wa-51.a-pacific

FLIGHT MANUAL

TRANSLATED
FROM
THE MAKERS MANUAL IN FRENCH
FOR
MESSRS ROLLASONS AND AIRCRAFT AND ENGINES
CROYDON – SURREY – ENGLAND

Ste ISSOIRE-AVIATION
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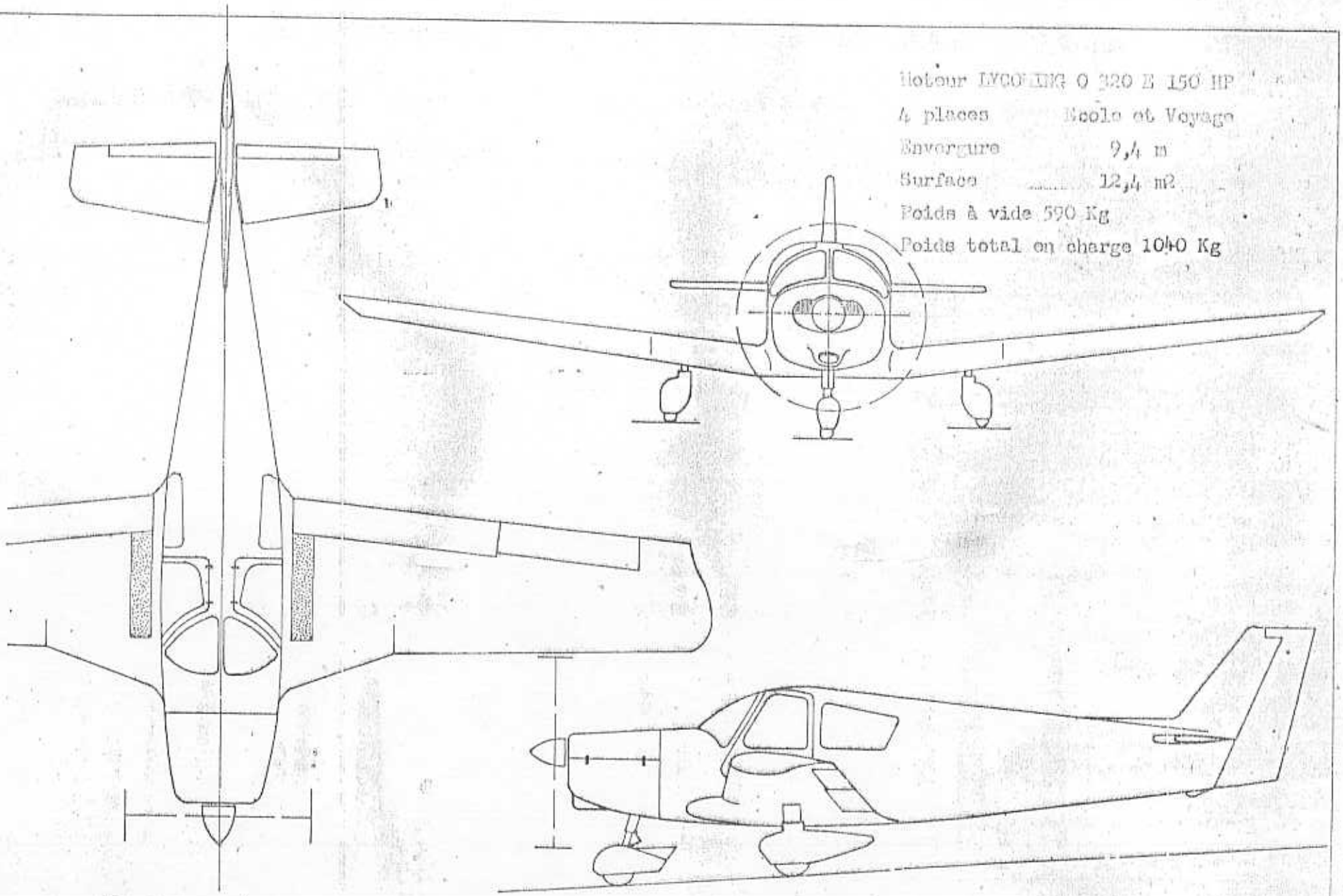
WASSMER-AVIATION – 63501-ISSOIRE – FRANCE – BP 7 –



Moteur LYCOMING O 320 E 150 HP
4 places Ecole et Voyage
Envergure 9,4 m
Surface 12,4 m2
Poids à vide 590 Kg
Poids total en charge 1040 Kg

WASSMER AVIATION

PRÉSENTE LE

wa 51 pacific

page 02

FLIGHT MANUAL

FOR THE WASSMER 5I AIRCRAFT

CONSTRUCTOR : WASSMER-AVIATION ISSOIRE LE BROC-63

Certificate of Type number. 5I

Series Number (individuel aircraft
constructors number)

Certification (date)

Sections i to 5 incl approved by
The Secretariat General à l'Aviation Civile

(stamp and signature for SGAC)

WASSMER-AVIATION
Le Directeur Général

Ce manuel de vol est la traduction en langue anglaise du manuel de vol français approuvé

P.

le 3.5.72

This aircraft must be flown within the limits of use specified in this Flight Manual.

