator.
37. Navigation lamp switches.

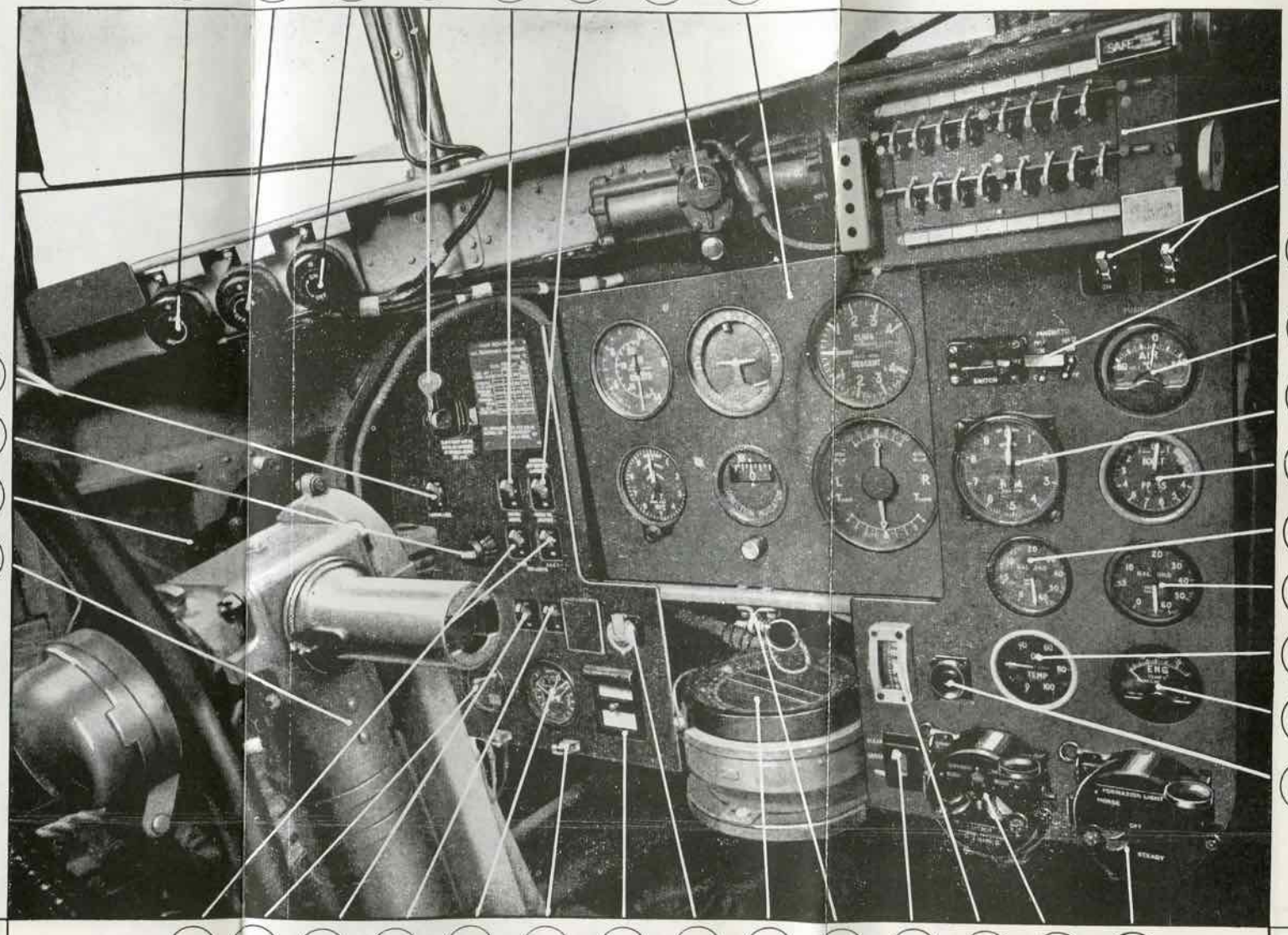


FIG 1

COCKPIT - INSTRUMENT PANEL

FIG 1

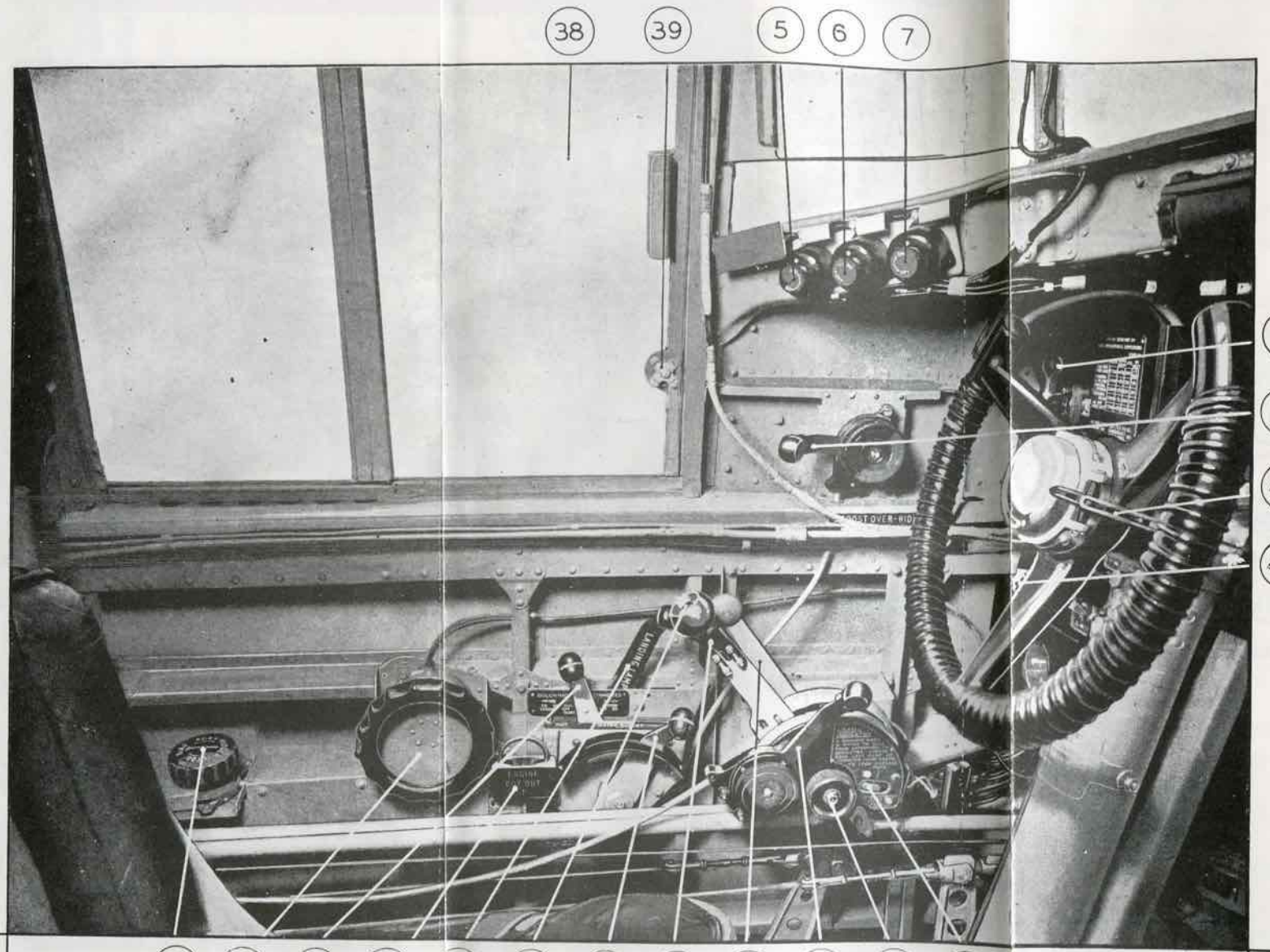


FIG 2

COCKPIT-PORT SIDE

FIG 2

KEY TO *Fig. 2*

COCKPIT— PORT SIDE

2. Boost control cut-out.
5. Compass lamp dimmer switch.
6. } Cockpit lamp dimmer
7. } switches.
8. Flaps control.
38. Sliding window.
39. Sliding window lock.
40. Wheel brake lever.
41. Radio switch.
42. Warning horn pushbutton.
43. Friction damper.
44. Propeller control.
45. Mixture control.
46. Throttle control.
47. Air-intake shutter control.
48. Bomb release.
49. Landing lamp control.
50. Cut-out slow-running control.
51. Water-rudder control.
52. Elevator trimmer control.
53. Rudder trimmer control.

