Sgt. Monaghan. N.
Flt. Lt. P. Cooney
Sgt Collins B.A

RESTRICTED

R.A.A.F. PUBLICATION No. 839
(September, 1950)

PILOT'S NOTES

FOR

VAMPIRE Mk.30

Nene II V.H. (Aust.) Engine

ISSUED FOR THE INFORMATION AND GUIDANCE OF ALL CONCERNED.

By Command of the Air Board,

Secretary

AIR FORCE HEAD-QUARTERS,
MELBOURNE, S.C.1

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The Amendments promulgated in the undermentioned Amendment Lists have been made in this publication.

Amendment List		Amendments made by	Date
No.	Date		
1	20/9/51	SGT MONAGHAN. N Monaghan.	12-1-52.
2			
3		Peterson	9.6.53

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.

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

VAMPIRE MK. 30 - PILOT'S NOTES

LIST OF CONTENTS

PART I - DESCRIPTIVE

PART II - HANDLING

NOMENCLATURE:

R.A.A.F. SERIAL NO. A79 -

Manufacturer	:	De Havilland Aust. Pty. Ltd.
Purpose	:	Interceptor fighter.
Type	:	Single engine, single seat, twin-boom mid-wing monoplane.

AIRFRAME:

Span	:	40 feet.
Length	:	30 ft. 9 in.
Height	:	8 ft. 10 in.
Track	:	11 ft. 3 in.
Gross Wing Areas	:	266 sq. ft.

C.G. DATA:

See paragraph 52 - Weight and Balance.

POWER PLANT:

Type	:	Rolls Royce Nene 11 - V.H. (Aus.) gas turbine.
Rated Power	:	5000 lb. static thrust at sea level.
Weight (dry)	:	1606 lb.
Fuel	:	Turbine fuel.

ARMAMENT:

Four (4) 20 mm. cannon, located in the nose.

VAMPIRE MK.30 - PILOT'S NOTES

PART I - DESCRIPTIVE

INTRODUCTION

1. The Vampire Mk.30 is a single seat, twin-boom fighter powered by one Nene II - V.H. (Aus.) gas turbine jet engine. It is fitted with a pressure cabin and armed with four 20 mm. guns.

FUEL AND OIL SYSTEMS

2. *Fuel Tanks:*

(a) Nine permanent self-sealing tanks are fitted, one of rigid metal type in the centre fuselage and four semi-rigid Marston bag type in each wing.

The tank capacities are :-

Centre Fuselage Tank	96 gals.
Inner Wing Tanks (52 gals. each)	104 gals.
Leading Edge and Outboard Wing Tanks (65 gals. of each group)	130 gals.
Total Contents	330 gals.
Total with 2 x 100 gals. drop tanks	530 gals.

Note: Due to design of the fuel system, residual fuel to the extent of approximately 30 gallons of the wing tank capacity is not available to the engine with the aircraft in cruising and low speed level flight conditions. This is to be taken into consideration when planning for operational and long range flights. Most of this fuel becomes available for taxying, after landing, when the aircraft's attitude is at zero incidence. (See Notes in paragraph 56.)

(b) The fuel from all tanks passes to a collector box incorporating a negative "g" valve which affords a fuel supply for approximately 15 seconds inverted flight. The tanks, which are not pressurised, are vented to atmosphere. A satisfactory delivery pressure at altitude is ensured by a booster pump incorporated in the negative "g" valve in the collector box. Non-return valves are placed between the fuselage tank and the inner wing tanks, and also between the inner wing tanks, and leading edge and outboard tanks, so that the inner wing tanks and/or the fuselage tank can be filled without filling the other tanks.

Fuel from the drop tanks is fed automatically into the fuselage tank by air pressure drawn from the compressor casing. A float valve is incorporated in the fuselage tank and this tank is continually replenished until the drop tanks are emptied.

(c) Fuel passes from the collector box, through a low pressure cock and a filter, to a pair of engine-driven (high pressure) pumps, either of which is capable of maintaining 85% of maximum thrust in the event of failure of the other. The pump delivery is governed by a Barometric Pressure control valve which is a capsule operated device functioning according to pump pressure and nacelle pressure, thus providing a fuel supply which will maintain the engine R.P.M. substantially constant, corresponding to the throttle setting selected by the pilot, irrespective of speed or altitude.

"(d) When the FUEL PUMP EMERGENCY switch (55) on the main electrical panel is switched ON, it operates a solenoid which closes an isolating valve and the two fuel pumps are isolated from each other so that one pump capable of maximum delivery remains available if the other fails. If the upper fuel pump fails with the FUEL PUMP EMERGENCY switch ON, the lower pump is controlled normally by the Barometric Pressure Control Unit.

AL2.

If the lower pump fails, with the FUEL PUMP EMERGENCY switch ON, the upper pump will be isolated from the B.P.C.U. as well as from the lower pump and the engine must be controlled manually by the throttle for changes of altitude and speed. If failure of the B.P.C.U. occurs with the Fuel Pump Emergency switch on, the upper pump is again isolated from the lower pump and the faulty B.P.C.U. This condition is similar to failure of the lower pump, i.e., the upper pump will function at maximum capacity and the engine must be controlled manually by the throttle for changes of altitude and speed. It is not possible with only one pump in operation to obtain maximum engine revolutions as under these conditions only 85% of maximum thrust is obtainable at sea-level, with attendant revolutions.".

3. *Fuel Gauges:*

Contents gauges.

Five fuel contents gauges (43) are mounted below the centre instrument panel. The top left and right-hand gauges represent the contents of the inner port and starboard wing tanks respectively; the lower left and right-hand gauges represent the outer port and starboard sets of tanks and the centre gauge the fuselage tank. The gauges will indicate the contents of their respective tanks when the MASTER SWITCH (21) is at FLIGHT, and the aircraft datum is horizontal (at normal cruising speed this involves a descending flight path of about 5 deg. to the horizontal). In level cruising flight (nose-up 5 deg.) the gauges will read slightly low with a maximum error of about 20 gallons when the whole system contains about 100 gallons.

Owing to restrictions on the movement of the float arms in the tanks, with gauges showing zero or their maximum readings, datum horizontal, the actual usable contents of the tanks are indeterminate within the following limits:-

Gauge at zero - between 0 and 31 gallons available.
Gauge at maximum reading - between 284 and 314 gallons available.

There are no gauges for the drop tanks but transfer will commence when the fuselage tank gauge reads approximately (55) gallons and this gauge will remain at a constant reading during the transfer of fuel, and then again show a drop in fuel level after the drop tanks have been emptied.

4. *Fuel Booster Pump:*

(a) The booster pump in the collector box is of the submerged type and is located in the centre fuselage tank. It is controlled by a FUEL PRESSURE circuit breaker located on the main electrical panel. This pump maintains a supply of solid fuel up to an altitude of 50,000 feet.

(b) A fuel pressure warning switch is fitted on the engine, and when the fuel delivery pressure falls below 3 lb./sq. in. a Fuel Pressure Warning Light (24) mounted on the top centre instrument panel is operated. When the booster pump is switched "ON", the warning light should go out. The light will be on at all times when the booster pump is switched "OFF". If the warning light comes on above 20,000 ft. with the booster pump switched "ON", height should be reduced below this altitude

AUSTRALIAN AIR PUB

as quickly as possible. Below 20,000 ft. the booster pump is not essential to maintain adequate fuel pressure to the engine, and flight may be continued safely.

5. *Fuel Cocks:*

(a) The low pressure fuel cock is controlled by a lever (15) which is mounted under the engine control box on the left-hand cockpit wall. It has two positions marked fuel "OFF" (down and back) and fuel "ON" (forward and up). The high pressure fuel cock is controlled by a lever (6) mounted outboard of the throttle lever, which must be moved forward for fuel "ON" and back for fuel "OFF". It is held in the forward position by a spring catch. There are no separate fuel cocks for the wing drop tanks.

(b) *Jettisoning of Wing Drop Tanks:*

Both wing drop tanks can be jettisoned by pulling up the lever marked Jettison-Fuel Tanks positioned on the left of the pilot's seat. (See paragraph 51 (b)(iii)).

6. *Oil System:*

(a) There is no oil tank, but the power unit has a sump of about 10 pints capacity, for lubrication of the engine driven accessories and of engine bearings. Oil is also to be put into the accessory gear box, which is accessible through a small removable plate on top of the fuselage just rear of the canopy. The oil consumption at all powers should not exceed one pint per hour.

(b) The oil pressure gauge (44) is fitted on the left hand side of the instrument panel. It records the main oil pump pressure, which should be a minimum of 3 lb./sq. in. for idling and usually ~~20 lb./sq. in.~~ 35-40 lbs /□" for flight.

AL2.

(c) An OIL TEMP. gauge (48) is fitted on the left-hand side of the instrument panel. It records the temperature of the oil at the oil gallery before being distributed to the three main shaft bearings and the fuel pump drives. This temperature must not exceed 80 deg. C. The minimum for opening up is - 40 deg. C.

MAIN SERVICES

7. *Pneumatic System:*

(a) An engine-driven compressor charges a bottle for operation of the brakes. The triple pressure gauge (38) on the right-hand side of the instrument panel, shows the available pneumatic pressure; this should normally be 450 lb./sq. in. and should give a pressure at each brake of 120 lb./sq. in. This pressure which may be up to 150 lb./sq. in. will be available even though the pressure in the bottle falls to the same value.

(b) An engine-driven vacuum pump operates the instrument flying panel. A suction gauge (35) is fitted on the right-hand side of the instrument panel and should normally record 4-4½ in. Hg.

8. *Electrical System:*

(a) An engine-driven 24-volt generator charges two 12-volt batteries connected in series. These in turn supply the whole of the electrical system except the automatic engine starting system, which must be energized by an external battery cart.

(b) The generator main circuit is protected by a fuse fitted in the voltage Regulator Panel and all other circuits are protected by thermal overload circuit breakers mounted in the main electrical panel on the starboard cockpit wall, with the exception of the GENERATOR WARNING LIGHT circuit breaker, which is mounted in the junction box on the engine bulkhead and the BATTERY MAIN circuit breaker mounted on the port rib No. 1 (accessible through the oil filter door in bottom cowling).

(c) All those circuit breakers which are protected by metal guard rails on the inboard face of the main electrical panel, the GENERATOR WARNING LIGHT, the BATTERY MAIN circuit breakers (see (b)) and the GENERATOR FIELD SWITCH (66) are intended to be switched "ON" (down) and left in this position indefinitely.

(d) A generator warning light (31) is mounted on the top right-hand side of the instrument panel. The warning light indicates when the generator is not charging the batteries. It is wired directly to the batteries and will therefore, be on continuously, irrespective of the position of the MASTER SWITCH (21), whilst the engine is not running or is idling below 5000 R.P.M.

(e) A MASTER SWITCH (21), with GROUND and FLIGHT positions, is fitted on the left-hand cockpit wall. Two external sockets are fitted in the port inner flap shroud. The forward socket is for normal ground test purposes and is marked TEST SOCKET. The rear socket is marked STARTER SOCKET and is wired only to the automatic engine starting system.

(i) When the MASTER SWITCH is set to Ground:
The electrical services are isolated from the generator and aircraft batteries; the system (except the automatic starter) can be connected to a ground battery if this is plugged in to the forward socket.

(ii) When the MASTER SWITCH is set to FLIGHT:
All the electrical services, except the automatic engine starting system, are connected to the aircraft batteries; the automatic engine starting system can be operated if a 240 ampere hour, 24 volt ground starter battery is plugged into the rear socket, but only if the MASTER SWITCH is at FLIGHT.