This must be kept permanently in the aircraft.

FLIGHT MANUAL

WASSMER WA 51 AIRCRAFT

LIST OF CONTENTS

SECTION I

GENERAL DESCRIPTION

SECTION 1

GENERAL DESCRIPTION

The WASSMER WA 51 PACIFIC is designed as a simple to operate and confortable touring and pleasure flying four seater aircraft. The design includes the sort of facilities expected of a modern saloop car, and is the culmination of eight years study and development by its makers.

The PACIFIC is unique in powered aircraft in its use of Glass Reinforced Plactic (G.R.P.) as its principal constructional materiel. In this it follows the now accepted practice among the world foremost buildiss of sailplanes; Like a high performance sailplane, the PACIFIC obtains great benefit from the exceptional finish of wing surfaces and coverings which this method of construction permits. Its excellent performance; a this silence of the cabin in fhght; and good lines are evidence of the standard achieved.

The PACIFIC is constructed in seven main elements, which are the two Lalves of the fuselage, the two wings; the power plant; the control surfaces, and the under carrige.

The fuselage

The fuselage is moulded in two Lalves, with the division vertical along the centreline. The moulding includes frames, longitudinals, and all the fittings necessary for subsequant completion. On removal from the moulds, the two Lalves are mated permanent lg together in a manner simelan to that used in the building of highest quality G.R.P. yacht hulls when the hull and dock are joined together.

The Wings

Port and starboard wings are buitt seperatele to the fuselage; each top and bottom surface are than mated together, enclosing littrin the resultand monocoque structure ribs, stiffening pieces, and the massive G.R.P. main

The protraud ends of each main spar butt together ninder the front seat position in the cabin. The actual joint is effected by steel plates and bolts, sothet when dismantling the auciaft (c. g. for overhauf of surface transport) this is the fuet joint to be undone. Other fixings attach the main spar itselj, and the false (or drag s par) to the fuselage; these are locatis at the sides of the fuselage, and mate Lith steed plates embodied in the fuselage moutdigs.

Power Plant

The engine IS a LYCOMING O.320 E flat four developing I50 hp. It drives a Sensenich two-bladed fixed pitch ourscrew (type 74 DM 6 S5 - 0 - 60).

The engine is suspended in a vibration damped dyna-focal steel tube mounting developed by LYCOMING which is attached ta the front of the fuselage thaogh steel plates embolied for the purpose suring moulding. A fireproof bulkhed separates the engine compartment from the fuselage.

Fuel is contained in two similar tanks, one in each wing root. To remove a tank for inspection, the wing is first remord from the fuselage, in the marner aheady indicated, the end forward former rib oy the wing is then remord, aftir which the tank itselt is withdraun. Factu tank contains I6 I/2 gallons all of whech is woable fuel. It is dradn up to the engine by an engine driver pump, supplemented by an electicalby driven auxilian pump nonally used only suring take-offs and landings. A main fuel cock in the cockpit las three positions - PORT TANK - STBA TANK - OFF.

CONTROL SURFACES

The PACIFIC las ailerons inset from the wing tips, linged to a false spar at thew upper surface. The gap bet ween mainplace and aileron is sealed by a strip of material so that any indesirable flow of air from lower to opper surface is prevented. It is an important part of the saily inspection to ensure thet this strep is in position and intact.

The flaps extend and lower simultaneous so that they increare th effective wing area as they are lowered. They are operated by an electric motor, and can be set in any desired position from zero to the full dorm position of 30 degrees.

VARIABLE INCIDENCE FLAPS

Electrically actuated

Motor, reduction gear, toothed pinion, pulley, operation through cables.

Position Indicator

Flaps up or lowered. Surface 0,686 m2 x 2

Position for take off 12 degrees or 18 degrees

Position for landing 30 degrees

Horizontal Tail surfaces

Fully moving with automatic anti (servo) tab, and central (pilot controlled trim tab)

Operated through cables

Upward movement 12 degrees

Downward movement 6 degrees

Tolerance (upwards) NIL downwards (7) plus two degrees

Tab with elevator neutral 13 degrees down

16 degrees up

Tolerance plus or minux 2 degrees

Tab surface 0,1365 m2 x 2 $\frac{1}{2}$

VERTICAL TAIL SURFACES

CLASSIC rearward swept, moveable balance tab

Surface 1,05 m2

Operated through cables

Movement of the rudder

265 mm plus or minus 10 mm measured at the lower edge of the trim tab

FLIGHT MANUAL WA 5I

LANDING GEAR

Fixed tricycle with the forward wheel steered by the rudder bar.