KEY TO *Fig. 3*

COCKPIT—
STARBOARD SIDE

13. Bomb selector switches.
23. Oil dilution pushbutton.
39. Sliding window lock.
40. Wheel brake lever.
54. Speaking tubes.
55. Second pilot's throttle linkage.
56. Flares isolating switch.
57. Generator switch.
58. Automatic bomb distributor, Mk. VI.
59. Mic-Tel socket.
60. Windscreen wiper ON/OFF cock.
61. Second-pilot's throttle lever.
62. Towing bridle release lever.
63. Second-pilot's seat (stowed position).
64. Map stowage.
65. Second-pilot's foot rest.
66. Stowage clips for (65).
67. Aldis lamp and stowage.
68. Second-pilot's rudder pedal bearing.
69. Undercarriage handpump.
70. Rudder pedal.

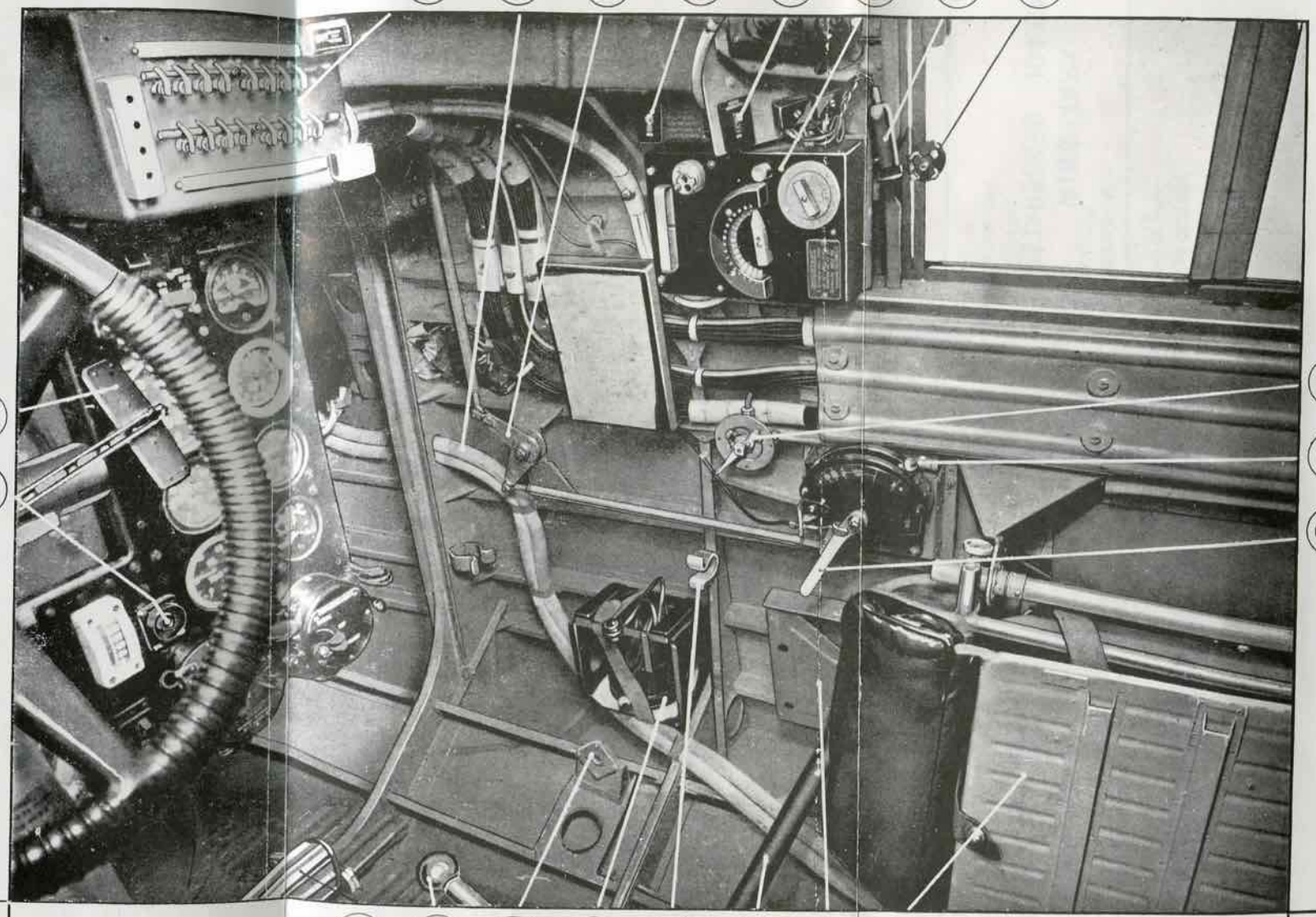


FIG 3

COCKPIT-STARBOARD SIDE

FIG 3

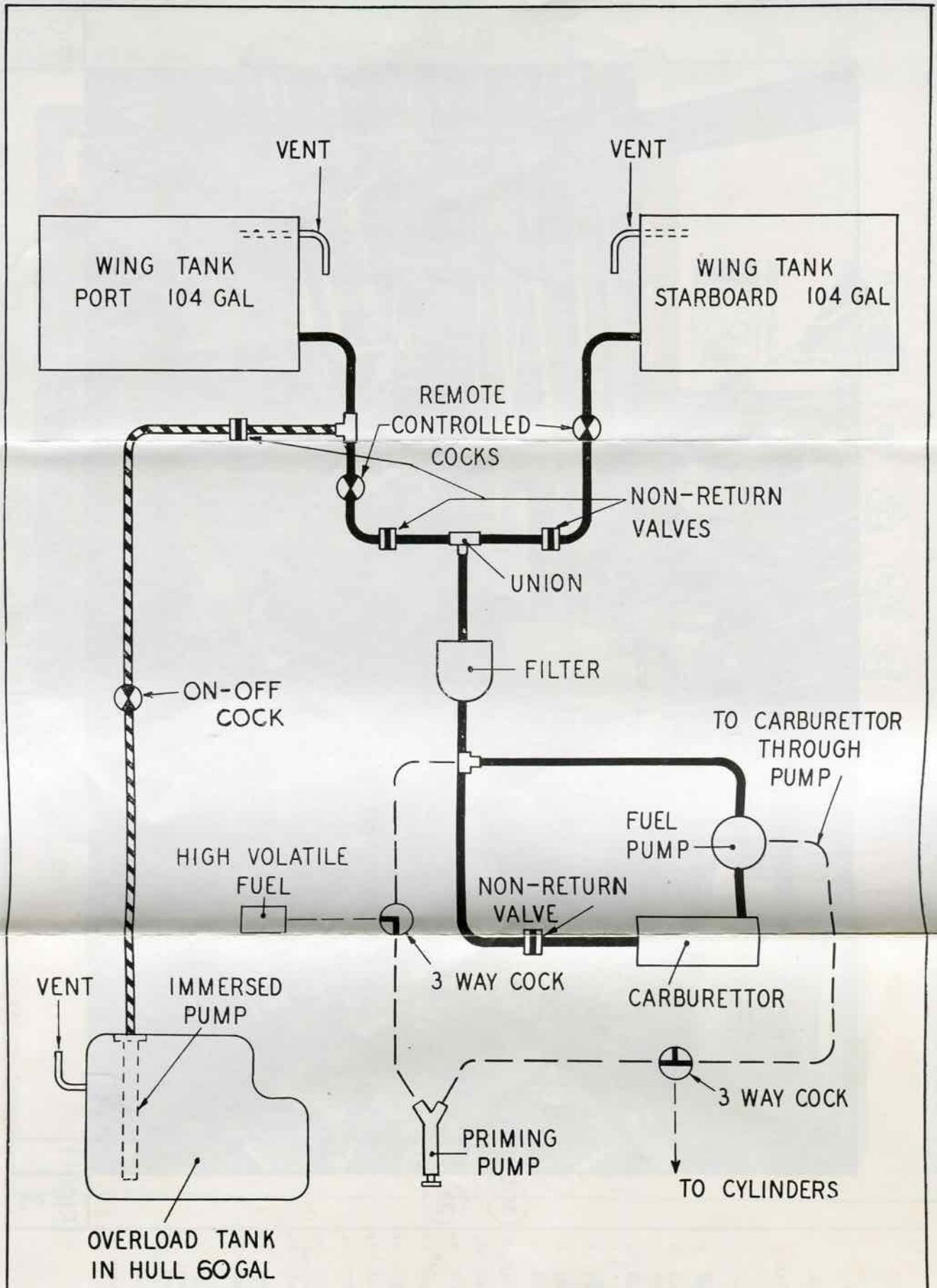


FIG 4

FUEL SYSTEM DIAGRAM

FIG 4