FLIGHT MANUAL

IAR 823 S/N 36

IMPORTANT NOTICE

This manual should be read carefully in order that you become familiar with the operation of your IAR 823 airplane.
Suggestions and recommendations have been made within it to help you obtain maximum performance without sacrificing economy.

USE OF THE MANUAL

This Flight Manual is designed to maintain documents necessary for the safe and efficient operation of the IAR 823.
The manual has been prepared in loose leaf form for ease in maintenance and in convenient size for storage in the glove compartment.
The Manual contains six basic division:
Section I: Limitations, Section II: Normal Procedures, Section III: Emergency Procedures, Section IV: Performances, Section V: Weight and Balance, Section VI: Systems.

The Manual must be in the aircraft during all flight operations. For pilot convenience, the Normal Procedures section and the Emergency Procedures section have been presented in check list form.

The Weight and Balance section of the manual carries the normal loading tables for this model of aircraft.

The Performances section contains data in form of graphs and tables and Systems section gives informations concerning the particular systems of the aircraft.

REVISING THE MANUAL

When performing a modification in the manual, one should add to the Flight Manual an "Amendment List" where the amendment no, the affected page and a short description of the amendment are written. The "Amendment List" carries the number of the issue to which is added the identification letter, alphabetically for each amendment of the respective page; the same letter should accompany the revised page as well. A vertical line, marked with the amendment number indicates the revised text.

AMENDMENTS LIST

IAR 823 Flight Manual

All amendments enclosed in this list are approved

Amend-ment	Revised page	Descrip-tion	Date of approval

A black marginal line indicates the revised text

INDEX

SECTION I - Limitations

LIMITATIONS

All airspeeds quoted in this section are calibrated airspeeds of this airplane (IAS). The following limitations must be observed in the operation of the airplane.

Engine

Airplane equipped with Lycoming IO-540-G1D5 engine.
Take-off and maximum continous power (sea-level) at 2575 rpm, 750 mmHg boost, is of 290 HP.

Propeller

The airplane is fitted with a variable pitch, metallic, two-blade, D/W 9350-4.6 HC-92-WK-1 Hartzell type propeller. The pitch is controlled by a Hartzell F6-3A type governor installed on the engine.

Fuel

Standard fuel system: two 170 l (45 gallons) fuel tanks each, in wings. Aviation gasoline 100/130 (grade)

Engine Control Instruments

Oil Temperature	
Caution (Yellow Radial)	60 C gr.
Operating Range (Green Arc)	60/82 C gr.
Maximum (Red Radial)	118 C gr.
Oil Pressure	
Min.Pressure for idling (Red Radial)	1.75 Kgf/sq.cm
Operating Range (Green Arc)	4.2-6.3 Kgf/sq.cm
Max.Pressure (on starting and heating)	7.1 kgf/sq.cm
Fuel Pressure	
Minimum (Red Radial)	1.3 kgf/sq.cm
Maximum (Red Radial)	2.8 Kgf/sq.cm

Tachometer	
Operating Range (Green Arc)	1800-2400 rpm
Maximum r.p.m. (Red Radial)	2575 rpm
Cylinder Head Temperature	
Operating Range (Green Arc)	150-225 C gr.
Max. Temperature (Red Radial)	260 C gr.
Manifold Pressure	
Operating Range (Green Arc)	575-680 mmHg
Approved for Continuous	
Operation (Yellow Arc)	680-730 mmHg
Maximum (Red Radial)	760 mmHg
Fuel Quantity	
Flight Stand - by for 30 min.	
(Red Arc)	0-20 l each
Yellow Arc	20-50 l

1K = 2.23 Lb

Altitude:
- meter sec — 200 Per min
- 1 m = 3.28

Alt.:
- 1 Ft. = 25.4 m meter
- 1 m.m .039"

Speed:
- 1 mile = 1.609 KM — KM 1.85 Kt.
- 1K = .621 mile

Kph	mph		
100	62	300	186
135	84	320	148
150	93	350	217
170	105	380	236
190	118	400	248
220	137	460	285
250	155		
270	168		

Airspeed Limitations

(Indicated Airspeeds)

	N	U	A
Never Exceed VNE			
(Red Radial)	360	360	390
Caution Range	-	280	-
(Yellow Arc)		360	
Operating Range	-	112	-
(Green Arc)		280	
Flap Expension	102	102	102
Range (White Arc)	170	170	170
Max.Gear Operating			
Speed	180	180	180
Max.Gear Extended			
Speed	300	300	300

Approved Maneuvers (1380 Kg)

Maneuver	Entry Speed
Chandelle	230 km/h
Lazy-Eights in horizontal plane	220 Km/h
Limits	Without dynamic limits
Turn at 60 grade	220-240 Km/h

Controlled spin is prohibited (N and U versions)

If a spin is entered inadvertently, start imediately the recovery procedure according to Section III, page 9, as the movement accelerates rapidly.

