STAMPE SV4.C
RENAULT ENGINED

OPERATING MANUAL

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1.0 GENERAL DESCRIPTION

1.1 **Construction** – The Stampe SV4 is a biplane of wire-braced wooden construction and fabric covered. It has a fixed undercarriage, a fully castoring tail-wheel, independent brakes and dual controls. The two cockpits are in tandem and in some examples are enclosed by a sliding hood.

1.2 **Engine** – The aeroplane is powered usually by a Gypsy Major engine or a Renault 4P series engine driving a two bladed, fixed pitch wooden propeller. The Renault engine usually has a compressed air self-starter.

1.3 **Dimensions** – The principal dimensions are as follows:

Max Wing Span	8385 mm (27' 6")
Length on ground	6810 mm (22' 4")
Height on ground	2825 mm (9' 3")

2.0 FUEL SYSTEM

2.1 **Fuel tanks and venting** – Fuel is carried in a single tank between the two upper main planes. The capacity can be 80, 90 or 115 litres (18, 20 or 25 gallons) depending on the type of tank fitted. From the tank the fuel flows by gravity to single fuel cock and thence to

2.2 **Fuel cock** – The fuel cock is usually operated by a single push/pull rod on the port side of each cockpit. A release spring is provided to hold the cock in the open position when so required. The fuel cock should be set fully open before starting and must remain in this position at all times when the engine is running.

2.3 **Fuel gauges**

a. Contents – A float operated direct reading gauge is fitted to the underside of the fuel tank on the port side. The gauge will give an optimistic reading when the aeroplane is in a tail down attitude, i.e. on the ground.

b. Fuel pressure – A gauge, indicating the pressure at which fuel is being delivered by the fuel pumps to the carburettor, is fitted outside the fuselage in front of the forward cockpit on the starboard side.

3.0 RENAULT ENGINE

3.1 **Renault** – The aeroplane is powered by an inverted, four cylinder, air-cooled Renault 4P series engine driving a two bladed, fixed pitch propeller. The engine develops 145 hp at 2430 rpm at sea level in ISA conditions. Two engine driven fuel pumps are provided. The engine also drives an air compressor for the starting system.

3.2 **Priming**

a. A priming button on either of the fuel pumps is operated to ensure that the pipeline to the carburettor and the float chamber are filled with fuel at a pressure of 20 pz [200 g/cm^2] (2.84 psi).
b. The manifold is primed by operating the throttle lever until fuel appears at the manifold drain.

3.3 **Throttle and mixture controls**

a. Throttle – Interconnected throttle controls are provided, one in each cockpit on the port side.
b. Mixture – A mixture control is mounted with each throttle control and is moved forward to weaken the mixture. A catch on the throttle bottle lever is arranged to bring the mixture leaver back to the fully rich position whenever the throttle is closed.
c. Friction control – A friction nut is provided on each assembly for both throttle and mixture control levers.

3.4 **Carburettor air intake** – It should be noted that on Renault engine Stampes there is usually a provision for hot air to be provided to the carburettor.

3.5 **Starting and stopping controls**

a. Starter mixture control – An enriched mixture is required for starting when cold. A device is incorporated within the carburettor to provide this. This device, known as the Starter should be in the closed position for normal use and in the open (rich) position when starting from cold. The control is provided in the rear cockpit below the instrument panel on the starboard side. The control is pulled to provide the starting mixture and may be locked in this rich position by turning the control knob.

b. Ignition switches – A multiple ignition switch is provided on the instrument panel of each cockpit. The switch provides four positions – Off position, No.1 magneto only, No. 2 magneto only or both magnetos On. Both magnetos must be switched to both when the engine is running. The ignition can be switched Off to stop the engine from either cockpit. An impulse starter coupling is on the starboard magneto (No. 1). When starting, especially when starting by hand, this magneto only should be used, the switch being set to both as soon as the engine starts.

c. Compressed air starting – A compressed air cylinder is mounted within the fuselage behind the rear cockpit. It is controlled by a pull handle in either or both cockpits below the instrument panel on the starboard side. The control is protected from accidental use by a spring loaded plunger on under-side. This plunger must be pulled out and held whilst operating the control handle.

d. Slow running cut-out – A slow running cut-out control is provided in the forward cockpit below the instrument panel on the starboard side. The control knob is marked ETOUFFOIR. To stop the engine close the throttle and pull the cut-out knob. Release the knob after the engine has stipped and switch off the magnetos.