Track of main undercarriage	9 feet	I0 ins (3 m)
Distance from main wheels to front wheel		5 feet 4 ½ ins (I,64 m)
Dimensions Front Wheel	330 x I30	pressure 29 lbs / in^2
Main Wheels	420 x I50	
Oleo pneumatic Shock absorber legs		270 lbs / in^2 (I9 Bars)
Forward recoeil (???) leg		64 lbs / in^2 (4,5 Bars)

WHEEL BRAKES

Discs

Operated by a hand lever in a serrated gate, simultaneously on the two main wheels. Parking by means of a pawl to fix the control

POWER PLANT

SINGLE LYCOMING O 320 E (I50 HP) four cylindre drive direct. Horizontally opposed cylinders air cooled

Direction of rotation seen from the pilots seat same as the hands of a watch (Right handed)

TANK CAPACITIES

Fuel	33 IMPERIAL GALLONS	(I50 litres)
Oil	I3 3/4 (UK) PINTS	(7,8 Litres)

The all-flying tailplane is constructed as a single monocoque unit in sinilar fashion to the mainplanes. It is mounted on the fuselage by means y two roller bearing arcberages attached to its maurispar. Inset in the traily ehge y the tailplane is a trimming tab, extinding bott to port and starboard, which fills the double role of anti-servo trim tab, and pilot controlled trimmer. Thistrion tab is the only metal surface is the construction, and is of duralumin.

The rudder, also a stiffened monocoque is hingrd from the fixed fin, which is an integral part y the fuselage structure.

UNDERGARRIAGE

The tricyle under cevriage incorporates ohec pneunatic shock absubus; and disc wheel brakes; the brakes can be locked On for parking, and are sufhcantlg during normal engine checks.

Steeling is effected throyh the steerable hose sheel lenkes to the rudder pedals.

MAINTENANCE AND REPAIR

It is to ke noted that the auraft is so designed as to dismantle into a number of delatively sonals units cacily transported or replaced. Normal rocitine maintenance IS vey little. Simple repair schemes have been designed by the manufactuerey for each. of these limits. Plastic patching of unimportant surfaces is nev commonplace and can be dome in siV u.

FLIGHT MANUAL WA 5I

3 - VIEW OUTLINE DRAWING OF AIRCRAFT

AND FOLLOWING INFORMATION

ENGINE LYCOMING O.320 E 150 HP

FOUR SEATS	Instruction or Touring	
SPAN	30 FT 10 ins	(9,4 m)
Wing AREA	133,47 Ft^2	(12,4 m2)
WEIGHT EMPTY	1.300 lbs	(590 kgs)
WEIGHT LOADED	2.293 lbs	(1.040 kgs)
Wing Loades	17,2 lbs/St^2	84 Kg / m2
Power Loading	15,25 lbs/HP	7 Kg / CV

DESCRIPTION AND PRINCIPAL DIMENSIONS

Principal measurements

Span overall	30 FT 10 ins	(9,40 M)
Length overall	24 FT 7 ins	(7,5 M)
Maximum Height	6 FT 10 I/2 ins	(2,I M)
Wing Area	I33,47 Ft^2	(I2,4 m2)

Airscrew Diameter 74 INS (I,88 m) PITCH 60 INS (I,52 m)

Airscrew Ground clearance, everything extended II,4 ins (29 cm)

ditto , compressed 4,74 ins (I2 cm)

(The clearance is 4.74 ins when the undercarriage legs are compressed against the stops, and the tyres deflated).