Approved maneuvers (1250 Kg)

Maneuver	Entry speed
Horizontal turn	220-260 Km/h
Fight turn	320 Km/h
Looping	270-290 Km/h
Immelman	290-300 Km/h
Inverted Flight	140 Km/h
Turn Over	150 Km/h
Acrobatic Turn Over	280 km/h
Roll	260 Km/h
Sliding	150 Km/h
Spin	105-110 Km/h

Load factors	N	U	A
Positive load factor with flaps up	3.8	4.4	5.5
Positiv load factor with flaps down	2	2	2

Weight and Center of Gravity

		N	U	A*
Maximum Gross	Kg	1500	1380	1250
Weight	lb	3300	3040	2750

Datum is at the firewall theoretical plane.

MAC leading edge is at 485 +- 5 mm from the datum.

Mac length is 1550 mm.

* Max. 285 l fuel for 1 pilot flight and max. 165 l for 2 pilots flight.

CG Limits

Provisionally the airplane flight is approved only with occupants in the front seats, without luggage.
Provided this, any combination resulting from the occupants weight and the fuel quantity is within the accepted limits for balance.

Placards

On the central console

This AIRPLANE may be used in N,U,A categories complying with the limitations given by placards, markings and manuals.

MAX.WEIGHTS

N categ.	1500 Kgf
U categ.	1380 Kgf
A categ.	1250 Kgf

LIMITATION in A category

VNE	390 Km/h
VA	270 Km/h
VLO	180 Km/h
Flaps up VS1	112 km/h
Flaps down Vs1	98 Km/h

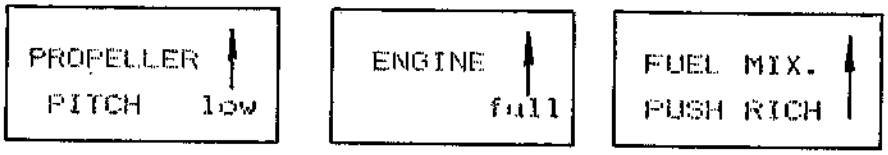
U category

MANEUVERS	ENTRY SPEED
CHANDELLES	230 km/h
LAZY EIGHTS	220 km/h
60 TURN LIMITS	220 km/h

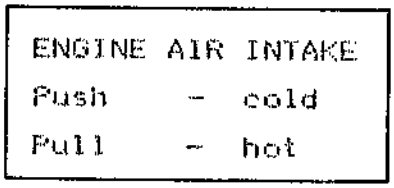
ALTITUDE
LOST ON LIMIT
RECOVERY
100 m

Spin prohibited
for N and U category

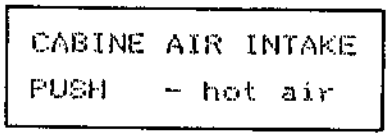
On the controls console, under the engine control levers.

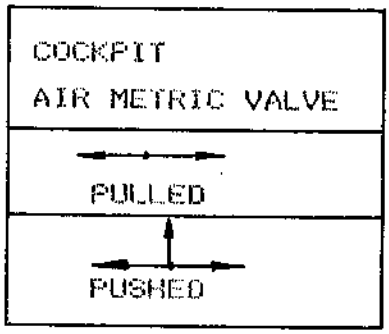


On the LH controls console for the engine hot air intake.



On the RH controls console for the cabin air intake.





On the console, RH down

Fire at engine	
Fuel selector valve	STOP
Throttle	FULL
Mixture	RITCH
Propeller pitch	LOW
Magnetos	ON
Alternator	CUT OFF
Cabin Air	PULLED

Descend in quick slides.
Cut off magnetos after the engine stops.

On the console, LH

VFR DAY FLIGHT
without icoing

On the fuel indicator

Check fuel indicator readings
before take-off

Under The tachometer

MAX. 585 mmHg
BELOW 2350 RPM

On the LH lateral panel, near the landing gear manual control.

Manual actuation AFTER swiching OFF the landing gear

On the door.

OPEN CLOSED	RELEASED LOCKED

Near the landing gear actuating levers.

RH lever cancels any control of LH lever Actuating from LH shall be carried out with RH lever in NEUTRAL position.
After any actuating of LH lever return with it to NEUTRAL position.

On the LH intrument panel

Rating	SPEED (rpm)	BOOST (mmHg)
Rated (MCP)	2575	750
Cruise (75% MCP)	2400	653
Cruise (60% MCP)	2200	578
WARNING : Propeller pitch and throttle controls shall be actuated slowly, at least in 5 sec.		

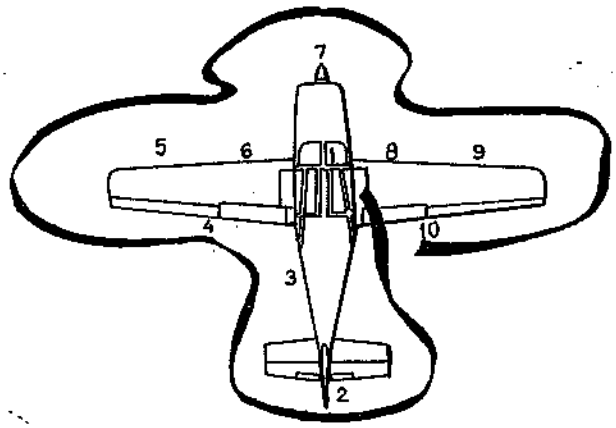
On the floor, near the gasoline cock

ATTENTION
In case of uneven consumption in LH + RH position, shift lever to fuller tanks.