3.6 **Oil System** – A 6 litre (1.32 gallon) oil tank is mounted outside the fuselage on the port side to the rear of the engine cowling. A dipstick is attached to the filler cap. A scoop on the outside of the tank passes air through an integral cooler. Oil is fed to the bearings of the engine under pressure via a filter in a housing, which is an integral part of the crankcase. The oil is scavenged from the crankcase and returned to the oil tank.

3.7 **Engine instruments** – An engine speed indicator (rpm) and an oil pressure gauge are provided on the left hand side of the instrument panel in each cockpit. An oil temperature gauge is usually mounted outside the fuselage in front of the forward cockpit on the port side. A fuel pressure gauge is usually mounted outside the fuselage in front of the forward cockpit on the starboard side.

4.0 AIRCRAFT CONTROLS AND FLIGHT INSTRUMENTS

4.1 **Flying controls** – The rudder pedals can be adjusted for leg reach only when on the ground. They may be adjusted in the front cockpit by lifting the spring clip and locating pin or in the rear cockpit by pulling the release knobs immediately in front of the seat.

4.2 **Trimming** – A trim tab is fitted to the elevator and can be adjusted in flight by sliding control knob on the port side of each cockpit.

4.3 **Wheel brakes** – The wheels are fitted with cable operated mechanical brakes. The brakes are applied to one wheel or the other at the limits of rudder pedal travel.

A lever on the port side of the rear cockpit may be used to apply both brakes equally. It may be locked on by manually engaging a pawl fitted to the lever. The lever should not normally be used other than for parking or for engine tests.

4.4 **Flight Instruments**

a. Air speed indicator – A combined pressure/static head usually mounted on port side forward interplane strut activates the Air Speed Indicator.

b. Compass – B compass is provided in each cockpit usually on the starboard side of the instrument panel.

c. Altimeter – An Altimeter (ft) and a vertical speed indicator (ft/min) is provided in each cockpit.

5.0 GENERAL EQUIPMENT

5.1 Seats and Harness

a. Seats – The Seats are designed for use with seat type parachutes and are adjustable for height. The rear seat may be adjusted by using a lever on the starboard side of the cockpit; the seat is spring loaded and the lever should be released only when the seat is occupied. The front seat may be adjusted by turning a large hand knob immediately in front of the seat.

b. Harnesses – The safety harness embodies a negative G restraint strap and a quick release box. There are two lap straps providing in all a seven point harness. There are two methods adopted for fastening the harness:

- Fasten the first lap strap. Insert the negative G strap and shoulder straps. Tighten the straps in the same sequence. Fasten the second lap strap over all others and tighten it.

Alternatively:

- Fasten the first lap strap. Insert the negative G strap and tighten in the same sequence. Fasten the second lap strap, to this insert the shoulder straps and tighten in the same sequence. This method in effect provides two harnesses, one restraining downwards and one backwards and may be preferred for aerobatics.

5.2 Stowage

Stowage for maps is on the starboard side of the rear cockpit.

A luggage compartment is provided aft of the seat in the rear cockpit. The permissible load is restricted by the maximum all up weight and the centre of gravity limits.

6.0 AIRFRAME LIMITATIONS AND OPERATING DATA

6.1 Dimensions

- Max Wing Span 8385 mm (27' 6")
- Length on ground 6810 mm (22' 4")
- Height on ground 2825 mm (9' 3")

6.2 Speeds

• Climb	54/57 kt	(63/65 mph)
• Cruise, economic	75 kt	(87 mph)
• Cruise, maximum	91 kt	(105 mph)
• Glide for range	54 kt	(63 mph)
• Stall max. (AUW)	36 kt	(41 mph)
• Maximum permissible	148 kt	(170 mph)

6.3 Weight and Centre of Gravity

a. Maximum all up weight 769.5 kg (1696 lbs)

b. Centre of gravity limits:

- Fiche de Navigabilite No. 6 Forward 19.5%
  Aft 36%

- Manufacturer: Forward 29%
  Aft 32.8%

6.4 Take off and Landing Distances

At the maximum weight of 1696 lbs (769.5 kg) the approximate take off and landing distances in ISA conditions with no wind:

	Ground Run	To/From 65 ft
• Take off	125 m (137 yds)	260 m (284 yds)
• Landing	370 m (410 yds)	515 m (629 yds)

These distances will be affected by the following which are cumulative:

- Each 1000ft increase in altitude increases the distances by 10%
- Each increase in temperature of 10°C may increase the distances by 20%
- Each 5% in decrease in AUW decreases the distances by 10%
- A 2° uphill slope can add 10% to take off run.
- A headwind component of 10% of the lift off speed will decrease the take off distance 20%
- Long grass, soft ground or snow can add up to 30% to the take off run and in severe cases can prevent lift off speed being attained.

6.5 Ceiling

- Service ceiling (approx.) 16,000 ft
- Absolute ceiling (approx.) 19,800 ft

6.6 Miscellaneous

- When the aeroplane is flown solo the pilot must occupy the rear seat.
- Tyre pressures: 1.5 bar [1.5 kg/cm^2] (21 psi)

7.0 ENGINE LIMITATIONS AND OPERATING DATA

7.1 Engine Speeds

- Cruise, economic -
- Cruise, normal 2100–2150 rpm
- Cruise, maximum 2150 rpm
- Maximum 2400 rpm
- Maximum overspeed 2520 rpm
- Idling 400 rpm

Note: It is advisable not to exceed 2150 rpm in flight without exceptional reason, in which case always remain within the maximum of 2520 rpm.

7.2 Oil Pressures

• Minimum (at 2400 rpm)	2 hpz	[2 kg/cm^2]	(28.4 psi)
• Normal	3 hpz	[3 kg/cm^2]	(42.6 psi)
• Maximum	3.5 hpz	[3.5 kg/cm^2]	(49.7 psi)

7.3 Oil Temperatures

- Maximum for opening up beyond 1500 rpm 30^{o}C
- Cruise, maximum 60^{o}C
- Full throttle, maximum 75^{o}C
- Exceptionally for very short periods for take off and climb 90^{o}C

7.4 Fuel Type – 80 Octane

7.5 Fuel Pressure (at 2400 rpm)

• Minimum			20.0PZ	[200 g/cm^2] (2.84 psi)
• Normal			22.5PZ	[225 g/cm^2] (3.19 psi)
• Idling:	Individual pumps		20.5PZ	[205 g/cm^2] (2.91 psi)
	Both pumps		22.5PZ	[225 g/cm^2] (3.19 psi)
• Full throttle:	Individual pumps		21.0PZ	[210 g/cm^2] (2.98 psi)
	Both pumps		22.5PZ	[225 g/cm^2] (3.19 psi)

7.6 Consumptions

Fuel

2100 rpm	32 l/hr (7 gals/hr)
2200 rpm	-
2400 rpm	47 l/hr (10.3 gals/hr)

Oil

2100 rpm	1 l/hr (0.6 pint)
2200 rpm	-
2400 rpm	1.5 l/hr (0.8 pint)

7.7 Propellers

Speed attainable, full power ground run

Manufacturer:	
Chauviere 6606	1950-2050 rpm
Levasseur 1536	2000-2100 rpm
Legere 2011-09-16	2000-2100 rpm

7.8 Clearances

- Sparking plug cap 15-16/1000 inch
- Magneto contact breaker 15-16/1000 inch
- Valve clearances – cold 12/1000 inch

8.0 HANDLING – STARING TAXIING AND TAKE OFF

8.1 Initial Checks

- Position and heading of aircraft
- General appearance (level, no leaks)
- Hood condition and operation (if fitted)
- Front Cockpit
  (1) Ignition switches off
  (2) Throttle friction nut loose
  (3) Harness secure (if solo)
  (4) Rudder pedals adjusted (if dual)
  (5) Loose articles?
  (6) Compressed air pressure
- Rear Cockpit
  (1) Brakes off (unless not choked)
  (2) Fuel cock open
  (3) Ignition switches off
  (4) Loose articles?
  (5) Baggage compartment - contents secure.
  (6) Rudder pedals adjusted.
  (7) Cut out switch closed
  (8) Starter mixture control closed

8.2 External Checks

Carry out a systematic check of the aircraft exterior for obvious signs of damage, leaks, loose panels or fairings. Make the following specific checks:

- **Starboard Fuselage**
  (1) Inspection panels: Secure
  (2) Under-surface of fuselage: Sound
  (3) Drain compressed air cylinder if due
- **Tail assembly**
  (1) Tail plane: Condition - tension and condition of bracing wires
  (2) Tail wheel: Condition. .
  (3) Elevators: Full and free movement. Condition of hinges, trim tab and linkages.