Main Plane

Profile (Section) NACA 63.4I8

Dihedral 6°40

Mean Aerodynamic Chord I.375 (metres) 4 Feet 6 ins

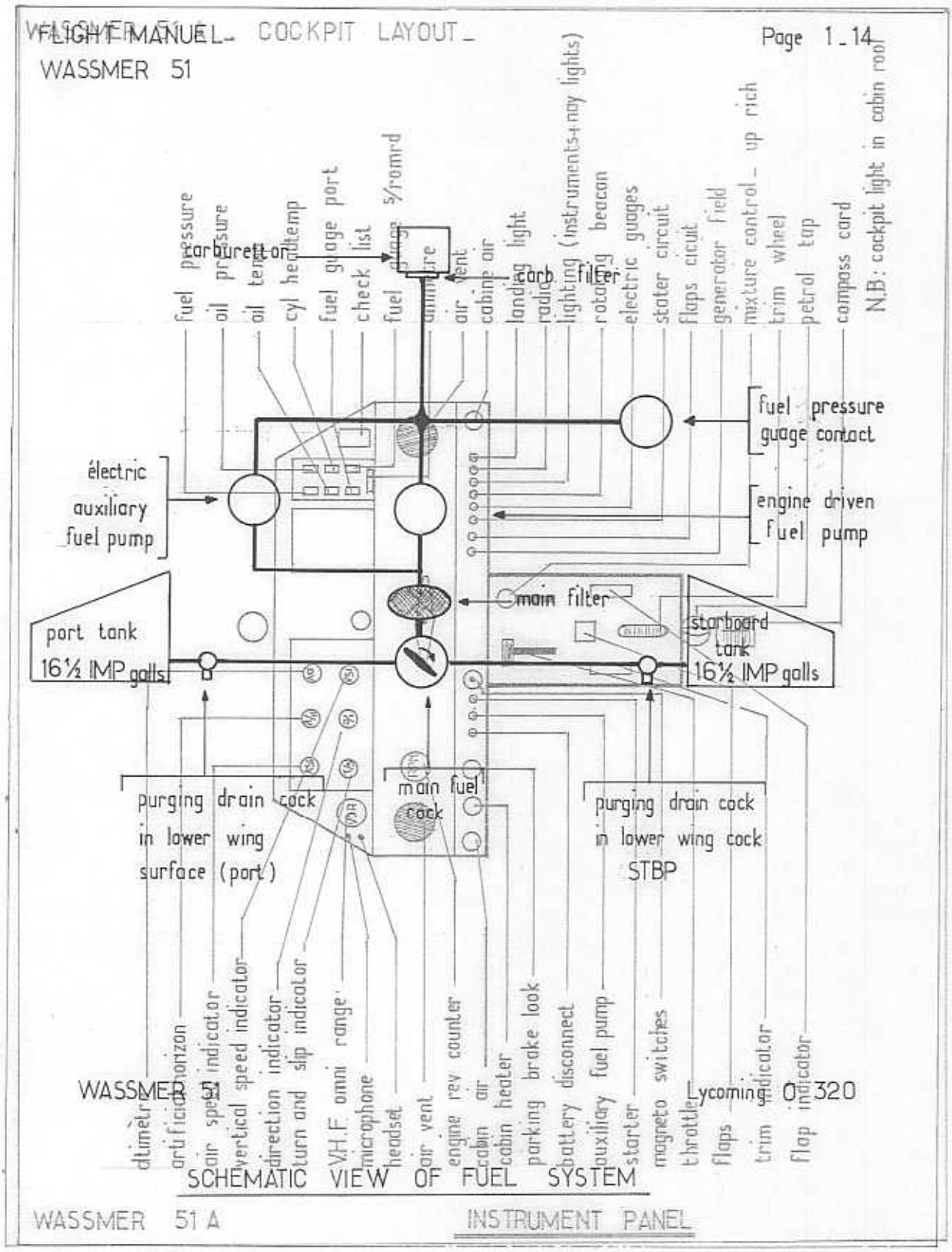
Ailerons

Surface	4.I6 Ft^2 x 2 (0,387 m2 x 2)
Angle of upward movement of aileron	23°
Angle of downward movement	I3°
Tolerance	I°30

Free movement plus or minus 80 degrees

Control through free pinion, chain, and cable circuit in the fuselage and wings.

Return (balance) through levers horns) en rigid connecting control rods.



WASSMER 51 Lycoming O-320

SCHEMATIC VIEW OF FUEL SYSTEM

SECTION 2

LIMITATIONS

SECTION 2
LIMITATIONS

FLIGHT LIMITATIONS

a) Certification authority

The WASSMER-5I has been certified according to

The order FAR part 23, Amendment 7 included

Normal category

b) Speed Limits

	NORMAL CATEGORY			
	RAS Kts	kmph	IAS Kts	kmph
VNE - Never Exceep Speed	I54	285	I57	292
VNO - Normal opeating Speed limit	I37	255	I4I	262
VC - (Design) cruising Speed	I37	255	I4I	262
Vp - Maximum permitted manoeuvring speed	I20	223	I24	230
Vfe - Maximum permitted with FLAPS LOWERED	I05	I95	I09	202
Vso - Stalling speed with lift Augmentation Devices in Landing Configuration	58	I07	58	I07
(Vsil)-Stalling speed flaps lip in level Flight	65	I20	67	I24

STALL WARNING

A Stall warnie worn is regulated to give warning from 6 to I2 kmph (3/6 ½ knots) above the speed of minimum control (CG Forward case)

Remeber that, according to the leading, stalling speed in the canding configuration can vary between 48 ÷ 59 KhnS 90/II0 Kph

PITOT POSITION ERROR

The pitot position error is constant.

With flaps lip the indicated air speed reads 4 knots (7 kmph). Higher than rectified airspeed.

With flaps lowered theke is no position error.

AIRSPEED INDICATOR DIAL MARKINGS (Indicated speeds)

	KTS	KMPH
Limit of red sector (Red Line)	I56	"( ) 290
Yellow arc	I4I / I56	262 / 290
use with prudence in calm air		
Green arc. Normal use	65/ I4I	I20 / 262
White Arc Use of flaps permitted	54/ I09	I00 / 202

AEROBATICS AND SPINS

Aerobatics including spins are forbidden

Flight in icing conditions

Flight in forecast icing conditions is forbidden

Smoking

Smoking in the aircraft is forbidden

(c) Design Load factors

positive	3.8	(plus)
negative	I.9	(minus)

(d) Maximum permitted all up weight

take off	229 8	lbs	I.040 Kgs
landing	229 8	lbs	I.040 Kgs

(e) Centre of Gravity Location

Place level. Spirit Leve GN Lower sillof door

Centre of Gravity reference leadinf edge of reference chord

Length of refezance chord I,375 m (4 Ft 6 ins)

C.G. LIMITS

Forward limit of C.G.	as % of reference chord	I6 %
	as distance from leading edge	8,66 ins (0,220 m)

AFT LIMIT of C.G. as % reference chrd 3I %
as distance from leading edge I3°95 INS (0,420 m)

(f) Loading Limits

Maximum number of occupants	4
Front seats	2
Rear Seats	2

Minimum crew I pilot

Baggage locker If Inexcess	30 Kg	(66 lbs)	check the CG
never exceed limit	45 Kg	(99 lbs)	

CROSS - WIND LANDING COMPONENT

The aircraft is well behaved in cross-winds. Normal procedures apply in crosswind components of up to 15 Knots. Landings have been demonstrated with a cross wind component of up to 25 Knots.