SECTION II - Normal Procedures

NORMAL PROCEDURES

All airspeeds quoted in this section are indicated airspeeds (IAS).



Preflight inspection

1. Cabin

a) All switches	OFF
b) Aerial	CHECK
c) Anti-collision beacon	CHECK

2. Empennage	
a) Control Surfaces	CHECK
b) Position Light	CHECK
c) Controls	CHECK
d) Access cover	CLOSED
3. Left Fuselage	
a) Battery cover	CLOSED
4. Left Wing Trailing Edge	
a) Flap	CHECK
b) Aileron	CHECK
c) Wing Tip	CHECK
d) Position Light	CHECK
5. Left Wing Leading Edge	
a) Pitot Head	CHECK
	(Remove cover)
b) Stall speed warning	CHECK
c) Fuel tank	CHECK
	QUANTITY
	Filler Cap
	SECURE
	DECANTATION
d) Tank ventilation	CHECK

6. Left Landing Gear	
a) Wheel Well, strut, vent	CHECK
7. Nose Section	
a) Air intake	CLEAR
b) Left cowl	CHECK
c) Wheel well, strut and vent	CHECK
d) Oil	CHECK
e) Cowl	SECURE
f) Landing light	CHECK
g) Propeller	CHECK
h) Engine	CHECK GENERAL CONDITION
i) Right cowl flap	CHECK
j) Right cowl	SECURED
8. RH Main Strut	
a) Wheel well, strut, vent	CHECK
9. Right Wing Leading Edge	
a) Fuel tank	CHECK and DECANTATION
b) Filler Cap	SECURED
c) Tank ventillation	CHECK

10. Right Wing Trailing Edge

a) Position Light	CHECK
b) Wing Tip	CHECK
c) Aileron	CHECK
d) Flap	CHECK

Before starting

(Preparing for starting the engine)

1. Switches for: Accumulator, Aircraft instruments, LH magneto, Starter, Gear, Gear signalling	ON
2. Gear Handle position	NEUTRAL
3. Flap 0	UP
4. Switches - lights	OFF
5. Fuel selector valve	SELECT TANK MORE NEARLY FULL
6. Fuel gauges	CHECK FUEL QUANTITY
7. Radio	ON

Starting and heating-up the engine

1. Propeller	LOW PITCH
2. Throttle about 1/4	OPEN
3. Booster pump	ON
4. Mixture	RICH
5. Booster pump	CUT (on stabilizing the 1.3 Kgf/sq.cm pressure)
6. Mixture	POOR
7. START button	START

When the engine fires, switch on both magnetos.

8. Mixture - slow passing to	RICH
9. Oil pressure	CHECK

If the reading does not appear in 30 seconds, cut-off engine and troubleshoot faults.

10. If engine SINKS

a) Mixture — POOR

b) Throttle — FULL

c) Magnetos — CUT

d) START button — START

After 5 - 6 full rotations try starting using normal procedure. After starting, reduce throttle at 1400 RPM and pass mixture slowly to RICH.

NOTE: During hot starts, the auxilliary Fuel pump (Booster pump) is turned on momentarily after starting to purge system, then turned off.

11. Generator switch — ON

12. Heating at 1200 - 1400 RPM

NOTE: Increase RPM when the cylinder head temperature is 100 - 120 C gr.

13. Engine control instruments — CHECK

14. Lights — ON

Before take-off

(Engine operation check)

1. Radio	CHECK
2. Engine control instruments	CHECK
3. Flight instruments	CHECK and SET
4. Throttle	1500 RPM
5. Propeller pitch	Decrease slowly with 300-500 rpm return to low pitch.

6. Magnetos check

   At 2000 rpm, operating in turn with only one magneto, the drop off should not exceed 175 rpm. Maximum permissible rpm difference between magnetos is 50 rpm. The operation with one single magneto is of max. 3 sec.

Preparing take-off

7. Elevator trim	SET
8. Flap	CHECK and OUT 15 gr.
9. Doors	CLOSED and SECURED

10. Belts	SECURE
11. Controls	FREE
12. Mixture	RICH
13. Brakes	RELEASED
14. Instruments	CHECK

NOTE : If the external temperature exceeds 25 C gr., the BOOSTER pump should be used till reaching an altitude of 50m. Finally check r.p.m. and fuel manifold pressure at the take-off line.

Climb

1. Engine Temparature	MONITOR oil =60-82 C gr. cyl.head=150-225Cgr.
2. Recommended speed	2500 RPM

Cruise

1. Power	SET
2. Mixture	LEAN AS REQUIRED

Descent

1. Mixture	MONITOR

(Enrich as required during descent).

Before Landing

1. Seat belts	SECURE
2. Fuel Selector Valve	SELECT TANK MORE NEARLY FULL
3. Mixture	RICH
4. Landing Gear out (Maximum extension speed 180 km/h)	DOWN and CHECK
5. Flap (Maximum extension speed 170 Km/h)	DOWN (40 gr.)