Note: ~~If an attempt has been made in Error to start the engine with the MASTER SWITCH at GROUND, the starting cycle should be terminated by the airman immediately disconnecting the external battery, either by switching it off at the battery cart or by pulling out the battery cart plug. No attempt should be made to change the master switch from Ground to Flight when the starting cycle is in operation.~~

AL.2.

9. *Hydraulic System:*

(a) Hydraulic pressure, supplied by an engine-driven pump is stored in a pressure accumulator, from which it operates the:-

Undercarriage;
Flaps;
Divebrakes;

when the appropriate selector lever is placed in the required position.

AL.2.

"(b) Sufficient pressure will be available in the accumulator for one complete one way operation of the undercarriage, or flaps or of the dive brakes, after failure of the engine-driven hydraulic pump.".

~~flaps, after failure of the engine-driven hydraulic pump.~~

(c) A handpump is provided on the left of the pilot's seat for use when accumulator pressure is not available; with the appropriate selector lever in the required position, operating the handpump will transmit hydraulic fluid direct from a reserve supply in the reservoir to the jacks (without going through the accumulator) under sufficient pressure to operate the desired service (except the dive brakes) at a reduced rate.

AIRCRAFT CONTROLS

10. *Undercarriage Control:*

(a) The undercarriage selector lever (19) is on the rear face of the engine control box, and has two positions only, UP and DOWN. When the wheels are on the ground it is locked in the DOWN position by a solenoid. The solenoid can be over-ridden to permit UP to be selected on the ground, in the case of emergency, by a switch marked U/C Emergency Retraction (18) mounted on the left-hand cockpit wall aft of the engine control box.

(b) The undercarriage position indicator (49) is on the bottom left-hand side of the instrument panel. The warning lights have dimmer screens for night flying, which should be open by daylight or indications will be too weak to be noticed.

"Push/pull action of the centre control provides alternative lights in the event of light globe failure.".

Indications are:-

Wheels locked UP	...	No lights.
Wheels between UP and DOWN	...	Three red lights.
Wheels locked DOWN	...	Three green lights.

There is a warning horn mounted behind the pilot's seat on the fuselage deck, and a red warning light (10) fitted next to the R.P.M. indicator on the left-hand instrument panel, both operating if the wheels are not locked down and the throttle is less than a quarter open.

(c) If engine-driven pump pressure is not available and the residual accumulator pressure is insufficient, the under-carriage can be raised and lowered by the handpump with the selector lever in the appropriate position.

11. *Flaps Control:*

(a) Operation of the wing flaps is controlled by the selector lever (4), marked FLAPS, next to the undercarriage selector lever. It has three positions: UP - NEUTRAL - DOWN. Any angle up to 80 deg. can be obtained by returning the selector lever to neutral when the desired angle has been reached. The selector lever will not return automatically to neutral on completion of an operation.

(b) A flaps position indicator (50) is fitted next to the undercarriage position indicator.

(c) If engine-driven pump pressure is not available, and the residual accumulator pressure is insufficient, the flaps can be operated by the handpump, with the selector lever in the appropriate position.

12. *Dive Brakes Control:*

The red-topped lever (5) fitted on the rear face of the control box has two positions only - ON and OFF. The dive brakes cannot be operated by the handpump while in the air.

On the ground the dive brakes can be operated by the handpump by manually tripping the non-return valve to be found on the rear face of No. 2 Bulkhead on the port side.

13. *Flying Controls:*

(a) The control column is of the spade-grip pattern and incorporates the brake lever, the gun firing pushbutton, the cine-camera control (which also operates the G.G.S. Camera Recorder) and a spring-load PRESS TO SPEAK switch.

(b) The rudder pedals can be adjusted for length by lifting them from one slot to another.

14. *Flying Controls Locking Gear:*

The flying controls locking gear consists of a V-shaped fitting which joins a peg in the floor, near the control column, to the port rudder pedal, and of a Y-shaped tubular fitting which joins the control column spade-grip to the coaming above the instrument panel. A stowage is fitted on the left-hand side of the pilot's seat.

15. *Elevator Trimming Tab Control:*

The elevator trimming tab control wheel (14) is on the engine control box; the indicator (23) is on the top left-hand side of the instrument panel.

16. *Wheel Brakes:*

The brake control lever and parking catch are on the control column. Differential control of the brakes is afforded by a relay valve connected to the rudder pedals.

ENGINE CONTROLS

17. *Throttle Control:*

(a) A throttle lever (8) marked SHUT - THROTTLE - OPEN, fitted in the engine control box, is the only engine control and is used to regulate power in the normal way. The lever must be operated very slowly and at a uniform rate. The friction control (7) is on the engine control box above the elevator trimming tab control wheel.

(b) A JET PIPE TEMP. gauge (51), an R.P.M. Indicator (53), an OIL TEMP gauge (48) and an oil pressure gauge (44) are mounted on the lower left-hand side of the instrument panel.

18. *Engine Starting Controls:*

An electrical starter motor is fitted and is controlled by an automatic system which is operated by the ENGINE STARTING pushbutton (75), and interlinked STARTER CIRCUIT SAFETY switches (76) on the electrical panel on the right-hand cockpit wall. This pushbutton, which should be pressed for about two seconds and then released, sets in motion the timing system which automatically controls and operates the starting sequences; it provides first a turning period sufficient for attainment of the correct R.P.M. before combustion commences, and then a further period to allow R.P.M. to build up sufficiently to ensure satisfactory running before the starter motor is cut out. If the engine fails to start or to

continue running after one sequence, the defect must be found and remedied before a second attempt is made.

Note: (a) The engine should not be re-started for four minutes after it has been shut down to enable the fuel to drain from the system.

(b) A RELIGHT SWITCH (74) is fitted on the main electrical panel which operates the torch igniters but by-passes the starting panel thus making it possible to re-start the engine in flight. (For procedure see Emergencies, paragraph 61)

AL.2

OPERATIONAL CONTROLS

"19. *Wireless Equipment:*

A TR.1520 V.H.F. set of the four channel type is installed. The control is a five-way switch located on the lower left of the instrument panel next to the 'G' switches (46). A spring-loaded "press to talk" switch (42) is mounted on top of the spade-grip of the control column.".

20. *Guns:*

(a) The selective firing push-button (12) on the control column spade grip, is fitted with a spring-loaded safety flap. When the flap is at SAFE the cine-camera and/or the gyro gun-sight camera recorder can be operated by pressing the knurled portion of the gun-firing switch. When it is set to "Fire" the guns may be operated in the following manner:-

Pressure at bottom of knurled push-button fires guns Group 2 (outer pair).

Pressure at top of knurled push-button fires gun Group 1 (inner pair).

AL.2. Pressure at centre of knurled push-button fires all guns together.

Note: G.G.S. Recorder Camera will not function unless the Cine Camera Switch is on.". provided Cine Camera Switch (59) and G.G.S. Master Switch (60) are ON.

(b) The gyro-gunsight master switch (60) is on the electrical panel, the combined dimmer and selector switch (29) is on the top right-hand side of the instrument panel, and the ranging control is incorporated in the top of the throttle lever.

(c) There is a cine-camera footage indicator (39) on the lower right-hand side of the instrument panel.

(d) The gyro-gun sight camera Recorder (27) is stowed on the right-hand side of the cockpit when not in use.

(e) Two spare filaments for the gyro gun-sight are stowed on the starboard side of the cockpit.

21. *Signalling Equipment:*

(a) The type BC.965A and BC.958A controller units (40) are fitted on the lower right-hand side of the instrument panel.

(b) The detonator for the SCR.695A is operated by a push-button (64) switch on the main electrical panel.

(c) The identification lights are controlled by an ON-OFF switch (70) and operated by a push-button (69) on the electrical panel.

12. *Dive Brakes Control:*

The red-topped lever (5) fitted on the rear face of the control box has two positions only - ON and OFF. The dive brakes cannot be operate by the handpump while in the air.

On the ground the dive brakes can be operated by the handpump by manually tripping the non-return valve to be found on the rear face of No. 2 Bulkhead on the port side.

13. *Flying Controls:*

(a) The control column is of the spade-grip pattern and incorporates the brake lever, the gun firing pushbutton, the cine-camera control (which also operates the G.G.S. Camera Recorder) and a spring-load PRESS TO SPEAK switch.

(b) The rudder pedals can be adjusted for length by lifting them from one slot to another.

14. *Flying Controls Locking Gear:*

The flying controls locking gear consists of a V-shaped fitting which joins a peg in the floor, near the control column, to the port rudder pedal, and of a Y-shaped tubular fitting which joins the control column spade-grip to the coaming above the instrument panel. A stowage is fitted on the left-hand side of the pilot's seat.

15. *Elevator Trimming Tab Control:*

The elevator trimming tab control wheel (14) is on the engine control box; the indicator (23) is on the top left-hand side of the instrument panel.

16. *Wheel Brakes:*

The brake control lever and parking catch are on the control column. Differential control of the brakes is afforded by a relay valve connected to the rudder pedals.

ENGINE CONTROLS

17. *Throttle Control:*

(a) A throttle lever (8) marked SHUT - THROTTLE - OPEN, fitted in the engine control box, is the only engine control and is used to regulate power in the normal way. The lever must be operated very slowly and at a uniform rate. The friction control (7) is on the engine control box above the elevator trimming tab control wheel.

(b) A JET PIPE TEMP. gauge (51), an R.P.M. Indicator (53), an OIL TEMP gauge (48) and an oil pressure gauge (44) are mounted on the lower left-hand side of the instrument panel.

18. *Engine Starting Controls:*

An electrical starter motor is fitted and is controlled by an automatic system which is operated by the ENGINE STARTING pushbutton (75), and interlinked STARTER CIRCUIT SAFETY switches (76) on the electrical panel on the right-hand cockpit wall. This pushbutton, which should be pressed for about two seconds and then released, sets in motion the timing system which automatically controls and operates the starting sequences; it provides first a turning period sufficient for attainment of the correct R.P.M. before combustion commences, and then a further period to allow R.P.M. to build up sufficiently to ensure satisfactory running before the starter motor is cut out. If the engine fails to start or to

continue running after one sequence, the defect must be found and remedied before a second attempt is made.

Note: (a) The engine should not be re-started for four minutes after it has been shut down to enable the fuel to drain from the system.

(b) A RELIGHT SWITCH (74) is fitted on the main electrical panel which operates the torch igniters but by-passes the starting panel thus making it possible to re-start the engine in flight. (For procedure see Emergencies, paragraph 61.)

AL.2

OPERATIONAL CONTROLS

"19. *Wireless Equipment*:

A TR.1520 V.H.F. set of the four channel type is installed. The control is a five-way switch located on the lower left of the instrument panel next to the 'G' switches (46). A spring-loaded "press to talk" switch (42) is mounted on top of the spade-grip of the control column.".

20. *Guns:*

(a) The selective firing push-button (12) on the control column spade grip, is fitted with a spring-loaded safety flap. When the flap is at SAFE the cine-camera and/or the gyro gun-sight camera recorder can be operated by pressing the knurled portion of the gun-firing switch. When it is set to "Fire" the guns may be operated in the following manner:-

Pressure at bottom of knurled push-button fires guns Group 2 (outer pair).

Pressure at top of knurled push-button fires gun Group 1 (inner pair).

AL.2.

Pressure at centre of knurled push-button fires all guns together.