(4) Rudder: Full and free movement - condition of hinges, control cables and attachments.
(5) Stern post: Condition.
(6) Fin: Security.

- **Port Fuselage**
  (1) Inspection panels secure.

- **Port Mainplanes**
  (2) Ailerons: Full and free movement. Condition of hinges. Condition of actuating cable around pulleys.
  (3) Pressure head: Cover removed. Condition.
  (4) Wires: Condition and tension of flying, landing and stagger wires.

- **Port undercarriage**
  (1) Undercarriage leg: Extension
  (2) Tyre: Condition and pressure.
  (3) Undercarriage struts: Free movement.

- **Centre section**
  (1) Fuel tank: Cap secure. Vent clear.
  (2) Fuel gauge: Contents.
  (3) Bracing wires: Condition and tension.

- **Engine and propeller**
  (a) Port side
    (1) Engine mountings: Condition.
    (2) Control linkages: Secure.
    (3) Oil tank: Contents. Cap secure.
    (4) Pressure relief valve: free.
    (5) Compressed air system: Cock open.
    (6) Cowling secure.

  (b) Starboard side
    (1) Engine mountings: Condition.
    (2) Control linkages: Secure.
    (3) If ready to start the engine prime fuel pump to give a pressure of 20 pz [200 g/cm^2] (2.84 psi).
    (4) Cowling secure.

- **Propeller**
  (1) Condition of blades. Secure and locked.
  (2) Unused engine:
  If the engine has been unused for any prolonged time, pull the propeller through revolutions by hand with the magneto switches Off. Check for any abnormal resistance.

- **Starboard undercarriage** as for port undercarriage
- **Starboard mainplanes** as for port mainplane

8.3 **Cockpit checks** – Enter the cockpit and fasten the straps.

a. Check full and free movement of the flying controls, surfaces moving the correct direction.
b. Check from left to right around the cockpit:
   (1) Apply parking breaks
   (2) Elevator trim control. Full and free movement in correct direction. Set to neutral position.
   (3) Throttle and mixture controls. Open throttle, set mixture control fully lean, check that mixture control moves back to rich when the throttle is closed. Set throttle friction nut.
   (4) Instruments. Check condition. Set altimeter to zero.
   (5) Fuel cock open. Spring attached.

8.4 **Starting the engine** – Note: After standing for any prolonged time it is essential, before starting to pull the propeller four revolutions by hand with the magneto switches Off. If abnormal resistance is felt, remove the sparking plugs to drain any fuel or oil which may be responsible.

a. Preliminaries

(1) Position the aircraft into wind.
(2) Check fuel and oil levels.
(3) Check compressed air pressure.
Minimum for use:
Summer 114 psi [8 kg/cm^2] (7.84 bar)
Winter 284-426 psi [20-30 kg/cm^2] (19.6-29.4 bar)
(4) If very cold, pre-heat the oil.
(5) Open the fuel cock.
(6) Ensure that the cut-out is pushed home.
(7) Check that the ignition override switch is set to Normal.

(8) Ensure that one of the fuel pumps has been primed to give a fuel pressure of 200 g/cm^2 (2.84 psi).
(An engine which has been in recent use should not require priming).

(b) Starting procedure

(1) Pre-start Checks

(a) Ground crew calls:

- Fuel on. Brakes on. Throttle closed. Switches off.

(b) Pilot:

- Checks and confirms:
- Fuel on. Brakes on. Throttle closed. Switches off.
- Gives and maintains a thumbs down signal.
- Operates the throttle lever
  (This primes the manifold by operating the accelerator pump in the carburettor).
- Cease operating the lever when fuel is seen at the manifold drain.
- Pull the starter mixture control and twist to hold open.
- Suck in fuel by pulling the propeller through four revolutions by hand.
- Check that personnel are clear of the propeller.

(2) Air start

- Switch on No. 1 magneto (not No. 2 in order to avoid backfiring). The impulse device on No. 1 magneto will facilitate starting.
- Pull the air starter handle and release promptly.