6. Speed - for a normal approach
7. Propeller - low pitch

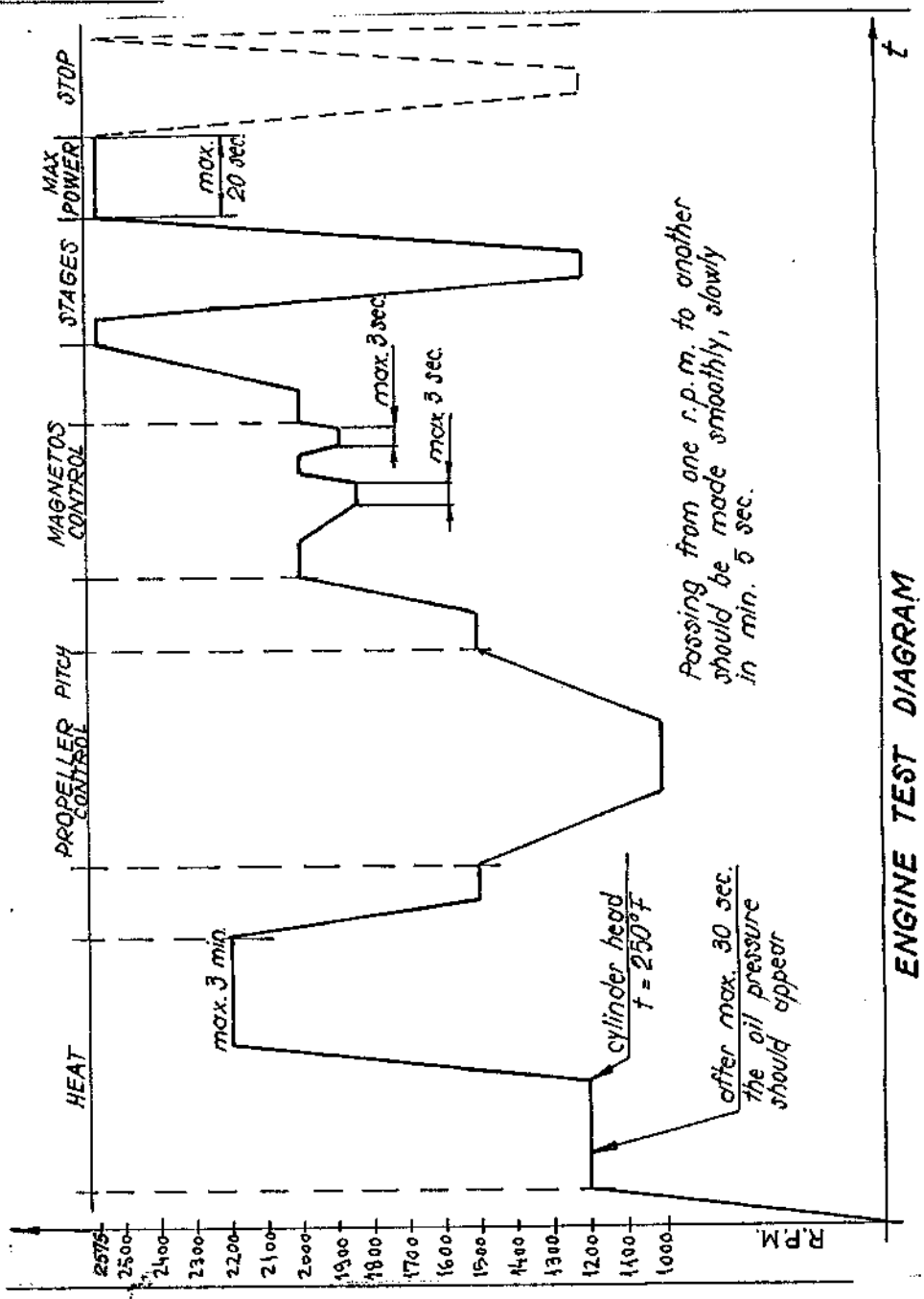
NOTE : If the external temperature exceeds 25 C gr. below 50 m altitude, fly with operating BOOSTER pump.

CAUTION : To avoid the propeller hit the ground when the operation takes place on grass, the landing should be made on the main wheels, and the nose wheel will be put smoothly on ground.

Shutdown

1. Electric and radio equipment	CUT

2. Flap 0	UP
3. Propeller	LOW PITCH
4. Throttle	CLOSED
5. Mixture	POOR
6. Magnetos/start switch after engine stops	OFF
7. Battery and alternator	OFF
8. Parking and chocking	OFF


ENGINE TEST DIAGRAM
t
R.P.M.
2575
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
HEAT
PROPELLER CONTROL
PITCH
MAGNETOS CONTROL
STAGES
MAX POWER
STOP
max. 20 sec.
max. 3 sec.
max. 3 sec.
max. 3 min.
cylinder head t = 250°F
after max. 30 sec. the oil pressure should appear
Passing from one r.p.m. to another should be made smoothly, slowly in min. 5 sec.