The cine-camera and/or the gyro gunsight camera recorder function simultaneously with each of the above three operations, provided Cine Camera Switch (59) and G.G.S. Master Switch (60) are ON.

(b) The gyro-gunsight master switch (60) is on the electrical panel, the combined dimmer and selector switch (29) is on the top right-hand side of the instrument panel, and the ranging control is incorporated in the top of the throttle lever.

(c) There is a cine-camera footage indicator (39) on the lower right-hand side of the instrument panel.

(d) The gyro-gun sight camera Recorder (27) is stowed on the right-hand side of the cockpit when not in use.

(e) Two spare filaments for the gyro gun-sight are stowed on the starboard side of the cockpit.

21. *Signalling Equipment:*

(a) The type BC.965A and BC.958A controller units (40) are fitted on the lower right-hand side of the instrument panel.

(b) The detonator for the SCR.695A is operated by a push-button (64) switch on the main electrical panel.

(c) The identification lights are controlled by an ON-OFF switch (70) and operated by a push-button (69) on the electrical panel.

Cockpit Equipment:

22. *Sliding Hood:*

(a) The sliding hood is opened and closed by the crank handle (77) mounted on the right-hand cockpit wall. A spring loaded plunger which is located in the crank-handle, engages in one of ten positions on the base plate. This permits the hood to be locked in any desired position.

(b) When closing the hood, the crank-handle should be rotated with sufficient force to ensure that the spring-loaded plunger engages in the next hole after the one in which it would engage if the extra force were not used.

(c) The hood can be jettisoned in flight by operating the yellow CANOPY JETTISON handle (79) forward of the normal crank-handle.

(d) A push-button on the outside of the fuselage, marked PRESS RED BUTTON TO RELEASE HOOD, is pressed to permit the hood to be opened from the outside.

23. *Cockpit Heating and Ventilation:*

(a) Cockpit heating is provided and is controlled by a CABIN BLOWER AIR lever (65) marked OFF - HOT - COLD, mounted on the right-hand cockpit wall, to the rear of the electrical panel.

(b) An adjustable cold air ventilator is fitted on the left-hand cockpit wall, beneath the coaming. The ventilator embodies a non-return valve to prevent leakage of air when the cabin is pressurised.

24. *Cabin Pressurising:*

(a) A three-way CANOPY SEAL cock (78) is mounted on the right-hand cockpit wall forward of the crank-handle. The cock admits air pressure to the rubber cabin seal from the engine blower casing when turned to ON, or deflates the seal through a connection to the suction side of the vacuum pump when turned to OFF. The cabin seal must only be inflated when the sliding hood is closed and must be deflated before the hood is opened as the rubber canopy seal will be torn or chaffed by the sliding canopy.

(b) The pressurising air is supplied to the cabin from the impellor casing through the cabin blower control, on the right-hand side of the cockpit. No pressurisation is possible below 15,000 feet as the cabin pressure is automatically controlled by a Westland valve set to start at this altitude. The cabin blower control admits air which has been heated by compression from the impellor casing and leads it through the CABIN BLOWER AIR control to the cabin. The CABIN BLOWER AIR control merely allows, progressively, this hot air to pass over or by-pass the cold radiator situated on the starboard side of the fuselage, according to the position of this control selected by the pilot. Cabin heating is available from the starting of the engine even though the Westland Valve does not allow pressurising until the selected altitude is reached.

(c) The cabin altimeter (34) on the right-hand side of the instrument panel will show the altitude corresponding to the cabin pressure, and the pilot should regulate his oxygen supply to correspond with this altitude.

A cabin pressure gauge (33) and warning light (36) are also provided. The warning light glows when the cabin pressure is ½ lb./sq. in. below the standard; this light may flicker on and off during the climb.

25. *Seat Adjustment:*

A lever on the right-hand side of the seat provides adjustment for height.

26. *Pilot's Seat Harness:*

A pilot's harness lock is on the right-hand side of the seat.

27. *Oxygen:*

A Mark XIC oxygen regulator (37) with high pressure control and indicator are mounted together on the right-hand side of the instrument panel. Access to the charging valve is gained through the starboard ammunition door.

Important Warning: Under present procedure in AP.1275A, emergency flow valve of oxygen regulator Mark XIC is normally locked by soft copper locking wire. This wire should be removed in aircraft undertaking flying above 35,000 ft., whether cockpit is atmospheric or pressurised, so that, in possible event of annoxia, emergency valve can be operated without effort. Locking wire must be replaced before despatch of aircraft to any other station.

28. *Windscreen De-Icing:*

A handpump (72), with a regulator, is mounted on the bottom right-hand side of the instrument panel.

29. *Cockpit Lighting:*

(a) The Dual System of cockpit lighting is used, and consists of red lights for general cockpit and instrument illumination, and ultra violet lights for instrument panel illumination. The ultra violet lights are controlled by one dimmer switch (1). The red lights are controlled by two dimmer switches (2), (3), one of which operates the red light illuminating the main electrical panel, and the other operating the three remaining red lights. The three dimmer switches are mounted on a wooden block on the port cockpit wall just below the canopy rail, and forward of the pilot.

(b) An emergency red light (25) is fitted on the gyro-gun sight brackets and is supplied from an Accumulator mounted on the port side of the cockpit forward of the instrument panel. The light is operated by an EMERGENCY LIGHT Switch (20) mounted directly under the three dimmer switches, thus ensuring that the pilot is not left in complete darkness in the event of failure of the aircraft general services supply.

30. *Compass:*

A type E.2 compass (28) is mounted in front of the pilot, to the right of the gun sight.

The compass is a stand-by in case of failure to the R.I. compass (32).

AL 1.

17 "Pilots are warned that the recorder bracket, when fitted, can cause marked deviations, of up to 20 degrees on the E.2 compass. The position of this bracket during compass swinging should therefore be recorded on the compass correction card."

31. *Engine Fire Extinguisher:*

A micro switch operated by the CABIN BLOWER AIR control lever ensures that the extinguisher cannot be inadvertently operated while this pressurising control is open. This precaution is necessary as the fumes are extremely noxious and unless the lever is at OFF they would be forced into the cockpit. A FIRE warning light (30) is provided and operation is controlled by a push-button (see also Emergencies, paragraph 60.).

PART II - HANDLING

32. *Preliminaries:*

(a) Before entering aircraft check that:

(i) The ground is suitable for starting up and no loose articles in front or behind air intake.

(ii) There is an unobstructed taxy path.

(iii) All covers, tethering ropes and control locks have been removed.

(iv) There are chocks in front of the wheels.

(v) Tyre and oleo leg pressures are correct. Locking pins removed. Nose wheel straight for taxying.

(vi) The blanking plate is removed from the jet pipe.

(vii) Cowlings and fuel caps are secure.

(viii) No loose articles in the cockpit.

(b) On entering the cockpit:

(i) Avoid standing on the canopy runners when entering the cockpit.

(ii) Check canopy lock and movement and ensure windscreen is clean.

(iii) Unlock controls and test for freedom and CORRECT movement.

(iv) Adjust seat for maximum vision and then adjust rudder pedals.

AL.2. (v) Check parking brakes ON - minimum pressure ~~120~~ 200 lb./sq. in. in main system.

(vi) Check Master Switch on FLIGHT. All individual electrical services switches mounted on top of the main electrical panel are OFF.

(vii) Check Undercarriage selector lever in DOWN position. Undercarriage position indicator lights GREEN.

(viii) Dive Brakes control lever OFF.

(ix) Canopy Seal control lever OFF.

(x) Cabin Blower Air Control OFF.

AL.1. (xi) Check contents of fuel tanks.

"Check the operation of the hydraulic hand pump by raising and lowering the flaps; return selector lever to neutral.
Warning: Flaps must *not* be operated with ground starter battery connected.".

of the Fuel System:

All permanent tanks (and the drop tanks if used), feed the engine through the L.P. Fuel Cock which is operated by a lever on the lower portion of the engine Control box and a high pressure cock which is mounted outboard of the throttle lever. Both these levers must be in the ON position for fuel to reach the engine.

"34. *Starting the Engine*:

(a) Ensure flap lever is in the DOWN position and brakes locked ON.

(b) Have a 240 ampere-hour, 24 volt, ground starter battery plugged into the starter socket in the port flap shroud.

(c) Turn Ground/Flight switch to FLIGHT.

Note: If aircraft batteries are flat it may be necessary to use an external 24 volt battery in the front, or test socket, in which case the Ground/Flight switch should be at GROUND until the starting cycle is complete and the engine idling satisfactory.

(d) Check L.P. cock ON (fully forward and up). Set H.P. cock ON (fully forward). Check fuel contents. Check fuel pressure warning light (34) ON.

(e) Fully close throttle lever.

(f) Switch ON interlinked S.C. SAFETY switch (76) and BOOSTER COIL ISOLATING switch (54).

(g) Check Fuel Pressure Warning light OUT (24).

(h) Press ENGINE STARTING button (75) for two (2) seconds and release.

"(i) After ignition has taken place the engine will accelerate to idling revolutions (2500 plus or minus 200) without further attention. A normal start should begin 10/15 seconds after pressing the engine starter button and be completed 45/50 seconds after. For this reason, the ground battery socket MUST NOT BE REMOVED until a minimum time of 45 seconds has elapsed since pressing the starter button. The normal starting sequence after pressing the engine starter button will be the noise of preliminary engagement of the engine starter motor, followed by a gradual increase of engine R.P.M. to idling figures. No attempt must be made to assist the engine to reach the idling R.P.M. by opening the throttle during the starting cycle. During the starting period the jet pipe temperature may momentarily exceed the maximum idling temperature of 550°C.

R.P.M. refuses to increase and jet pipe temperatures have reached a maximum of 600° C. the H.P. cock should be closed and an investigation carried out on the state of the aircraft and ground batteries before attempting further starts.

(k) Before taxying check that ground starter equipment has been removed then raise flaps and check hydraulic operation by opening and closing dive brakes.

(l) Switch on R.1. compass and uncage artificial horizon and directional indicator.

(m) When throttle is opened to taxy check that Generator Warning light (31) goes out at approximately 5000 R.P.M.

fuel. . .

"35. *Check list before Taxying*:

Flaps — When starting equipment is disconnected and removed, select UP.

Dive Brakes — Check operation by opening and closing.

Brakes — At least 200 lb./sq. in. in main system and 120 lb./sq. in. to each brake.

Jet pipe temperature — Under 550°.

R.1 Compass — ON.

D.1 and A.H. — Uncaged and synchronised.

Radio — ON and operating.

O[illegible] supply."

"34. *Starting the Engine*:

(a) Ensure flap lever is in the DOWN position and brakes locked ON.

(b) Have a 240 ampere-hour, 24 volt, ground starter battery plugged into the starter socket in the port flap shroud.

(c) Turn Ground/Flight switch to FLIGHT.

Note: If aircraft batteries are flat it may be necessary to use an external 24 volt battery in the front, or test socket, in which case the Ground/Flight switch should be at GROUND until the starting cycle is complete and the engine idling satisfactory.

A 4.2.

(d) Check L.P. cock ON (fully forward and up). Set H.P. cock ON (fully forward). Check fuel contents. Check fuel pressure warning light (34) ON.

(e) Fully close throttle lever.

[illegible] starting sequence after pressing engine starting button will be noise of preliminary engagement of engine starter motor and the then gradual increase of engine R.P.M. to idling figures. During this operation jet pipe temperatures may momentarily exceed maximum permissible idling temperature of 550° C.