(3) Starting by hand

(a) Ground crew positions the propeller and calls: "Throttle set, contact!"

(b) Pilot: Switch on No. 1 magneto. Replies: "Contact!" and give 'thumbs up' signal (only the No. 1 magneto with the impulse device should be used for starting.

(c) The ground crew swings the propeller through the compression.

- Once the engine is running, switch on both magnetos.

- Close the starter mixture control when black fumes are seen at the exhaust or after a maximum of one minute.

(4) Staring warm. As above but do not use the Starter mixture.

(5) Hints:

- Do not operate the air starter for more than 4 or 5 seconds. If the motor fails to start, recommence the procedure but avoid emptying the air cylinder without success with consequent wetting of the sparking plugs.

- If the engine only fires once at each swing of the propeller, it indicates an excess of fuel. Switch off the magnetos, open the throttle wide and blow out the engine by turning the propeller by hand rapidly in the normal direction for as long as possible, then recommence without using the Starter mixture.

- If the motor starts but then stops after a few explosions, restart the procedure with slightly more throttle opening.

8.5 After Starting

- Set the motor to turn over at 800 rpm but use low revolutions for as little as possible to avoid bougle encrassement! (sparking plug fouling).
- Check that the oil pressure is rising. If it is not normal within about 10 seconds, stop the engine and ascertain the cause.

8.6 Warming the engine

- Increase engine speed to 1200 rpm and allow the motor to warm until the oil temperature reaches 30^{o}C (the airframe manual recommends that the motor should be run at 400-600 rpm for 4 minutes before slowly increasing the speed).
- Carry out the ignition dead cut check.
- Test the radio and/or intercom.

8.7 Engine Checks

- Ensure that the engine temperature has reached 30^{o}C.

- The aircraft should be headed into wind.
- Set the brakes on fully, centralise the rudder, hold the control column fully to the rear, increase the engine speed to 1800 rpm and carry out the following checks:

(1) Select individual magnetos in turn. The engine should not vibrate abnormally and the engine speed should not drop by more than 50 rpm.

(2) Check instrument readings:

Oil pressure normal	3 hpz	[3 kg/cm^2]	(42.6 psi)
Fuel pressure normal	20 pz	[220 g/cm^2]	(2.84 psi)

(3) Set full power and confirm that the engine speed attained corresponds to that prescribed for the propeller in use. The period for which full power is applied should not exceed 10 seconds.

(4) Close the throttle slowly and check the minimum slow running speed.

(5) Set the throttle to give 800-1000 rpm

8.8 **Taxiing** – to brake one wheel push the rudder bar to the end of its travel. Do not use the brake lever. The brake lever should be used only for parking and engine checks.

8.9 **Pre-Take Off Checks**

- Trim neutral position.
- Throttle friction nut, Tight.
- Mixture. Fully rich.
- Magnetos. Both on.
- Fuel. Cock on. Contents sufficient.
- Gauges. Oil pressure/Oil temperature/Fuel pressure.
- Harness. Secure and tight.
- Flying controls. Full and free movement.

8.10 **Take off**

(a) Initial actions

- Align the aircraft with the take off path, release the brakes, open throttle slowly to the fully forward position.

- Keep the aircraft straight by use of the rudder. There is a tendency to swing to starboard if the throttle is opened too quickly.
- Raise the tail wheel and fly the aircraft off at approximately 40 kts (46 mph).

(b) Checks after Take Off
- Brakes fully off.
- Oil pressure and temperature.
- At a height of 300 ft reduce power. Full throttle should be used only for take off and initial climb, reduce power as soon as possible to a level which permits the continuation of the climb.

9.0 HANDLING IN FLIGHT

9.1 **Climbing** – Climb at 54-57 kts (63/65 mph) depending upon the load. The mixture control should be left in the fully rich position.

9.2 **General Flying**
- Cruising – once operating height has been reached, the engine speed should be set at 2100-2150 rpm. It is advisable not to exceed this without exceptional reason in which case always remain within the maximum of 2520 rpm. The maximum cruising speed will be 91 kts (106 mph).
- Flying for range – to obtain the most economic mixture at an altitude above about 5000 ft progressively use the mixture control.
- Operating the mixture control – the mixture control should be used with care. Operation too soon or return too late during descent will create too lean a mixture which will overheat the engine and damage the valves and pistons. At an altitude above 4900 ft note the engine speed, slowly move the mixture control lever forward until a reduction in engine speed is noticed or rough running commences, then move the lever to enrich the mixture more sufficiently to restore the engine speed and smooth running.