Engine Limitations. Instrument references

Maximum continuous	2700 RPM (150 HP)	Red Line at 2700 rpm
Maximum Cyl Head Temp	260° C (500°F)	
Green arc 150/ 230	Yellow Arc 230/260	Red Line 260
Maximum Oil Temperature	118°C (245°F)	
Green Arc 20/118	Red Line 118	

There is no minimum temperature limit.

Note. It is peintless to warn the engine systematically whilst stationary. Too much ground running is detrimental.
The engine is sufficiently warn for take off whem the throttle, can be opened fully without the engine being heared to misfire.

Oil Pressure	Min. low RPM	25 lbs in^2	1.75 Kg/CM
	Normal	60/90 lbs in^2	4.2/6.3 Green Arc
	Maximum on take off	100 lbs/m2	7 Kg/Cm^2
Fuel pressure	Normal	3 lbs/in^2	200 g/cm^2
	Maximum	8 lbs/in^2	560
	Minimum	1/2 lb/in^2	35

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Fuel Aviation Fuel, minimum Octane rating 80/87

A Higher octane Rated fuel is permetted

Fuel Tanks 2 X I6 ½ (Imperial) Gallons (75 litres) each

Fuel Guneges, readings

Mean quantity in each ress tank

0	2 to 2 ½ (Imp) Galls.	8 to I0 litres
I/4	4	I8
I/2	7 3/4	35
3/4	II I/2	53
4/4	I5	69
Full	I6 I/2 Imp Galls	75 litres

(Auxilary ank (sec Appendix)

Oil

For the first 50 hours use ordinary mineral oil one may thereafter use DETERGENT oils

Mean ambient temp at place of departure		Viscosity of Mineral Oil SAE	Multigrade Oils SAE	TEMPS Recommended Maximum	
From					
60°F	I5°C	50	40 or 50	I80°F	82°C	245 F II8 C
30/90 F	0/30 C	40	40	I80 F	82 C	245 F/II8 C
0/70 F	-20/plus 20 C	30	40 or 20X30	I70 F	76 C	225 F/I06 C
minus I0F and below						
minus I0c and below		20	20 W 30	I60C	7I F	2I0F/98 C

The tank (engine sump) conteins 6 Quarts (7,6 litres)

The maximum consumption of oil (above which an engine overhaul is necessary without delay) is 0.0I0 lbs/BHP/Hr which in cruising conditions should amount to I ½ pints/hro (9 litres/Hr

MANDATORY Placards

Quantity	Designation	WA 5I
I	Switches / Contact breakers indication WA 5I	79 repl
I	Main Switch auxiliary pump	2
I	Starter	3
I	Baggage; 30 Kg and over. Check	4
2	Fuel 80/87 Octane Capacity 75 litres	5
I	Mixture	6
I	Fuel	7
I	Trim tab pas conyral wheel sense indicator	8
I	Trim tab position indicator	9
I	Falp position indicator	IO
I	Flap control switch	II
2	Cabin Air	I2
I	Hot Air	I3
I	Bendix Magneto Switch	STWA 8.05
I	Brakes	I5
I	Parking brake	I6
I	Microphone plug point	2I
I	Perbidden to smoke	I7
I	Carb. Hot Air	I9
I	Main fuel cock	20
I	Placard forbidding aerobatics espins	I8

SECTION 3

EMERGENEY PROCEEDURES

SECTION III EMERGENCY PROCEEDURES

(a) ENGINE FAILURE DURING TAKE OFF

Below 400 metres (I300 feet) do not attempt to return to the airfield, and chosse a point of touch dewn in the area ahead

Switch OFF the fuel, the auxiliary electric pump, and MAGNETOS

Reduce speed to stop the airscrew turning

Turn the airscrew to the horizantle position using the starter motor.

(if time permits)

Put the Master Switch to OFF

(b) ENGINE FIRE IN THE AIR

I. Put the Master Switch to OFF

2. Turn the fuel OFF

3. Open the throttle fully

4. Put the Magneto switches to OFF as soon as the motor stops

(c) BREAKAGE IN FLIGHT OF A MAIN CONTROL

Elevator or Rudder Flight control, changes in configuretion, and landing should be possible by using the other flight controls, the elevator trim tab, and variations in power.

Lateral control. Lateral control can be maintained by the induced effects of directional control at normal cruising speeds. During landing in order to maintain control it is imperative to keep the flaps up and to make.

the approach at a minimum speed of I.4 V si (94 Kts)

INVOLUNTARY SPIN

The aircraft responds to normal spin reccevery action, and may be expected to be fully reccevery from rotation by the time the control column has been centralised.