A 4.3

(j) In event of ground and aircraft batteries being not fully charged it is possible that after preliminary light up of the engine during the starting cycle it will be found that the engine R.P.M. will not build up to idling figures and jet pipe temperatures have exceeded normal maximum. When under this condition engine R.P.M. refuses to increase and jet pipe temperatures have reached a maximum of 600° C. the H.P. cock should be closed and an investigation carried out on the state of the aircraft and ground batteries before attempting further starts.

(k) Before taxying check that ground starter equipment has been removed then raise flaps and check hydraulic operation by opening and closing dive brakes.

(l) Switch on R.1. compass and uncage artificial horizon and directional indicator.

(m) When throttle is opened to taxy check that Generator Warning light (31) goes out at approximately 5000 R.P.M.

[illegible] fuel. [illegible]

"35. *Check list before Taxying*:

Flaps — When starting equipment is disconnected and removed, select UP.

Dive Brakes — Check operation by opening and closing.

Brakes — At least 200 lb./sq. in. in main system and 120 lb./sq. in. to each brake.

Jet pipe temperature — Under 550°.

R.1 Compass — ON.

D.1 and A.H. — Uncaged and synchronised.

Radio — ON and operating.

[illegible] assembly".

~~should~~ do as much of the cockpit check and preparations for take-off as possible before starting the engine, in order to avoid excessive waste of fuel whilst idling on the ground (approximate fuel consumption whilst idling on ground is 22 gals. per hour).

(2) Any attempt to start with the MASTER SWITCH at GROUND will damage the starter equipment. This will be accentuated if, after commencing the starting sequence, the MASTER SWITCH is then changed to FLIGHT. If in error an attempt has been made to start the engine on GROUND, the ground crew should be immediately instructed to cut the external supply at the battery cart.

(3) Before starting the engine, check ~~that the air intake guards are in position~~ that the aircraft is facing into wind and that nothing behind it will be damaged by the "wake" of the jet, the danger length of which extends more than 100 yards.

(a) Have a 240 ampere-hour, 24 volt ground starter battery plugged into the starter socket in the port flap shroud.

(b) Ensure that the throttle lever is fully closed.

(c) Set both H.P. and L.P. cocks to "FUEL ON".

(d) Switch ON the interlinked STARTER CIRCUIT SAFETY switches (76) and the BOOST COIL ISOLATING switch (54).

(e) When FUEL PRESSURE Warning Light (24) goes out, press ENGINE STARTING button (75) for two seconds and then release.

(f) After ignition has taken place the engine will accelerate up to idling R.P.M. (2000 - 3000) without further attention. A normal start should take place 10 - 15 seconds after pressing the Engine Starting Button. An increase in R.P.M. and J.P.T. will indicate when the engine has started. The J.P.T. may momentarily exceed its maximum reading.

(g) Before taxying, check all temperatures and pressures and the operation of the engine-driven hydraulic pump by opening and closing the dive brakes. Ensure that the generator is charging the accumulators, at between 5000 and 6000 R.P.M., by noting that the power failure warning light goes out when R.P.M. reaches 5000 [illegible]

Note: (i) It is advisable to do as much as possible of the cockpit check and preparations for take-off before starting.

(ii) Before starting the engine, check that the aircraft is facing into wind and that nothing behind it will be damaged by the "wake" of the jet, the danger length of which extends more than 100 yards.

(iii) Do not run up the engine. It is unnecessary and wastes fuel.".

"35. *Check list before Taxying*:

Flaps — When starting equipment is disconnected and removed, select UP.

Dive Brakes — Check operation by opening and closing.

Brakes — At least 200 lb./sq. in. in main system and 120 lb./sq. in. to each brake.

Jet pipe temperature — Under 550°.

R.1 Compass — ON.

D.1 and A.H. — Uncaged and synchronised.

Radio — ON and operating.

Oxygen — ON [illegible]

VAMPIRE

FINAL CHECKS FOR TAKE-OFF

HARNESS	...	SECURE - CANOPY LOCKED - OXYGEN ON
TRIM	...	NEUTRAL
FUEL	...	"H.P. AND L.P. COCKS FULLY ON CONTENTS CHECKED FUEL PUMP EMERGENCY SWITCH ON [LIGHT (73) ON] (BEFORE RELEASE OF BRAKES PRIOR TO TAKE-OFF RUN) FUEL PRESSURE WARNING LIGHT (24) OUT"
FLAPS	...	UP (OR 30° DOWN IF REQUIRED)
DIVE BRAKES	...	OFF (CLOSED)
DIRECTIONAL INDICATOR	...	SYNCHRONIZED WITH COMPASS AND UNCAGED

Pa.2.

FINAL CHECKS FOR LANDING

HARNESS	...	SECURE - CABIN BLOWER AIR OFF CANOPY SEAL OFF
BRAKES	...	450 LB. SQ. IN. (420 LB. SQ. IN. AT EACH WHEEL)
UNDERCARRIAGE	...	DOWN AND LOCKED (MAX. SPEED 175 KNOTS)
FUEL	...	"CONTENTS CHECKED FUEL PUMP EMERGENCY SWITCH ON (LIGHT ON) FUEL PRESSURE WARNING LIGHT OUT"
FLAPS	...	30° DOWN (FULLY DOWN ON FINAL)
DIVE BRAKES	...	OFF (CLOSED)

Pa.2.

36. *Taxying:*

(a) The nose wheel can swivel freely through 360 deg. and it is easy to make turns of such short radius that the inside main wheel remains stationary. This must always be avoided since it causes undesirable stresses on the tyres and oleo legs.

(b) The throttle must not be opened rapidly or excessive jet pipe temperature will result.

(c) Taxy with due regard to safety in the event of brake failure, but reasonably quickly as the fuel consumption at ground level, even at taxying R.P.M., is exceptionally high. Once the aircraft is rolling, harsh use of either brake is to be avoided, as when the aircraft stops or slows down a great deal of fuel is wasted in moving again.

37. *Check List Before Take-off:*

H - Harness Secure	-	Canopy closed and locked. Oxygen "ON", if required
T - Trimming Control	-	Elevator - at typical service load (full ammunition full fuel. with or
F - Fuel		"F — FUEL — Both H.P. and L.P. cocks to Full ON.
AL.2.		Check fuel contents.
F - Flaps		FUEL PUMP EMERGENCY switch ON (Warning light (73) ON) (after release of brakes prior to take-off para. 38 (b)).
Dive Brakes		Fuel pressure warning light (24)
Directional Indicator		OFF.".

38. "(b) Open the throttle slowly to 8500 R.P.M. against the brakes. Switch ON the FUEL PUMP EMERGENCY switch. (Correct operation of the Fuel Pump Emergency switch will be shown by a rise in engine R.P.M. as the fuel pumps are isolated from each other. The amount of rise is not consistent on individual engines and can be over a range of 200 to 1500 R.P.M.). Check all engine instruments and if satisfactory, release the brakes.".

AL.2

(c) Keep straight initially by gentle use of the brakes, then, as speed is gained, by use of the rudders.

(d) Ease the nose wheel off the ground at about 70 - 75 knots I.A.S. Care must be taken not to get the nose wheel too high or the tail may touch the ground. The aircraft, which does not unstick cleanly, should be flown off at about 105 knots I.A.S.

AL.2. (e) When comfortably airborne brake the wheels and retract the undercarriage. When drop tanks are carried it is essential to raise the undercarriage before 125 knots I.A.S. is attained; otherwise the wheels may not lock up.

"*Note:* (i) If the undercarriage does not fully retract it may be indicated by either a red or a green light for the particular leg — usually a green. A red light indicates that the leg itself is not fully retracted and a further indication of this is a rolling or yawing tendency of the aircraft. A green light indicates that the main wheel door fairing is not correctly in place. The handling characteristics of the aircraft are not normally affected by this.

Negative 'G' may correct the state in either case, but the most certain method is to reduce speed, lower the undercarriage fully, further reduce speed to below 120 kts. and select up.

(ii) If the solenoid lock sticks and prevents the selector lever from being raised, it can be over-ridden by operating the U/C. EMERGENCY RETRACTION switch on the port cockpit wall aft of the engine control box.

AL.2.

"(f) Raise the flaps (if used) at a safe height.

(g) Having obtained a reasonable safety height (approximately 2,000 ft.) switch OFF the FUEL PUMP EMERGENCY switch (55) (Warning light (73) out).".

(h) Set the CANOPY SEAL control lever to ON.

39. *Climbing:*

(a) Do not start to climb until a speed of approximately 115 - 125 knots is reached and endeavour to reach the recommended speed as soon as possible. For maximum rate of climb use 12,000 R.P.M. at not more than ~~[illegible]~~ deg. C. Jet Pipe Temperature for a maximum of 30 minutes, and the recommended speed is:-

AL.3.

"From sea level to 10,000 ft. — 280 knots I.A.S.

Above this height reduce airspeed.

2 Knots per 1,000 ft. up to 20,000 ft.
3 Knots per 1,000 ft. up to 20-30,000 ft.
4 Knots per 1,000 ft. up to 30-35,000 ft.

until a constant Mach number of .65 is attained.

Continue climbing at constant Mach number of .65."

(b) During climb above 10,000 feet the cabin pressurising system fails, indicated by the cabin altimeter reading the same as the aircraft altimeter and/or the warning light coming on, the climb should not be continued above 35,000 feet. During the climb the pilot should adjust the oxygen supply for "above 25,000 feet" or "below 25,000 feet" according to the cabin altimeter reading.

Note: The temptation to climb at a speed comparable to that recommended for any contemporary propeller-driven, single-seat fighter must be resisted since efficiency of the jet engine is poor at low airspeeds.

40. *General Flying:*

(a) *Stability:*

At typical service load (with full ammunition) longitudinal and directional stability are satisfactory at all altitudes and in all conditions of flight. The aircraft is laterally unstable. When no ammunition is carried, logitudinal stability is decreased and there is a slight tendency to tighten in turns at low airspeeds. This is more noticeable at high altitude (see paragraph 41 (i)).

(b) *Changes of Trim:*

Undercarriage down	-	Slightly nose up.
Undercarriage up	-	Slightly nose down.
Flaps down	-	Nose down.
Flaps up	-	Nose up.
Dive Brakes open (ON)	-	Nose up.
Dive Brakes closed (OFF)	-	Nose down.

(c) *Controls:*

(i) The controls are light and well balanced and the aircraft is pleasant to fly. The elevator is powerful throughout the speed range, and large accelerations may be induced with small stick forces. The ailerons and rudders tend to lose effectiveness at low speeds.

(ii) The elevator trimming tab is light and moderately powerful but less effective at high altitudes.

(iii) The dive brakes are effective but promote considerable vibration when open.

(d) *Flying at Reduced Airspeed in Conditions of Poor Visibility:*

Use the dive brakes to reduce speed to 155 knots I.A.S., then lower 30 deg. of flap and close the dive brakes. Speed may then be reduced to not less than 140 knots I.A.S.

(e) *Throttle Manipulation:*

The throttle should normally be operated very slowly to avoid high temperatures, surging and (if above 20,000 feet) "blowing out" of the flame. In emergency, however, at low altitudes, as in the case of a baulked landing, the throttle may be opened with reasonable speed.

41. *High Altitude Flying:*

(a) At 35,000 feet with typical service load, stability remains satisfactory but harsh or unco-ordinated movements of the controls cause a wallowing effect. This is accentuated when flying without ammunition.

(b) There is a slight tendency to tighten in steep turns making it easy to stall the aircraft.