CRUISE POWER SETTINGS
75 % maximum continuous power

	I.S.A. – 20 °C					ATMOSPHERE - I.S.A.					I.S.A. + 20 °C				
ALT.	OAT	ENGINE R.P.M.	BOOST	CON-SUMPTION	SPEED T.A.S.	OAT	ENGINE R.P.M.	BOOST	CON SUMPTION	SPEED T.A.S.	OAT	ENGINE R.P.M.	BOOST	CON-SUMPTION	SPEED T.A.S.
m	°C	R.P.M.	mm Hg	l/h	Km/h	°C	R.P.M.	mm Hg	l/h	km/h	°C	R.P.M.	mm Hg	l/h	km/h
0	- 5	2350	634	62	280	15	2350	652	62	289	35	2350	675	62	299
300	- 7	2350	627	62	284	13	2350	645	62	294	35	2350	666	62	304
600	- 9	2350	622	62	288	11	2350	640	62	297	31	2350	660	62	308
900	-11	2350	615	62	293	9	2350	632	62	300	29	2350	652	62	313
1200	-13	2350	608	62	297	7	2350	625	62	305	27	2350	645	62	318
1500	-15	2350	597	62	301	5	2350	615	62	310	25	2350	635	62	322
1800	-17	2350	594	62	297	3	2350	610	62	305	23	2350	630	62	318
2100	-19	2350	570	62	293	1	2350	587	62	310	21	2350	607	62	313
2400	-21	2350	650	62	288	- 1	2350	566	62	297	19	2350	586	62	308
2700	-23	2350	535	62	284	- 3	2350	545	62	294	17	2350	565	62	304
3000	-27	2350	510	62	280	- 6	2350	525	62	289	15	2350	542	62	299
3300	-30	2350	490	62	276	- 7	2350	505	62	284	13	2350	525	62	294

CRUISE POWER SETTINGS
60% max. continuous power

	I.S.A. - 20°C					ATMOSPHERE I.S.A.					I.S.A. + 20°C				
ALT.	O.A.T.	ENGINE R.P.M.	BOOST	CON-SUMPTION	SPEED T.A.S.	O.A.T.	ENGINE R.P.M.	BOOST	CON-SUMPTION	SPEED T.A.S.	O.A.T.	ENGINE R.P.M.	BOOST	CON-SUMPTION	SPEED T.A.S.
m	°C	R.P.M.	mmHg	l/h	Km/h	°C	R.P.M.	mmHg	l/h	Km/h	°C	R.P.M.	mmHg	l/h	Km/h
0	-5	2200	560	45,4	247	15	2200	580	45,4	256	35	2200	600	45,4	265
300	-7	2200	555	45,4	251	13	2200	575	45,4	260	33	2200	595	45,4	269
600	-9	2200	547	45,4	254	11	2200	567	45,4	264	31	2200	585	45,4	273
900	-11	2200	542	45,4	258	9	2200	560	45,4	268	29	2200	580	45,4	277
1800	-13	2200	536	45,4	261	7	2200	555	45,4	272	27	2200	570	45,4	281
1500	-15	2200	530	45,4	265	5	2200	546	45,4	275	25	2200	563	45,4	285
1800	-17	2200	524	45,4	268	3	2200	542	45,4	279	23	2200	560	45,4	289
2100	-19	2200	520	45,4	272	1	2200	536	45,4	284	21	2200	555	45,4	294
2400	-21	2200	514	45,4	276	-1	2200	532	45,4	288	19	2200	550	45,4	299
2700	-23	2200	510	45,4	281	-3	2200	526	45,4	293	17	2200	546	45,4	303
3000				45,4				525	45,4						
3300				45,4				505							

SECTION III - Emergency Procedures

EMERGENCY PROCEDURES

All airspeeds quoted in this section are indicated airspeeds (IAS).
The following information is presented to enable you to form, in advance, a definite plan of action for coping with the most probable emergency situations which could occur in the operations of your airplane. Where practicable, the emergencies requiring immediate corrective action are treated in check list form for easy reference and familiarization.

Engine fire (on ground)

1. Mixture	POOR
2. Fuel Selector Valve	STOP
3. Battery, alternator and magneto switches	OFF
4. Use airfield extinguisher	

Engine failure on take-off

a) During ground roll :

1. Throttle	CLOSE
2. Braking	MAXIMUM
3. Fuel Selector Valve	STOP
4. Battery, alternator magnetos switches	OFF

b) If airborne and insufficient runway remains for landing

1. Fuel Selector Valve	SELECT OTHER TANK
2. Booster pump	ON
3. Mixture	RICH
4. Magnetos	CHECK, ON BOTH

c) If no restart

1. Select most favorable landing site
2. The use of landing gear is dependent on the terrain where landing must be made.

Engine malfunction in flight

Engine failure

The most probable cause of engine failure would be loss of fuel flow or improper functioning of the ignition system.

Various Maneuvers

1. Fuel Flow Gage	CHECK (tank may be empty)
a) Select other tank (Check power recovery).	
2. Fuel pressure	CHECK
a) Mixture	RICH
b) Booster pump	ON
c) Booster pump	OFF if operation does not improve next moments.