SECTION 4

NORMAL PROCEEDURES

SECTION 4
NORMAL PROCEEDURES

Pre-Flight

First ensure that ALL SWITCHES ARE OFF . Then proceed with the pre-flight external inspection as follows.

1. Transparencies and windshield in proper order and clean
2. Flaps ... Hinges ... (Wheel) Axles
3. Ailerons ... hinges
4. Pitot head. Cover removed and in proper order
5. Fuel ... fuel tank filler caps check purge fuel cocks
6. Port undercarriage leg ... tyre pressure
7. Engine Cowling opened
   - Mounting and general condition
   - security of main parts; vibration damper suspension
   - Accessories; oil and fuel connections
   - Electric connections and cables
   - Internal coolong air deflectors
   - Airscrew ... condition of/blades ... security of spinner
   - Oil level
8. Carefully replace engine cowling
9. Front wheel and gear (Tyre pressure)
10. Starborad u/c leg ... (Tyre pressure)
11. Starborad fuel tank of (5)
12. Aileron of 3
13. Flaps of 2
14. Tail Unit general condition ... hinges
15. Purge thex fuel circuit, using the purge cocks under each wing close to the fuselage
16. Check static vents oneither side of fuselage

FLIGHT MANUAL WA 5I

INTERNAL INSPECTION

I. Ensure that baggage and all loose articles are propuly stowed. Maps and all documents requered in flight available and accessible.

2. Adjust seat and harness

3. Check fuel quantity is sufficunt fo the f light interded

4. Check aucraft instruments, incluaed fus guages

5. Check all controls for full movement and freedom of operation and correct sense of movement

6. Check that ther are no obstruction or people likely to endangered or incca venuraed by startu op

STARTING

I. Battery disconnect (Master) Switch on

2. Circuit breakers set to on services requered

3. Fuel on

4. Mixtore control full rich (Lever up forword)

5. Carburettor hot air in cold

6. Auxiliarry fuel pump on

7. Prime with thottle lever one to four stnokes (depending upon engine temperature. Set thwpttme O§2 ONCH open

8. Ignition both on and start

9. Auxiliary fuel pumpe off

IO. Alternator field switch on

ENGINE TESTING

I. Check ignition for dead cut

2. Open up to I.800 Rpm and checj single magneto operation. Dhop should not exceed 75 Rpn.

3. AT I600 apm check operation of carburettor hot an control. Not that full hot ou should result in snop of rpn, and return to cold ou should restore original rpm.

If a full poor cheak is requered on the ground it is advisable to use chocks normal maximum rpm on chocks should ke in rgean of 2.300 rpm clepedry on ambient an temperator f preasure.

Note also engine limitatione given in Section 2 relation to fuel and orl preasures and operations conditions.

FLIGHT MANUAL WA 5I

PRE TAKE OFF CHECKS

Trim Set TO neutral (centre position on tab position indicator)

Throttle friction. Set as required

Mixture Full Rich

Carburettor heat cold

Fuel on check sufficient

Aux fuel pump On

Flaps Set AT I8 Degrees (Red line on upper flap surface indicates correct setting)

Instruments Functionning correctly normal readings

Hatches Closed and locked secure

Harness Adjusted and secure

Controls Check fullard free movement of controls in correct sense

CRUISE

Normal Cruise is at 2.550 Rpm

STALLS The aircraft has normal stalling characteristics, and a pre-stall buffet. It responds quickly to normal recovey action. Intentional spins are prohibited

APPROACH AND LANDING

CHECK

I. Fuel on to tank with sufficient fuel

2. Mixture fully rich

3. Carb AR to hot

4. Auxiliary fuel pump to ON

5. Reduce speed to under I09 Kts before lown flaps

ON DOWNWORD LEG

I. Reduce spped to 80 Knots

2. Flaps to take off position

AFTER UTRNIN FINALS

I. FULL FLAP (or as required)

2. Cum to cross the thrishold at 75 KTS

LANDINGS

Aim to touch down on the mantohead only, tail down. This attitude makes maximum use of arrodynamic brakes; gives the lowist possible landing speed, and meneasures wear and tear on the aurcist.

Use the brakes, if required, only af ter the nose wheel can no longer be held off the ground witt the control spectacle fully back.

AFTER LANDING

1. Flaps Up
2. Aux fuel pum OFF
3. Carb hot air to Iold

OVERSHOOT

Use full power end climb away at 80 KTS. Carb. hot an to cold, rouze flaps at safe hught to take off position, and theraftar proceed as for a normal take off.

SHUTTING DOWN

Set parking brake on, and allov engine to idle for two minutes at I000 rpm Stop engine by closing throttle o moving mixture Lever to idle cut Off (full down/back) Thenafter ignition to Off.

Alternator Switch to off
Fuel off
All other switches Off

USE OF CARBURETTOR HOT AIR

The evaporation of petiol in the carburettor results in a temperature drop of the order of 25°C in the carburettor throat. In the engine of a motor car the mass of hot metal, combined witt the use of hot liquid from the cooly system is sufhcient to minimise thir effect. Hut in an euraft engine the effuts are more siffrault to avoid, with the result thet enf moistine in the intakto au man be quickly frozen, and collect as ice in the carburettor throat. Icing conditione mag ke cheountered on any moist dan in Europe wher the au temperature IS delard 25°C (77° F) It is most. Likg wher the avi tempers ture delard Leezuy point carburettor icing is wilikely.