(c) Above 30,000 feet, the pilot should constantly check the correct functioning of the pressure cabin and oxygen supply. In the event of failure of either, it is essential to descend to a moderate altitude as quickly as possible without exceeding the limiting indicated Mach number. In addition the oxygen regulator should be set to the emergency position.

(d) Speed builds up quickly on descending and it is advisable to use the dive brakes. Care must be taken not to exceed the limiting indicated Mach number.

(e) A total of 80 gallons of fuel, read in level flight, must be left for the descent and landing, as the windscreen may become iced up on descending, and it will be necessary to fly at low altitude for 5 - 10 minutes, to allow for de-icing and de-misting. (See paragraph 55, "Economical Flying".)

42. *Stalling:*

(a) The stalling speeds, engine off, in knots I.A.S. are:-

Flaps and Undercarriage Down: Wt. - Lbs.	I.A.S. Knots
8,000 without drop tanks	~~70~~ 85.

AL.1.

AL.2.

(ii) If the solenoid lock sticks and prevents the selector lever from being raised, it can be over-ridden by operating the U/C. EMERGENCY RETRACTION switch on the port cockpit wall aft of the engine control box.

"(f) Raise the flaps (if used) at a safe height.

(g) Having obtained a reasonable safety height (approximately 2,000 ft.) switch OFF the FUEL PUMP EMERGENCY switch (55) (Warning light (73) out).".

(h) Set the CANOPY SEAL control lever to ON.

39. *Climbing:*

(a) Do not start to climb until a speed of approximately 115 - 125 knots is reached and endeavour to reach the recommended speed as soon as possible. For maximum rate of climb use 12,000 R.P.M. at not more than ~~105~~ deg. C. Jet Pipe Temperature for a maximum of 30 minutes, and the recommended speed is:-

AL.3.

"

(b) During the climb the cabin pressure warning light will come on at approximately 16,000 feet. The CABIN BLOWER AIR lever should then be pushed down to HOT or COLD as required, and the warning light should go out. (If desired for heating, the blower air can be turned on after take-off). If above 16,000 feet the cabin pressurising system fails, indicated by the cabin altimeter reading the same as the aircraft altimeter and/or the warning light coming on, the climb should not be continued above 35,000 feet. During the climb the pilot should adjust the oxygen supply for "above 25,000 feet" or "below 25,000 feet" according to the cabin altimeter reading.

Note: The temptation to climb at a speed comparable to that recommended for any contemporary propeller-driven, single-seat fighter must be resisted since efficiency of the jet engine is poor at low airspeeds.

40. *General Flying:*

(a) *Stability:*

At typical service load (with full ammunition) longitudinal and directional stability are satisfactory at all altitudes and in all conditions of flight. The aircraft is laterally unstable. When no ammunition is carried, logitudinal stability is decreased and there is a slight tendency to tighten in turns at low airspeeds. This is more noticeable at high altitude (see paragraph 41 (i)).

(b) *Changes of Trim:*

Undercarriage down	-	Slightly nose up.
Undercarriage up	-	Slightly nose down.
Flaps down	-	Nose down.
Flaps up	-	Nose up.
Dive Brakes open (ON)	-	Nose up.
Dive Brakes closed (OFF)	-	Nose down.

(c) *Controls:*

(i) The controls are light and well balanced and the aircraft is pleasant to fly. The elevator is powerful throughout the speed range, and large accelerations may be induced with small stick forces. The ailerons and rudders tend to lose effectiveness at low speeds.

(ii) The elevator trimming tab is light and moderately powerful but less effective at high altitudes.

(iii) The dive brakes are effective but promote considerable vibration when open.

(d) *Flying at Reduced Airspeed in Conditions of Poor Visibility:*

Use the dive brakes to reduce speed to 155 knots I.A.S., then lower 30 deg. of flap and close the dive brakes. Speed may then be reduced to not less than 140 knots I.A.S.

(e) *Throttle Manipulation:*

The throttle should normally be operated very slowly to avoid high temperatures, surging and (if above 20,000 feet) "blowing out" of the flame. In emergency, however, at low altitudes, as in the case of a baulked landing, the throttle may be opened with reasonable speed.

41. *High Altitude Flying:*

(a) At 35,000 feet with typical service load, stability remains satisfactory but harsh or unco-ordinated movements of the controls cause a wallowing effect. This is accentuated when flying without ammunition.

(b) There is a slight tendency to tighten in steep turns making it easy to stall the aircraft.

(c) Above 30,000 feet, the pilot should constantly check the correct functioning of the pressure cabin and oxygen supply. In the event of failure of either, it is essential to descend to a moderate altitude as quickly as possible without exceeding the limiting indicated Mach number. In addition the oxygen regulator should be set to the emergency position.

(d) Speed builds up quickly on descending and it is advisable to use the dive brakes. Care must be taken not to exceed the limiting indicated Mach number.

(e) A total of 80 gallons of fuel, read in level flight, must be left for the descent and landing, as the windscreen may become iced up on descending, and it will be necessary to fly at low altitude for 5 - 10 minutes, to allow for de-icing and de-misting. (See paragraph 55, "Economical Flying".)

42. *Stalling:*

(a) The stalling speeds, engine off, in knots I.A.S. are:-

AL.1.

Flaps and Undercarriage Down: Wt. - Lbs.	I.A.S. Knots
8,000 without drop tanks	- ~~70~~ 85.

AL. 1.

Wt. - Lbs.		I.A.S. Knots
9,500 without drop tanks	-	~~77~~ 92
10,400 without drop tanks	-	~~81~~ 97.

Flaps and Undercarriage Up:

AL. 1.

Wt. - Lbs.		I.A.S. Knots
8,000 without drop tanks	-	~~81~~ 95
9,500 without drop tanks	-	~~88~~ 103
10,400 without drop tanks	-	~~92~~ 107

Note: (The A.S.I. fluctuates badly at 94 knots.
(With drop tanks, add 3 knots to above stalling speeds.

(b) With the dive brakes or the sliding hood open, the above stalling speeds are increased by about 3 knots and the pre stall buffet is more pronounced.

(c) With the undercarriage and flaps up, warning of the approach of the stall is given by slight elevator buffeting some 15 knots before it occurs and becomes more pronounced as it approaches. Just before the stall there is some slight logitudinal pitching and rudder vibration and the A.S.I. fluctuates widely. At the stall the nose drops gently but continued backward pressure on the control column may cause either wing to drop.

(d) With the undercarriage and flaps down, there is general vibration and slight logitudinal pitching prior to the stall when the nose and either wing may drop sharply. Continued backward pressure of the control column results in pronounced buffeting and an increased tendency for either wing to drop. Recovery is straightforward in both cases.

(e) High-Speed Stall:

Warning of the approach of the stall is given by elevator buffeting and at the stall the aircraft may flick in either direction. Stick forces are light and it is easy to stall the aircraft at low speeds in a steep turn.

43. *Diving and High Speed Flying:*

(a) The aircraft becomes increasingly tail heavy as speed is increased and should, therefore, be trimmed into the dive.

(b) The elevator is light and powerful and must be used with care during the recovery.

(c) It is advisable to use the dive brakes when making rapid descents from high altitude to avoid exceeding the speed limitations.

(d) Individual aircraft are known to have different compressibility characteristics. Warning of the approach of compressibility may be given by one or a combination of the following characteristics:-

(i) A progressive backward movement of the control column for a constant angle of dive. This occurs at indicated Mach numbers between approximately .73 to .75.

(ii) Slight porpoising at an indicated Mach number between .75 and .76.

(iii) Sharp snatching of either wing from about .76 Mach onwards.

Note: The figures quoted in (a) to (c) above may vary with different aircraft.

(iv) As the limiting speed is approached, a progressive nose down change of trim may occur and heavy elevator stick forces are required to prevent the dive becoming steeper.

(v) At the limiting speed the aircraft may "break away" either in an upward or downward direction. Recovery from compressibility is almost immediate on throttling back ~~or~~ and with use of the dive brakes, but care must be taken on throttling back at low altitudes as this produces a nose down change of trim. The elevator trimming tab should not be used to effect recovery as it may suddenly become effective on reducing speed and impose excessive accelerations.

(e) The limiting speeds quoted are for calm air conditions only.

44. *Aerobatics:*

(a) The following minimum speeds in knots I.A.S. are recommended:-

Roll	230-250
Loop	320-340
Half roll off the top of a loop	340-360
Climbing roll	350 plus.

(b) In manoeuvres in the pitching plane, stick forces are light. Much height may be lost or gained and an ample margin must always be allowed for recovery to normal flight.

Note: The negative "g" trap in the fuel collector box ensures a supply of fuel for not more than 15 seconds inverted flight.

45. *Check List Before Landing:*

Reduce speed to 175 knots I.A.S. using dive brakes if necessary then check:-

Fuel Contents	Emergency Fuel Pump ON.
Pneumatic supply pressure	450 lb./sq. in.
Brake pressure at each wheel	120 lb./sq. in.
Cabin blower air lever	OFF.
Canopy seal	OFF.

Lower the undercarriage and check the indicators and warning light.

Reduce speed to 155 knots I.A.S. and check:-

Flaps	30 deg. down (fully down on final approach).
Dive Brakes	OFF (selector UP).

46. *Approach and Landing:*

(a) At the maximum landing weight of 10,134 lb. the recommended final approach speeds in knots I.A.S. are:-

	Flaps Down	Flaps Up
Glide or engine assisted	105 ~~95~~	~~105~~ 115
At maximum landing weight on unprepared runways (8,500 lb.)	95 ~~90~~	~~100~~ 105

Note: The final speed on approach, whether engine assisted or not, is quoted at one figure. This is because of the usual technique employed on jets of closing the throttle over the fence to allow for the slow decelleration of the aircraft.

The initial approach should be made some 15 knots above these figures.

The aircraft requires a long run for a flapless landing and the approach should be low and fairly flat. Speed drops off slowly and very little power is required. In emergency, when landing with full internal fuel, the above speeds should be increased by 5 knots.

(b) The response to throttle manipulation is not as prompt as on a propeller driven aircraft and early corrective action must be taken if undershooting. Owing to the absence of propeller drag, decelleration is slow when the throttle is closed.

(c) Make a normal tricycle landing holding the nose wheel clear of the ground. Hold the nose-wheel off the ground as long as possible to shorten the landing run. Do not apply the brakes until the nose wheel has settled firmly on the ground, and apply them gently and progressively in short applications.

47. *Going Round Again:*

Always use full power.

(a) Open the throttle slowly to full take-off R.P.M.

(b) Raise the undercarriage and climb initially at about 140 knots I.A.S. (Undercarriage may not lock if speed is in excess of 140 knots I.A.S.).

(c) Raise the flaps at a safe height. Full flap can be raised without any appreciable "sink".

(d) Adjust speed to normal circuit speed and reduce R.P.M. as required.

Note: It must be borne in mind that response is not as rapid as on a piston engine, so any decision to go round again should be made in good time.

48. *After Landing:*

(a) Before taxying raise the flaps.

(b) Check that the cabin seal lever is turned OFF before the hood is opened.

49.

(a) Close the throttle fully, and then move the High Pressure Fuel Cock Lever (6) to OFF.

The Low Pressure Fuel Cock should not be closed while the engine is running as this will evacuate the low pressure lines, possibly damage the H.P. fuel pumps and necessitate priming of the fuel system.

(b) Switch OFF individually the electrical services control switches mounted on top of the main electrical panel (including interlinked S.C. SAFETY switch (76)).

(c) Check oxygen to "OFF".