3. Engine shocks

a) Mixture	RICH when required POOR
b) Magnetos	CHECK and ON BOTH

Engine Starting in Flight

a) Fuel Selector Valve	SELECT TANK MORE NEARLY FULL
b) Magnetos, Starter	ON
c) Throttle	CLOSED
d) Mixture	RICH
e) Booster Pump	ON, until power is recovered, then OFF
f) START button	PRESSED
g) Throttle	PUSH to the required power
h) Mixture	RICH

Engine Fire

The following procedure should be carried out:

1. Fuel Selector Valve	STOP
2. Throttle Levers	FULL

3. Mixture	RICH
4. Propeller Pitch	LOW
5. Magnetos	ON
6. Alternator	OFF
7. Cabin air intake	PULLED

8. Descend in quick slides
9. Cut magnetos after engine stops

Emergency Descent

Reduce power, propeller to low pitch, landing gear down and establish 150 Km/h speed. This will provide the optimum slope of descent.

Optimum Glide Configuration

1. Landing gear	UP
2. Flap	UP
3. Propeller	Low RPM
4. Airspeed	140 Km/h

Landing Gear Manual Extension

Manual extension of the landing gear can be facilitated by reducing airspeed below 180 km/h (96 Kts).

1. Landing gear electric switch OFF
2. Cut lockwire
3. Engage handcrank setting it normal to the lever and turn it as on the placard (120 turns).
4. If electrical system is operative check landing gear position by reading the indicator. Set landing gear position electric switch ON.
5. Disengage handcrank
   Don't retract gear manually.

Warning

After landing do not move any landing gear controls or reset any switches or circuit-breakers until aircraft is not on jacks as gear might retract on the ground.

Emergency Landing

- Is carried out with retracted landing gear on an unknown ground.
- Is carried out with landing gear extented on appropriate ground.

When setting landing gear selected position in final approach:

1.	Speed	140 Km/h
2.	Fuel Selector Valve	STOP
3.	Mixture	POOR
4.	Magneto Switches	OFF
5.	Alternator	OFF
6.	Flap	OPTIMUM POSITION (40 gr.)
7.	Gear	DOWN or UP depending on the ground
8.	Battery	OFF (when approaching ground)

Gear up Landing

If possible, choose firm sod or sandy (unpaved) runway.
When landing on crop areas, the crop height is considered landing surface.
When landing on water or in forests, the touchdown is made on tail.
Carry out a normal approach, using flap as much as necessary (40 gr.).
When you are sure of making the selected landing spot :

1. Throttle	CLOSED
2. Mixture	POOR
3. Alternator, magnetos	OFF
4. Fuel Selector Valve	STOP
5. After engine stops actuate starter and set propeller to horizontal position.	
6. Battery	OFF

7. Keep wings horizontal during touchdown
8. Abandon airplane as soon as possible after stopping.

Spin

Spin are forbidden within N and U categories. If a spin is entered inadvertently, carry out the following maneuvers:
Pull stick forward to maximum; simultaneously use maximum pedals counterwise the spin rotational direction; maintain this position till rotation stops and pull stick slightly. Throttle closed during recovery.

Emergency Exits (doors jettison)

Jettison handle	PULLED
(on the overhead panel)	(downwards)
Door	PUSHED

Alternator Failure

1. Switch GEN OFF and the airplane electrical system shall be supplied from the battery only.

   OVERVOLTAGE failure is delimitated on the instrument panel.

   If overvoltage occurs during flight:

   1. Set GEN switch OFF and then ON.
   2. If the overvoltage lamp does not turn on any more, continue with alternator.
   3. If overvoltage persists, set generator OFF and decrease to minimum the electric consumption since baterry is the only supply.

      Failure shall be removed before next flight.

      When setting GEN switch OFF disconnect all consummers than are not strictly necessary, thus extending battery life. The ampermeter indicating the battery load current shall read the battery discharge current, and the voltmeter shall read the battery voltage.

Accumulator Failure

1. ACCUM switch OFF.

   The failure is indicated by an excesive load current exceeding red radial (-4A) when the switch is in ACCUM position.

RESCUE BY PARACHUTE

1. Inform the traffic operator about the situation occured, keep in touch, and make a decision.
2. Direct the airplane towards a clear area (avoid populated area and important objectives).
3. Get the airplane to normal flight, reducing airspeed (as much as possible).
4. Close fuel selector valve.
5. Disconect magnetos.
6. Jettison canopy.
7. Disconnect headset and release safety belts.
8. Actuate trimmer in "climb" position.
9. Disconnect electric power supplies.
10. It is recommanded to leave the airplane opposite to the spin direction.

SECTION IV - Performance

PERFORMANCES

All airspeeds quoted in this section are indicated airspeeds (IAS).
The performance data in this section have been established by flight tests and engineering calculation to assist you in operating your airplane.
Flight tests were conducted under normal operating conditions using average piloting techniques with the airplane and engine in good condition.
In using the following data, allowance for actual conditions must be made.