Presence of ice is indicated by an otherwise unexplainable loses of power, indicated by a lose of Rpm.

The hot au coptrol fe your carburettor, used fully, can raise the temperature of the intake au by as much as I50°C. This will thawout all icei whilet this happen the engine, which inhales the rasulty water, will ran roughly befiv regainy power. Do not be put off bu this.

Because of the heat produced in the intake system by this service use of continuons hot an should be as little as possible; and never at all for ground running other the quick function check. In the cucout and on the approach I/2 Hot au is adequate unless there is a stroy liklihood of icing.

SECTION V

PERFORMANCE

SECTION V - PERFORMANCE

ICAO STANDARD ATMOSPHERE

AT Maximum permetted all upweight of 2,293 lbs (1,040 Kgs)		
Maximum speed at Sea Level	127 Kts	235 Kmph
Cruising Speed at 75 % Power at 5,500 ft	113 Kts	210 Kmph
Range, at 75 % power at 5,500 ft		32 Kmph
Optimum range, at 10,000 feet	491 n.m.	910 Km
Rate of climb at Sea-Level	787 ft/min.	4 m/s
Creeing	14,436 ft	4,400 m
Landing Run from start , sbill air	754 feet.	230 m
Distance from stant to clear 50 feet	1,312 feet	400 m

CRUISING PERFORMANCE

AT maximum allup Weight

Speeds (IAS)

% POWER

	Full Power		75 %		65 %		55 %	
	Kts	Kmph	Kts	Kmph	Kts	Kmph	Kts	Kmph
Sea Level	I25	232	II0	205	I02,5	I.905	92	I72
2.000	I24	230	II2	208	I03	I93	93	I74
4.000	I22,5	227,5	II3,5	2I0,5	I05	I95,5	95	I76
6.000	I20	224	II5	2I3,5	I07	I98	95,5	I77
8.000	II8	220	II6,5	2I6,5	I08	200	96	I78
I0,000	II5	2I4*			I09	203	96,5	I79

* at I0,000 ft antj 70 % of fuet power is obtainable

CRUISING PERFORMANCE

at 1.984 Cbs Auw (900 Kgs)

% Power

	Full Power		75 %		65 %		55 %	
	Kts	Kmph	Kts	Kmph	Kts	Kmph	Kts	Kmph
Altitude								
Sea Level	127	236	113	210	105	197	98	183
2.000	126	234,5	115	213,5	107	200	100	185
4.000	125	232,5	116,5	217	109	203,5	101	187,
6.000	124	230	118	220,5	111	206,5	102	190
8.000	122	227	120	224	113	210	103	192
10.000 *	120	223			114,5	213	104	194

* only 70 % power available at this height.

STALLING SPEEDS

IN TURNS

AT MAXIMUM PERMITTED AUW

	TURN BANK							
	0°		30°		45°		60°	
	Kts	Kmph	Kts	Kmph	Kts	Kmph	Kts	Kmph
FLAPS UP	67	I24	72	I33	79	I47	94	I75
I2°	64	II9	69	I28	76	I4I	9I	I68
30°	58	I07	62	II5	68	I27	80	I5I

STALLING SPEEDS IN TURNS

At 1984 lbs (900 Kg) AUW

ANGLE OF BANK

	0		30°		45°		60°	
	Kts	Kmph	Kts	Kmph	Kts	Kmph	Kts	Kmph
FLAPS UP	59	109	63	117	69	129	83	154
12°	56	104	60	112	66	123	79	147
30°	51	94	54	101	60	112	72	133

SECTION VI

WEIGHTS OF BALANCE

DEATIALS OF LOADING

You should, in principe, before each flight know the all up weight and the position of the Centre of Gravity of your aircraft resulting from the lead put en board.

The C.G. calculation diagram is given to you to help you werk it aut.

FIRST The Rear CG position must be checked, the position boing easily obtained in flight (lightweight pilot on bord, empty tanks) when the position is aft of that permissable.

Second If is imperative to check the CG position with reference to the aft limit whenever the weithg of baggage exceeds 30 Kg (66 Lbs) since the weight of baggage and passengers may be excessive.

Third Method of using the CG Calculator

Place on the scale the weight empty and the CG og the aircraft.

For exemple

		Weight (Kg)	Moment (M/Kg)
Aircraft empty weight		590	I34
Pilot (s) read at	A	I50	67
Passengers	C	I50	I50
Fuel	B	I07	II
Baggage	D	25	44
TOTAL POINT	G	I.022	406

Mark this point on the Graph (page 2.4)

The point in within limits, the CG of the aircraft is correct.