(d) Set the MASTER SWITCH to GROUND.

(e) See that the air intake guards are placed in position.

(f) Brakes OFF when chocks have been placed in position.

PART III - OPERATING DATA

50. *Engine Data, Nene II V.H. (Aus.):*

(a) Fuel - Aviation Kerosene, Spec. D. Eng. R.D. 2482 - (R.A.A.F. Ident. No. K1/10019). "For use of emergency fuel see *Emergency Fuel,* paragraph 68, page 38."

(b) Oil - Fluid anti-freeze to Spec. D.T.D. 44D - (R.A.A.F. Ident. No. K2/116.).

A.L.1. (c) The principal engine limitations are as follows:-

Condition	R.P.M. (Max.)	J.P.T. (Max.)	Oil Pressure (Min.)	Oil Temp. Inlet (Max.)	Remarks
Take-off	12,300	745°C.	20 lb/sq. in.	80°C.	10 min. limit
Combat	12,300	745°C.	20 lb/sq. in.	80°C.	10 min. limit
Climb	12,000	705°C.	20 lb/sq. in.	80°C.	30 min. limit
Cruise	11,600	645°C.	20 lb/sq. in.	80°C.	
Idling (i) Sea level	2,500 ± 200	550°C.	3 lb/sq. in.	80°C.	Minimum Oil Temp. for Opening Up.
(ii) 20,000 ft. to 30,000 ft. ..	4,000 (Min.)				
(iii) 30,000 ft. and above	6,000 (Min.)				— 40°C.

51. *Flying Limitations:*

(a) The aircraft is designed for the duties of a single-seat fighter. Although the spinning characteristics are considered to be satisfactory for recovery from an incipient spin, intentional spinning should not be carried out. If a spin occurs, normal recovery action should be initiated immediately but care must be taken when moving the control column forward to avoid excessive negative acceleration and a very steep nose down attitude. The rudder should be centralised immediately rotation ceases, to avoid flicking into a spin in the opposite direction.

(b) Maximum Speeds:

The maximum permissible speeds are :-

(i) DIVING WITHOUT DROP TANKS

Sea level to 5,000 ft. - 455 knots I.A.S.

At heights above 5,000 ft. an indicated Mach number of 0.76 is not to be exceeded. A.L.1.

(ii) WITH DROP TANKS

Sea level to 5,000 ft. - 390 knots I.A.S.

5,000 ft. to 10,000 ft. - 365 knots I.A.S.

At heights above 10,000 ft. an indicated Mach number of 0.65 is not to be exceeded.

(iii) Jettisoning drop tanks in straight and level flight only - 260 knots.

(iv) Dive brakes open - Up to maximum permissible diving speed.

Undercarriage down - 175 knots.

Flaps down - 155 knots.

52. *Weight and Balance:*

(a) It is essential that the aircraft be loaded within the prescribed limits of weight and balance.

These limits are as follows:-

Maximum permissible weight for straight flying and gentle turns (overload limit)	12,400 lb.
Maximum permissible weight for all forms of flying	10,400 lb.
Maximum permissible weight for landings	
(i) prepared runways	10,134 lb.
(ii) unprepared runways	8,500 lb.

Datum: The datum point of this aircraft is a peg located on the port side of the fuselage beneath the wing.

Forward limit of the C.G. - 3.6 inches aft of the datum (undercarriage down).

Aft limit of the C.G. - 8.4 inches aft of the datum (undercarriage down).

(b) For method of correct loading of the aircraft and calculation of weight and balance, see Vampire Weight Sheet Summary (R.A.A.F. Publication No. 829).

53. *Position Error Corrections:*

The position error alone is meaningless in this type of aircraft as the error due to compressibility is often of the order of the P.E.C. with the opposite sign applied.

A graph of Equivalent Airspeeds against Indicated Airspeeds for all altitudes will be published as an amendment list.

AL.2. 54. *Maximum Performance:*

"(a) Climb: The speed for maximum rate of climb at full climbing power is 280 knots I.A.S. from sea level to 10,000 ft. Above this height a reduction in airspeed is recommended as below.

2 knots per thousand feet up to 20,000 ft.
3 knots per thousand feet up to 20-30,000 ft.
4 knots per thousand feet up to 30-35,000 ft.

or until a constant Mach number of .65 is attained. Continue at Mach .65.".

(ii) 35,000, if not carrying emergency bale-out oxygen or if cabin pressure system fails to operate.

Note: M.K.30 Vampire aircraft are temporarily limited to 35,000 ft. pending modification to the perspex structur

55. *Economical Flying:*

Note: As a general guide, weather conditions and circumstances permitting, it is advisable to fly as high as possible for either range or endurance. Jet engine fuel consumptions decrease rapidly with altitude, as the following specific consumption figures will indicate.

Recommended Speeds:-

(a) Flying for Range:

Altitude	I.A.S. Knots	Specific Consumption N.A.M.P.G.
5000 feet	195	1.23
25000 feet	195	2.33

Note: At 5,000 feet, range is reduced by 60 nautical miles for every 5 minutes at combat power.

(b) Flying for Endurance:

Should it ever become necessary to obtain maximum endurance, fly as high as possible with the minimum R.P.M. required to maintain height and control.

At 5000 feet and a speed of 225 knots. I.A.S., the maximum endurance is 80 minutes.

Safe endurance for general flying including aerobatics, is 45 minutes.

56. *Fuel Consumption:*

(a) It is important to note that, with the aircraft in normal flight attitudes, a certain amount of fuel is not available due to the wing tank outlets being above the bottoms of the tanks and therefore, all range and endurance calculations should be based on the worst case of 35 gallons of "lost" fuel giving a total available capacity of (330 - 35) which equals 295 gallons.

The actual usable fuel for different fore and aft attitudes is as follows:-

Datum : Horizontal ..... 314 gallons.
Datum : 5 deg. nose up (normal cruising) ..... 312 gallons.
Datum : 8 deg. nose up ..... 295 gallons.

(b) *The Following are Estimated Figures Only and Must Be Used With Caution.* Results of actual flight testing will be published as an amendment list.

The estimated consumption in gallons per hour:-

Altitude	Gallons per hour		
	Combat	Max. Climb	Max. Cont.
Sea Level	660	612	515
5,000 feet	690	610	490
10,000 feet	610	540	430
20,000 feet	460	410	330
30,000 feet	340	300	240

(iv) Dive brakes open	-	Up to maximum permissible diving speed.
Undercarriage down	-	175 knots.
Flaps down	-	155 knots.

52. *Weight and Balance:*

(a) It is essential that the aircraft be loaded within the prescribed limits of weight and balance.

These limits are as follows:-

Maximum permissible weight for straight flying and gentle turns (overload limit)	12,400 lb.
Maximum permissible weight for all forms of flying	10,400 lb.
Maximum permissible weight for landings (i) prepared runways	10,134 lb.
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Datum: The datum point of this aircraft is a peg located on the port side of the fuselage beneath the wing.

Forward limit of the C.G.	-	3.6 inches aft of the datum (undercarriage down).
Aft limit of the C.G.	-	8.4 inches aft of the datum (undercarriage down).

(b) For method of correct loading of the aircraft and calculation of weight and balance, see Vampire Weight Sheet Summary (R.A.A.F. Publication No. 829).

53. *Position Error Corrections:*

The position error alone is meaningless in this type of aircraft as the error due to compressibility is often of the order of the P.E.C. with the opposite sign applied.

A graph of Equivalent Airspeeds against Indicated Airspeeds [illegible] published as an amendment list.

AL.2.

(b) Cruising: The indicated speeds quoted in paragraph 51 (b) must not be exceeded in any circumstances nor, to attain them at altitude, should power be increased beyond the maximum continuous R.P.M. quoted in paragraph 50(c).

(c) Maximum Altitude:

(i) 45,000 feet, if carrying emergency bale-out oxygen supply.

(ii) 35,000, if not carrying emergency bale-out oxygen or if cabin pressure system fails to operate.

Note: M.K.30 Vampire aircraft are temporarily limited to 35,000 ft. pending modification to the perspex structur

54. *Economical Flying:*

Note: As a general guide, weather conditions and circumstances permitting, it is advisable to fly as high as possible for either range or endurance. Jet engine fuel consumptions decrease rapidly with altitude, as the following specific consumption figures will indicate.

Recommended Speeds:-

(a) Flying for Range:

Altitude	I.A.S. Knots	Specific Consumption N.A.M.P.G.
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Note: At 5,000 feet, range is reduced by 60 nautical miles for every 5 minutes at combat power.

(b) Flying for Endurance:

Should it ever become necessary to obtain maximum endurance, fly as high as possible with the minimum R.P.M. required to maintain height and control.

At 5000 feet and a speed of 225 knots. I.A.S., the maximum endurance is 80 minutes.

Safe endurance for general flying including aerobatics, is 45 minutes.

55. *Fuel Consumption:*

(a) It is important to note that, with the aircraft in normal flight attitudes, a certain amount of fuel is not available due to the wing tank outlets being above the bottoms of the tanks and therefore, all range and endurance calculations should be based on the worst case of 35 gallons of "lost" fuel giving a total available capacity of (330 - 35) which equals 295 gallons.

The actual usable fuel for different fore and aft attitudes is as follows:-

Datum : Horizontal	314 gallons.
Datum : 5 deg. nose up (normal cruising)	312 gallons.
Datum : 8 deg. nose up	295 gallons.

(b) *The Following are Estimated Figures Only and Must Be Used With Caution.* Results of actual flight testing will be published as an amendment list.

The estimated consumption in gallons per hour:-

Altitude	Gallons per hour		
	Combat	Max. Climb	Max. Cont.
Sea Level	660	612	515
5,000 feet	690	610	490
10,000 feet	610	540	430
20,000 feet	460	410	330
30,000 feet	340	300	240

PART IV - EMERGENCIES

57. *Undercarriage and Flaps Emergency Operation:*

In the event of failure of the engine driven hydraulic pump, the handpump on the left of the seat can be used to operate the undercarriage and flaps through normal pipelines (See paragraphs 9, 10 and 11).

Note: The handpump will not operate the dive brakes.

58. *Sliding Hood Jettisoning:*

The sliding hood can be jettisoned by pulling back the yellow release lever mounted on the right-hand cockpit wall forward of the hood crank handle. Before jettisoning the hood, the seat should be lowered fully, and the pilot should keep his head well down.

59. *Jettison Drop Tanks:*

To jettison the wing drop tanks (when fitted) the pilot should pull up the lever mounted on the front face of the bulkhead behind and to the left of him. Speed should be reduced to less than 260 knots and tanks should be released in level flight.

60. *Fire Extinguisher:*

(a) The engine fire-extinguisher is controlled by a shielded push-button on the electrical panel on the right-hand side cockpit wall. There is a shielded engine fire warning light on the top centre portion of the instrument panel.

(b) Should fire become apparent in the engine nacelle -

(i) the high pressure fuel cock lever should at once be set to FUEL OFF and then turn OFF low pressure cock;

(ii) switch OFF the interlinked S.C. SAFETY switches (76);

(iii) the throttle should be closed fully;

(iv) speed should be reduced as far as practicable by opening the dive brakes and pulling up the nose of the aircraft before the extinguisher is operated;

(v) move CABIN BLOWER AIR lever to OFF;

(vi) press ENGINE EXTINGUISHER button (61);

(vii) switch OFF Generator Field Switch (66).

Note: Do not relight after use of fire extinguisher system, as a re-start of the fire may occur without further fire-fighting equipment available.