- Checks – in flight periodically check that:

- Oil pressure does not drop below 2 hpz [2 kg/cm^2] (28.4 psi).
- Oil temperature does not exceed 75-80^{o}C
- Fuel pressure does not fall below 2 pz [200 g/cm^2] (2.84 psi).
- From time to time check the functioning of each magneto separately.

- Limiting Speeds

Cruise, economy	1950 rpm	75 kts	(87 mph)
Maximum, continuous	2150 rpm	91 kts	(105 mph)
Maximum	2400 rpm	107 kts	(123 mph)
Overspeed in dive	2520 rpm	148 kts	(170 mph)
Optimum glide path		54 kts	(62 mph)
Stall. Approximate there is no buffet.		36 kts	(42 mph)

- Stalling, Spinning and Aerobatics Checks
  - Height: Sufficient for recovery.
  - Airframe: Brakes fully off. Gyros caged.
  - Security: Harness secure and tight. No loose articles.
  - Engine: Mixture fully rich/oil pressure/oil temperature and fuel pressure within limits/fuel sufficient.
  - Location: Clear of controlled air space and populated areas.
  - Lookout: Clear of other aircraft and cloud.

- Spinning
  - Entry. Close the throttle and at about (41 kts) apply full rudder in the intended direction of the spin and move the control column fully back.
  - Recovery. Apply full rudder opposite to the direction of the spin. Pause. Move the control column forward until the rotation ceases. Ease the aircraft out of the dive.

9.3 Aerobatics

- Initially the following entry speeds are recommended:

Loop	100 kts	(115 mph)
Slow roll	100 kts	(115 mph)
Stall turn	100 kts	(115 mph)
Roll of the top	120 kts	(138 mph)

o Vertical half roll	120 kts	(138 mph)
o Spin	41 kts	(47 mph)
o Flick roll	70 kts	(81 mph)
o Inverted turns	80 kts	(92 mph)
o Outside loop	120 kts	(138 mph)

It should be noted that Fiche de Navigabilite No. 6 prohibits Spins and Flick rolls.

- An unintentional flick may result from an inverted turn below 92 mph (80 kts). An outside loop pushing hard below 92 mph (80 kts) will produce a negative flick.
- An unintentional inverted stall with the nose well up may produce a high rate of descent.
- A flick roll in excess of 70 kts (81 mph) may cause serious structural damage.
- For manoeuvres in the looping plane care should be taken not to exceed rpm limitations at high speed.
- Except in the case of the 4PO5, during manoeuvres involving negative G the throttle should be closed before reaching the inverted attitude. The engine should be cleared at normal power for several seconds after such a manoeuvre.

10.0 APPROACH AND LANDING

10.1 Checks before descending to join the circuit

- Fuel. Sufficient.
- Engine. Oil pressure and temperature. Fuel pressure.
- Compass. Check heading.
- Altimeter. Set.

10.2 Checks before landing

- Brakes off.
- Mixture rich.
- Fuel sufficient.
- Hood locked as required.
- Harness secure and tight.

10.3 Approach

- Reduce speed to 62 kts (72 mph) on the Base Leg. Maintain 62 kts (72 mph) during the final turn.

- Close the throttle. Set the trim control in the neutral position. Reduce speed as the threshold is approached to 54 kts (62 mph)

10.4 **Landing** – as the landing area is approached round out. Aim to touch down in the three-point attitude. When the tail wheel is firmly on the ground, hold the control column fully back. Do not use the handbrake on landing unless absolutely necessary to avoid obstacles.

10.5 **Cross wing landing** – the aeroplane is particularly susceptible to crosswinds and will easily lift a wing. The maximum advisable crosswind component is 8 kts. Up to this strength the 'crabbing' technique may be used. In crosswind components above 8 kts the side-slipping, crossed control, curving path should be adopted.

10.6 **Shut down procedure**

- After landing allow the engine to turn at 1000 rpm and test the magnetos for a dead cut.