SECTION 7

APPENDICES

CONVERSION TABLES FOR UNITS OF MEASUREMENT

UNITS OF POWER

ONE HORSE POWER	EQUALS	0.746 KW
	equals	1.013 CH
	equals	76 Kg/Metres/Sec

ONE CH (CONTINENTAL "Cheval") Equals

736 Watts

0.736 KW

0.987 HP

75 Kg/Metres/Sec

ONE KW EQUALS	1.36 CH
	1.34 HP
	98 Kg/Metres/Sec

UNITS OF CAPACITY (LIQUID MEASURE)

ONE IMPERIAL GALLON EQUALS	4.546 litres
ONE U.S. GALLON	3.78
ONE US QUART	0.945 litres

ONE PINT EQUALS $\frac{1}{8}$ Imperial Gallon, equals 0.568 litres

UNITS OF PRESSURE

I. Kg/ Cm2 equals 0.98 BAR or 98I MILLIBARS
OR 735 mm of Mercury
or 28.9 inches of mercury
or 98 piezes
or 9.8I00 Pascals

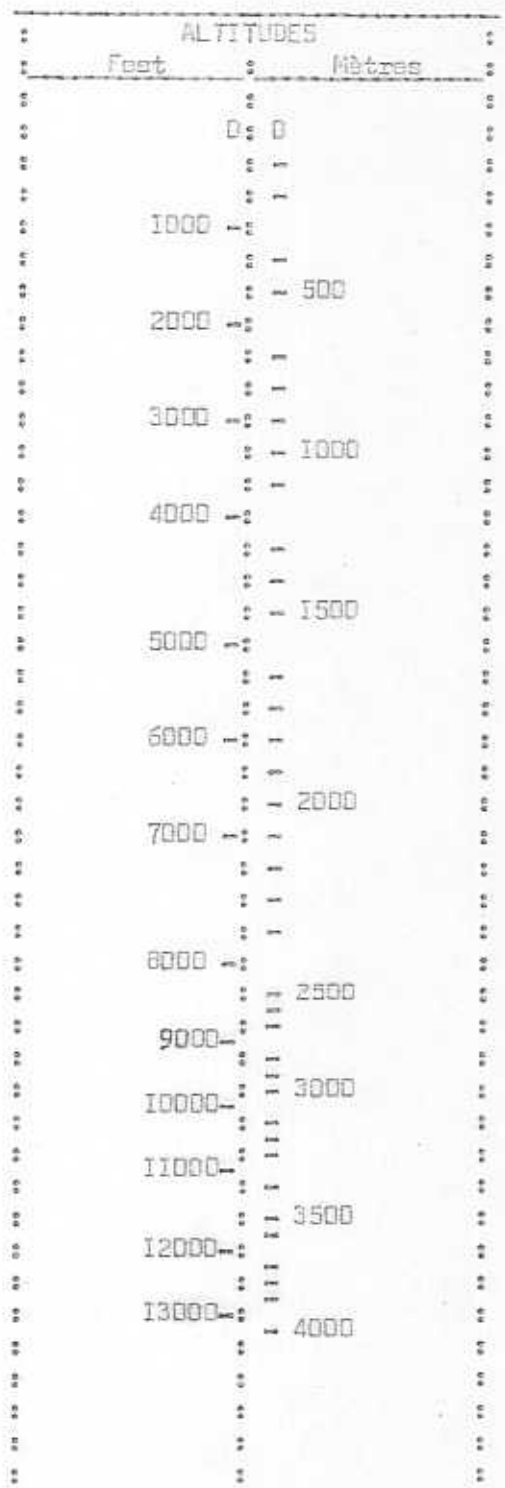
The Standard atmospheric pressure (ICAO) at sea level is
I.033 Kg/Cm2 or I.0I3 millibars
or 760 mm of Mercury
Or 25.92 inches of mercury
or I0I3 piezes
or I0.I300 Pascals

TABLE OF MANIFOLD PRESSURE CONVERSIONS

Inches of Mercury	Piezes	mm Mercury
29	99	736
28	95,4	7II
27	92	686
26	88.5	660
25	85.I	636
24	8I.8	6I0
23	78.3	584
22	75	559
2I	7I.5	524
20	68.I	508
I9	64.7	482
I8	6I.4	457

in English units One pound per square inch equals 0.0703 Kg/mCm2

(Note. As this is an american engine, any manifold pressure guage is likely to be calibrated in INS/HG No further interpolation is therefor necessay)


ALTITUDES
Feet
Mètres
0
0
1000
500
2000
3000
1000
4000
1500
5000
6000
2000
7000
8000
2500
9000
10000
3000
11000
3500
12000
13000
4000

SPEED CONVERSION TABLE

Kts	KM/H	M/S
	100	
55		28
		30
60	110	
	120	
		35
70		
	140	
		40
80		
	160	
		45
90		
	180	50
100		
		55
110	200	
		60
120	220	
		65
130	240	
		70
140	260	
		75
150	280	
		80
160	300	

TEMPERATURE

°F	°C
0	
	10
20	
	0
40	
	10
60	
	20
80	
	30
100	
	40
120	
	50
140	
	60
	70
160	
	80
180	
	90
200	
	100
220	
	110
240	
	120
260	
280	
	140
300	
	160
350	
	180
400	200
	220
450	
	240