61. *Engine Failure in Flight:*

(a) If combustion ceases, immediate relight action must be carried out as follows:-

(i) Close H.P. fuel cock AT ONCE. (Do not close L.P. cock).

(ii) Close throttle.

(iii) Turn ON the FUEL PUMP EMERGENCY switch." in lieu of "(iii) Turn Emergency Fuel Pump to "ON".".

(iv) Reduce windmilling to between 750 - 1000 R.P.M. by decreasing I.A.S.

(v) Press Relight Switch Button.

(vi) After 5 seconds have elapsed, turn on H.P. Fuel Cock.

(vii) Release Relight Switch Button when jet pipe temperature starts to rise.

(viii) Reset throttle to required R.P.M.

(b) If the re-light is unsuccessful, turn off the H.P. fuel cock and repeat re-lighting procedure as above.

Note: (1) The H.P. fuel cock must not be left on for more than 30 seconds if engine fails to start, and 1 minute should be allowed between attempt to re-light to permit any residual fuel to be blown from the combustion chambers.

(2) Better re-lighting is obtained if the I.A.S. is as low as possible when H.P. fuel cock is turned on.

(3) Re-light may be difficult above 15,000 feet, but should occur in normal time below that height.

A.L.2.

(c) If combustion again ceases when the ~~EMERGENCY FUEL PUMP~~ switch is switched "OFF", the inference is that the Barometric Pressure Control Valve is faulty. Re-light procedure must again be adopted, with the ~~EMERGENCY FUEL PUMP~~ switch "ON" and left on after the restart. The R.P.M. will then be controlled manually by the throttles.

FUEL PUMP EMEGENCY

62. *Cockpit Lighting Failure:*

In the event of failure of the cockpit lighting the EMERGENCY LIGHT switch (20) on the port cockpit wall is to be switched "ON".

63. *Ditching:*

(a) Whenever possible the aircraft should be abandoned by parachute rather than ditched, since model tests indicate that, in any but the calmest seas, the ditching qualities will be very poor.

(b) If ditching is inevitable:-

(i) The sliding hood should be jettisoned.

(ii) The undercarriage should be kept retracted, but the flaps should be lowered 40 deg. to reduce the touch down speed as much as possible.

(iii) The safety harness must be tightly adjusted and the R/T and oxygen leads must be disconnected.

(iv) If power is available, it should be used to help make the touch down in a tail down attitude as at low a forward speed as possible.

(v) Ditching should be along the swell or into the wind if the swell is not steep.

(vi) When contact with the water is made the tailplane will probably break off and the aircraft will tend to bounce.

Note: When wing drop tanks are fitted these must be jettisoned prior to ditching.

64. *Pressure Cabin Failure:*

At high altitudes, should either partial or complete failure of the cabin pressurising occur, or cracks appear in the sliding hood, the pilot must:-

(a) Open the dive brakes and descend immediately.

(b) Turn the oxygen supply to emergency.

(c) Do not turn off the cabin pressurising until below 35,000 ft.

65. *Emergency Equipment:*

A crowbar is stowed in spring clips on the left-hand side of the bulkhead behind the pilot's seat.

"66. *Abandonment by Parachute:*

The recommended procedure for abandoning the aircraft by parachute is as follows:—

(a) Reduce speed to the minimum at which the aircraft can be comfortably rolled onto its back.

(b) Jettison the canopy.

(c) Trim the aircraft as nose heavy as possible, whilst still being able to maintain control by over-riding this trim with the control column.

(d) Disconnect the intercommunication cord, oxygen tube, &c.

(e) Roll the aircraft onto its back and release the safety harness, at the same time allowing the control column to go forward. The resultant bunt should throw the pilot clear of the tailplane.

Note.—Owing to the positioning of the tailplane pilots are advised that where possible a forced landing should be chosen in preference to abandonment by parachute.

67. *Flight in Severe Turbulence:*

The recommended speed for flight under severe turbulence—220 knots I.A.S.".

"68. *Emergency Fuel:*

Aviation Gasoline, either 73, 91/98 or 100/130 octane plus 3% Aviation Lubricating Oil, either 100 or 120 second. If any of the above emergency fuel mixtures are used the following limitations must be observed:—

(a) Flight above 15,000 ft. is prohibited.

(b) Aerobatics are prohibited.

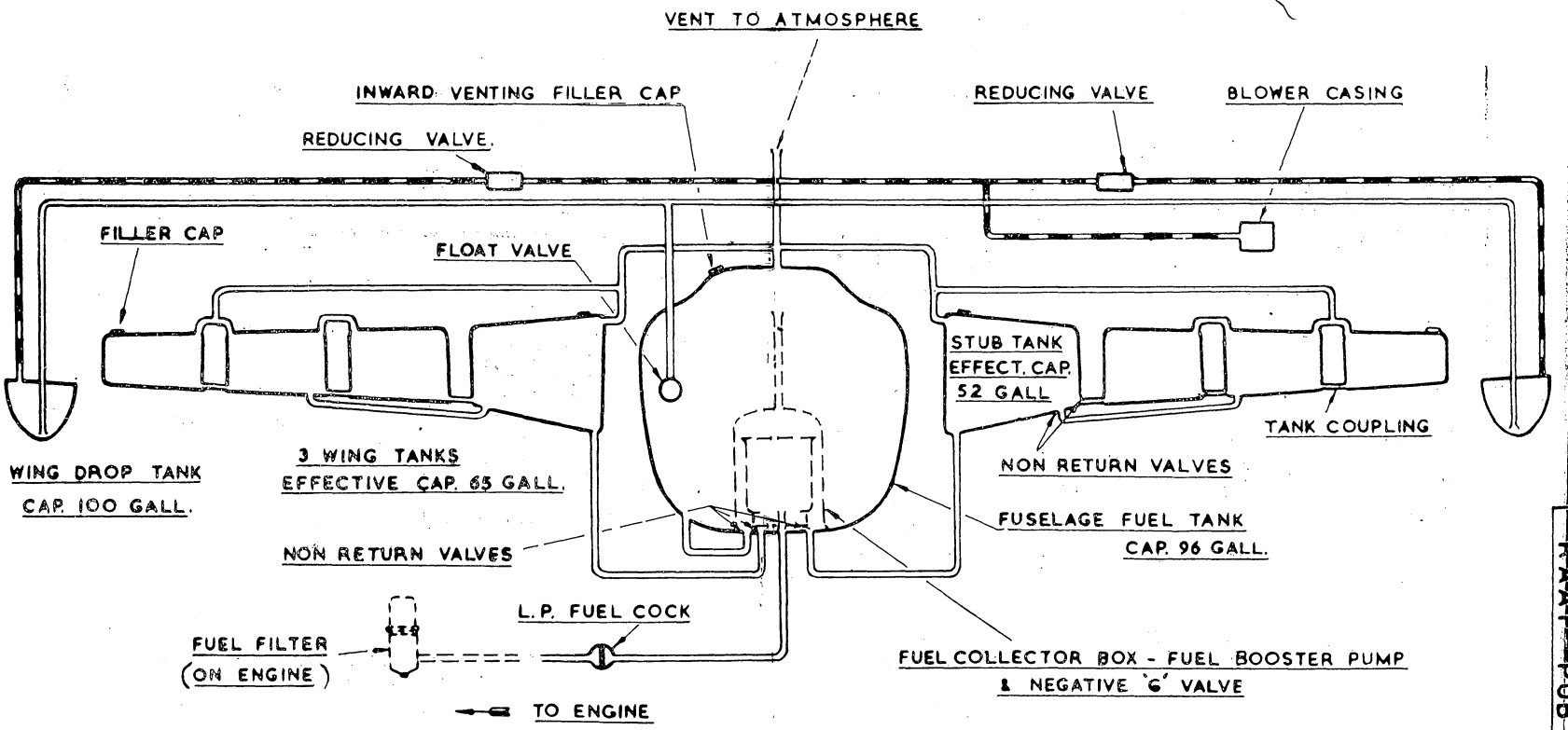
Notes: (i) With these emergency fuels the range will be decreased by approximately 10%. It will also be found that the engine may overspeed and consequently care is to be taken that maximum R.P.M. is not exceeded by controlling with the throttle.

(ii) At equal R.P.M. the engine power is the same for either kerosene or gasoline.

(iii) The 10% decrease in range with gasoline is to be taken into account if remaining gasoline in the aircraft tanks after emergency flight is used for further flying with or without addition of kerosene.

PART V - ILLUSTRATIONS

FIG.
1

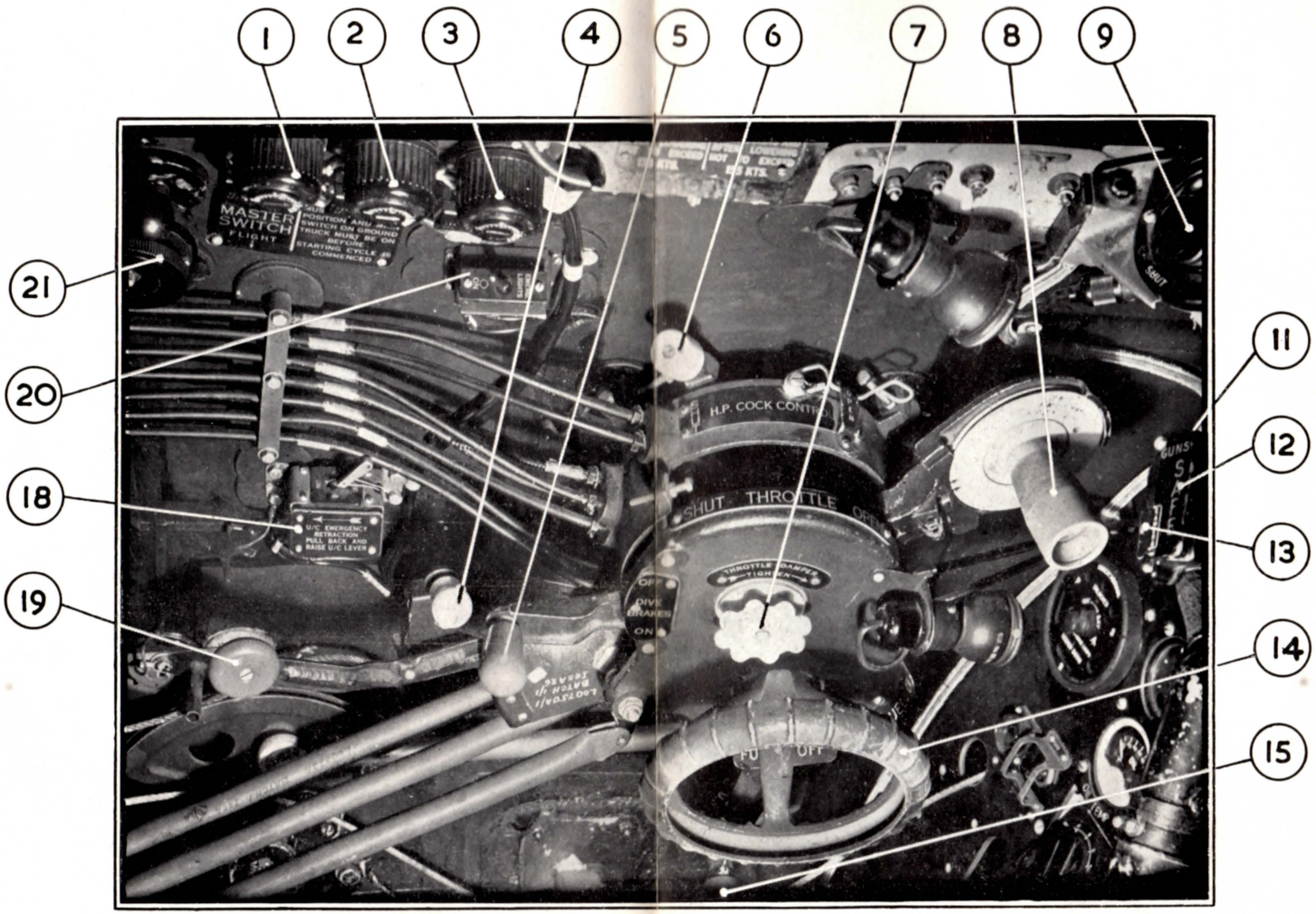


FUEL SYSTEM DIAGRAM

AIR PRESSURE LINES

Key to Figure 2: Cockpit - Port Side.