- Allow the engine to run at idling speed for about 30 seconds.

- Stop the engine by pulling the slow-running cut out. It is recommended that the motor is stopped only by using the cut out especially after prolonged taxiing or ground running when the reduction in effective cooling may induce running on by self ignition.

- After the engine has stopped, turn off the magneto switches in both cockpits. Turn off the fuel cock. Close the compressed air cocks in the forward cockpit and under the port sides engine cowling.

11.0 EMERGENCY HANDLING

11.1 Engine Failure after Take Off

- Select gliding attitude.
- Pick landing area.
- Warn passenger.
- Make RT call.
- Carry out Forced Landing Checks (se below).

11.2 Engine Failure in Flight

a. Immediate Actions

- Close throttle. Gain height if possible whilst reducing speed to 54 kts (62 mph) for the glide.
- Warn passenger.
- Notice wind direction and select landing area.
- Check altimeter setting.
- Plan descent.

b. Subsequent Actions

- Check for cause of failure. Set throttle. Fuel on and sufficient. Mixture rich. Magneto switches On.
- If fault found: make RT call. Attempt restart if height available.
- If fault mechanical:
  Fuel Off
  Magnetos Off
  Make RT call

- Make abandon decision before reaching 1500 ft AGL

11.3 Forced Landing

a. Checks

- Fuel Off
- Brakes Off
- Magnetos Off
- Hood open and locked. Do not jettison.
- Harness Secure and tight

b. Landing. If speed is high after the round out land on the main wheels except on rough or sort ground when a three point landing is essential.

11.4 Restarting the engine in flight

a. Check: Fuel Cock open
   Throttle set.
   Magneto switches On
b. Propeller windmilling. If engine fails to recover, carry out forced landing or abandon the aircraft.
c. Propeller stationary. Operate the compressed air starter. If starter fails to restart the engine by diving very steeply providing sufficient height will remain to carry out a forced landing if necessary. Application of rudder or elevator to produce an asymmetric load on the blades may assist in moving the propeller.

11.5 Abandoning the aircraft – the minimum height for deciding to abandon the aircraft is 1500 ft AGL except when in a spin when it is 5000 ft AGL. Action:

- Warn passenger.
- Make distress call.
- Release safety harness.
- Reduce speed to as low as possible.
- Disconnect RT lead.
- Abandon aircraft by diving towards the trailing edge of the lower mainplane.
- If in a spin, leave the aircraft on the outside of the spin.

11.6 Ditching – it is expected that the ditching behaviour of the aircraft would not be good. It is recommended that the aeroplane be abandoned rather than ditched.

- If ditching is unavoidable, carry out the following drill:
  - Warn passenger.
  - Make distress call.
  - Open hood and lock.
  - Release parachute harness.
  - Check safety harness secure and tight.

- Approach into wind at normal speed. If power is available hold off at the lowest practical speed until ready to touch down. Close the throttle and stall in a three point attitude onto the crest of the swell if possible. If the swell is heavy ditch along the line of the swell, be prepared for the aircraft to turn onto its back. After touchdown release the harness and leave the cockpit rapidly.

12.0 RENAULT ENGINE – PERIODIC CHECKS

12.1 After each flight

- Clean off any surplus oil or leakage.
- Check the cowling and fastenings.
- Check the security and condition of the sparking plug leads and magneto earth leads.

12.2 At each 12.5 hours of operation

- Check the fuel filters and the water trap.
- Check the security of the propeller securing nuts.

12.3 At each 25 hours of operation

- Drain the compressed air cylinder.
- Clean the oil filter.
- Check the condition of the various pipes.
- Check the level of oil in the fuel pump casings.
- Check the induction manifold and the exhaust stubs for security, distortion and cracks.

12.4 Every 50 hours of operation

- Check and clean the sparking plugs (Gap 15-16/000 ins).
- Check the magneto contact breaker points (Gap 15-16 thousandth of an inch). Clean the contact breaker housing. Lubricate with Vaseline oil at the oiling point at the top of the casings.
- Check the ignition circuit.
- Clean the carburettor float chamber, jets and filter.
- Lubricate the control linkages.
- Check and adjust the valve clearances (12 thousandths of an inch).
- Check the compression of the cylinders when hot.
- Change the oil in the fuel pumps.
- Change the engine oil.