1. U/V Dimmer Switch.
2. Instrument Panel Dimmer Switch.
3. Junction Box No. 1 Dimmer Switch.
4. Flaps Selector Lever.
5. Dive Brakes Lever.
6. High Pressure Fuel Cock Lever.
7. Friction Control.
8. Throttle Lever.
9. Cabin Ventilator.
11. Press to Speak Switch.
12. Firing Pushbutton.
13. Camera Push Switch.
14. Elevator Trimming Tab Control.
15. Low Pressure Fuel Cock Lever.
18. U/C. Emergency Retraction Switch.
19. U/C. Selector Lever.
20. Emergency Light Switch.
21. Master Switch.

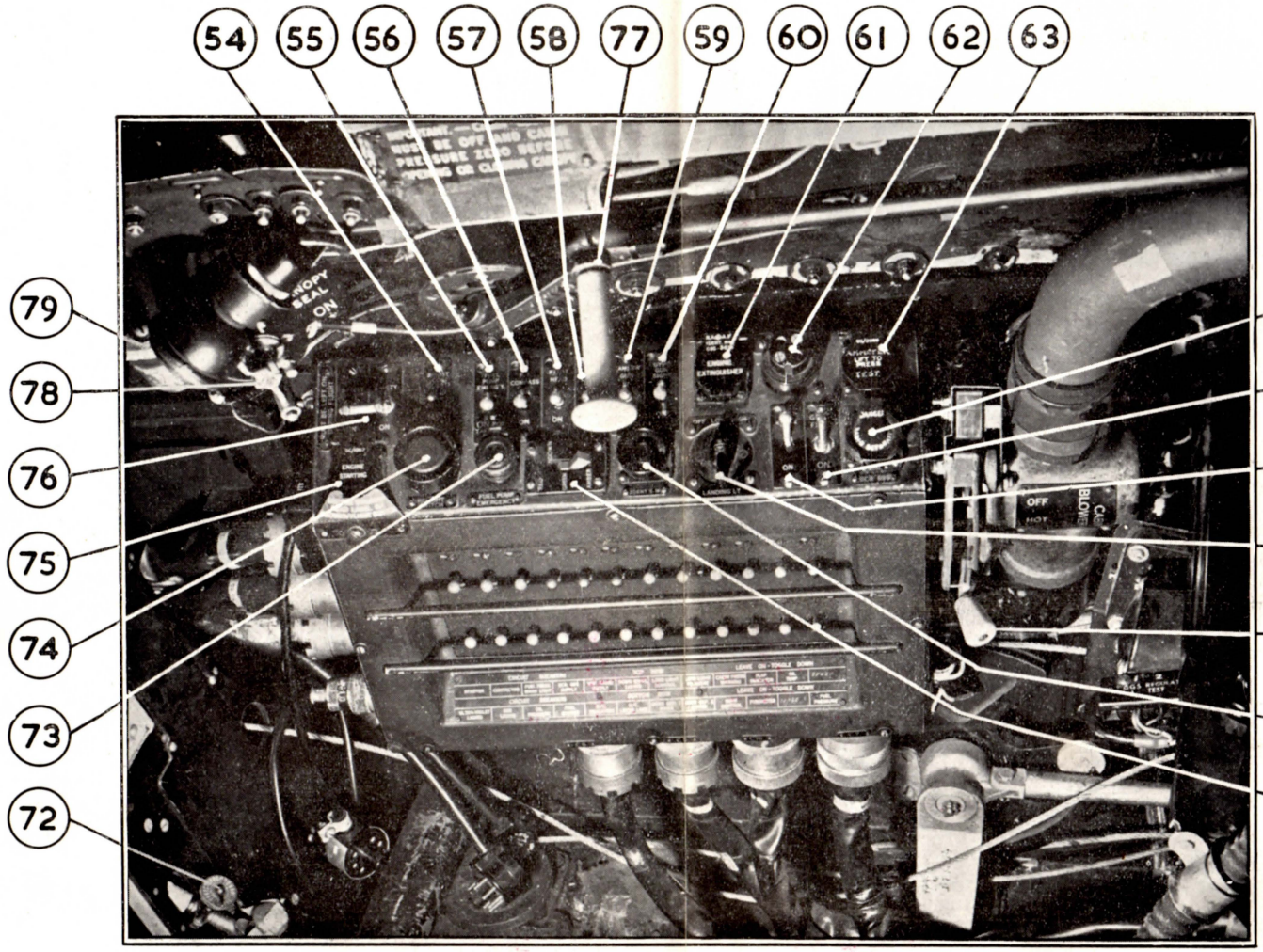


COCKPIT - PORT SIDE

FIG. 2

Key to Figure 3: Cockpit - Starboard Side.

54. Boost Coil Isolating Switch.
55. Emergency Fuel Pump Switch.
56. R.I. Compass Switch.
57. Pitot Head Switch.
58. Navigation Lights Switch.
59. Camera Gun Switch.
60. Gyro Gunsight Switch.
61. Engine Fire Extinguisher Button.
62. Fuel Pump Test Socket.
63. Ammeter Test Button.
64. Radio Detonator Button.
65. Cabin Blower Air Control.
66. Generator Field Switch.
67. Spare Switch.
68. Landing Light Switch.
69. Ident Light Signalling Switch.
70. Ident Light Selector Switch.
72. De-Icer Pump.
73. Emergency Fuel Pump Lamp.
74. Relight Switch.
75. Engine Starting Button.
76. S.C. Safety Switches.
77. Canopy Winding Handle.
78. Canopy Seal Cock.
79. Canopy Jettison Lever.

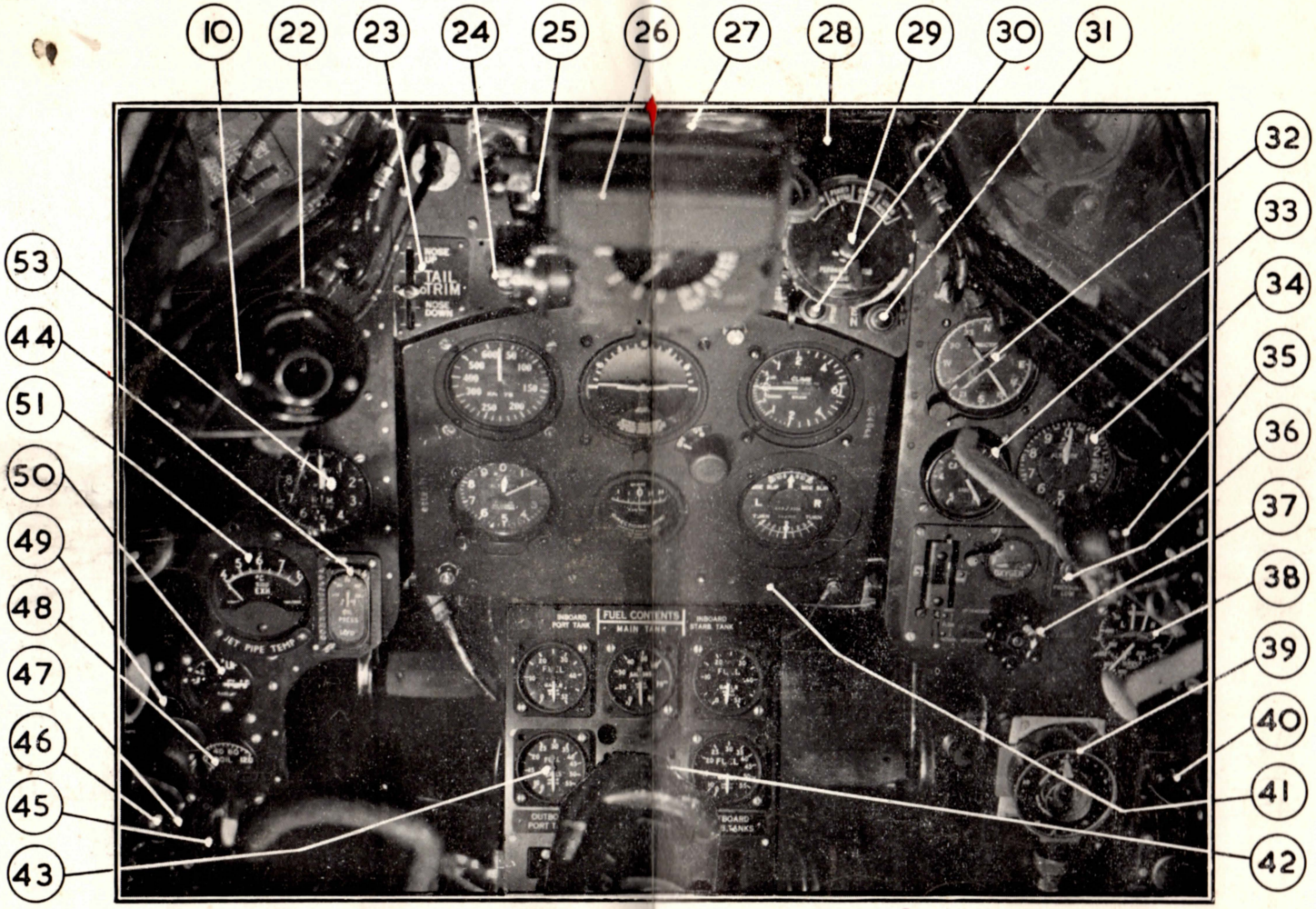


COCKPIT - STARBOARD SIDE

FIG. 3

Key to Figure 4: Cockpit - Instrument Panel.

10. U/C. Warning Light.
22. Machmeter.
23. Elevator Trim Indicator.
24. Fuel Pressure Warning Light.
25. Emergency Light.
26. Gyro Gunsight.
27. Gyro Gunsight Recorder.
28. E.2. Compass.
29. Gunsight Selector Dimmer Control.
30. Fire Warning Light.
31. Generator Warning Light.
32. R.I. Compass Indicator.
33. Cabin Air Pressure Gauge.
34. Cabin Altimeter.
35. Suction Gauge.
36. Cabin Prossure Warning Light.
37. Oxygen Regulator.
38. Brake Pressure Gauge.
39. Camera Footage Indicator.
40. Controllers SCR-695-A.
41. Blind Flying Panel.
42. Clock.
43. Fuel Gauges.
44. Oil Pressure Gauge.
45. TR-1520 Controller.
46. "G" Switch.
47. Manual Switch SCR-695-A.
48. Oil Temp. Gauge.
49. U/C. Position Indicator.
50. Flap Position Indicator.
51. Jet Pipe Temp. Gauge.
53. R.P.M. Indicator.



COCKPIT - INSTRUMENT PANEL FIG. 4