Take - Off Speed

	1500 Kg	1250 Kg
Nose wheel lifting speed	65	55
Airborne speed	110	100
Slope climbing speed	155	145

Climbing Speeds

Optimum Climbing Speed	1500 Kg	1250 Kg
(flap 15 gr., gear down)	160	140

Cruising Speed

(True) TAS

	1500 kg	1250 Kg
100 % PMC (0 m)	290	297
75 % PMC (0 m)	275	290
60 % PMC (0 m)	245	255

With gear down, the airspeeds might decrease by 30 - 40 Km/h.

Wind Conditions

Max. front wind	16 m/sec
max rear wind	2 m/sec
Side wind	8 m/sec

Limit Speeds

The altitude loss in limit is higher than 100 m :

Power	Gear and flap	Weight 1500 (N)	Weight 1250 (A)
With	UP	100	95
Without	UP	115	112
With	DOWN	87	90
Without	DOWN	106	102

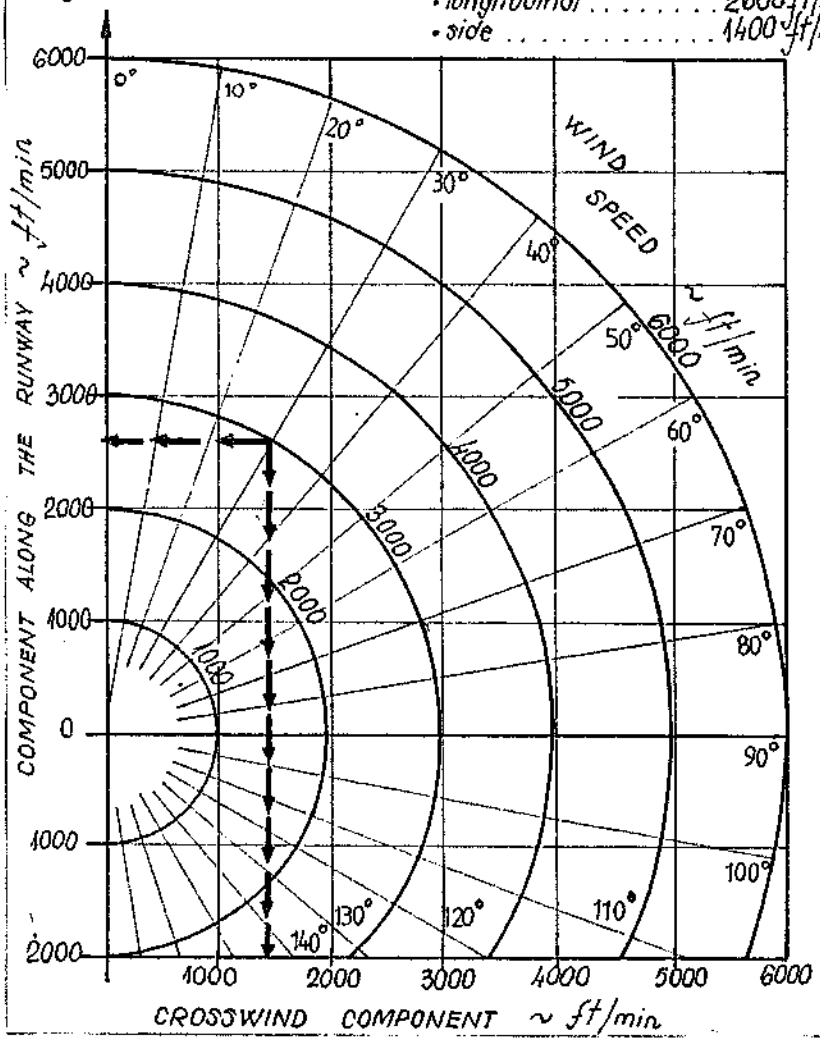
Landing Speed

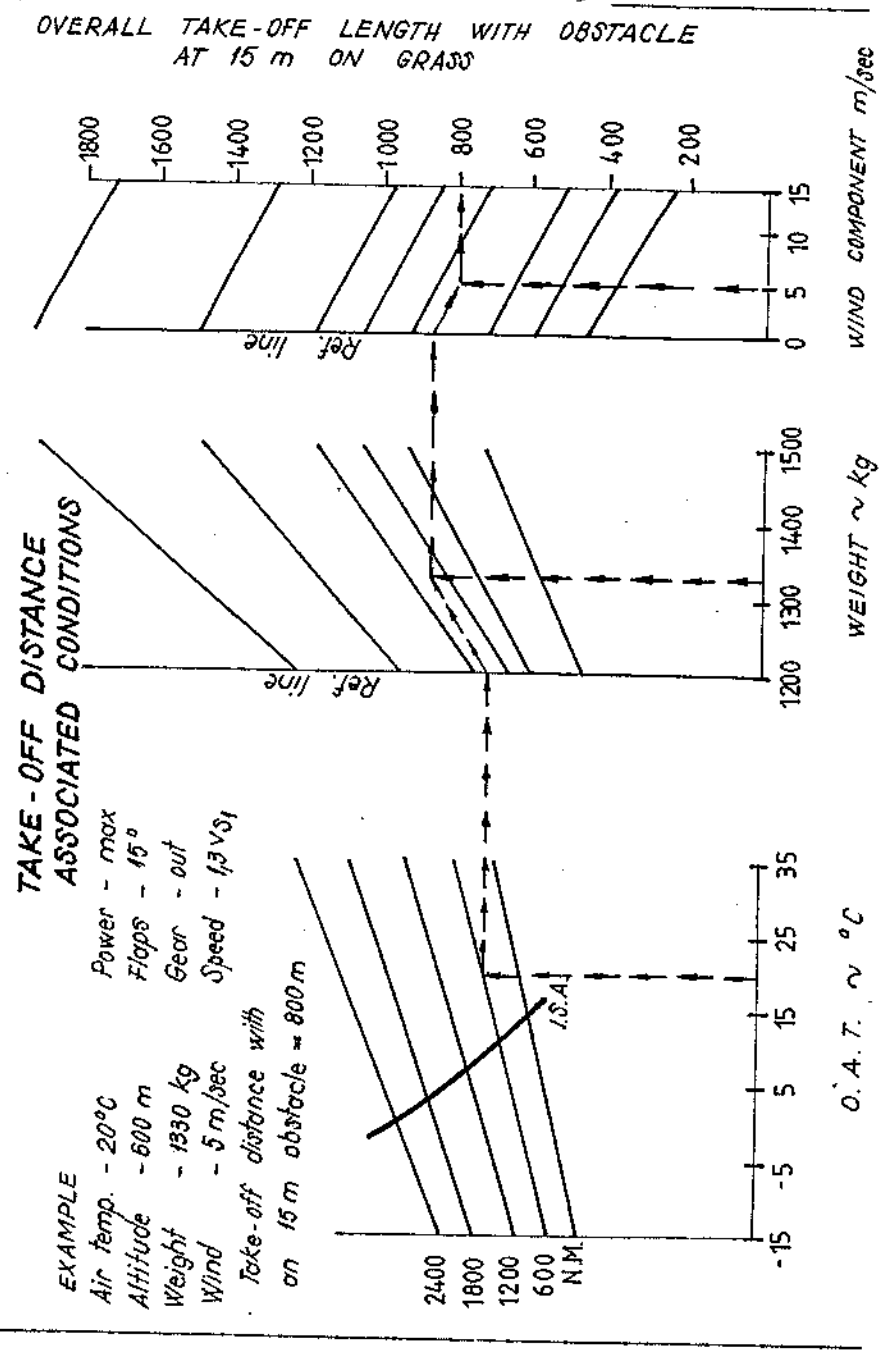
Normal Approach 150 Km/h

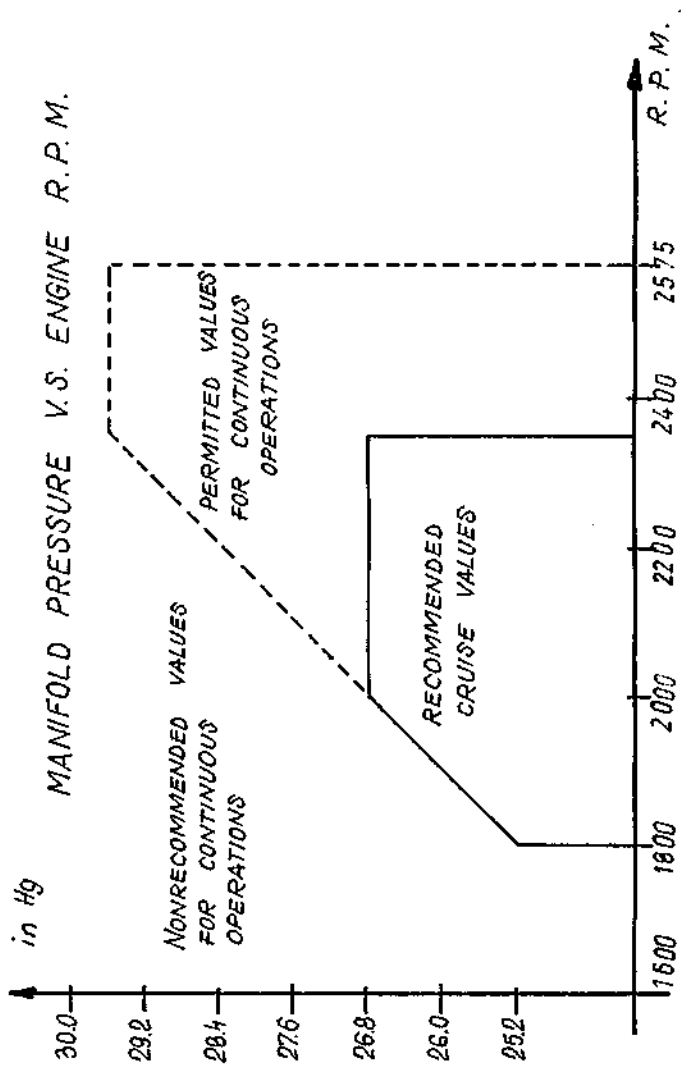
WIND COMPONENTS

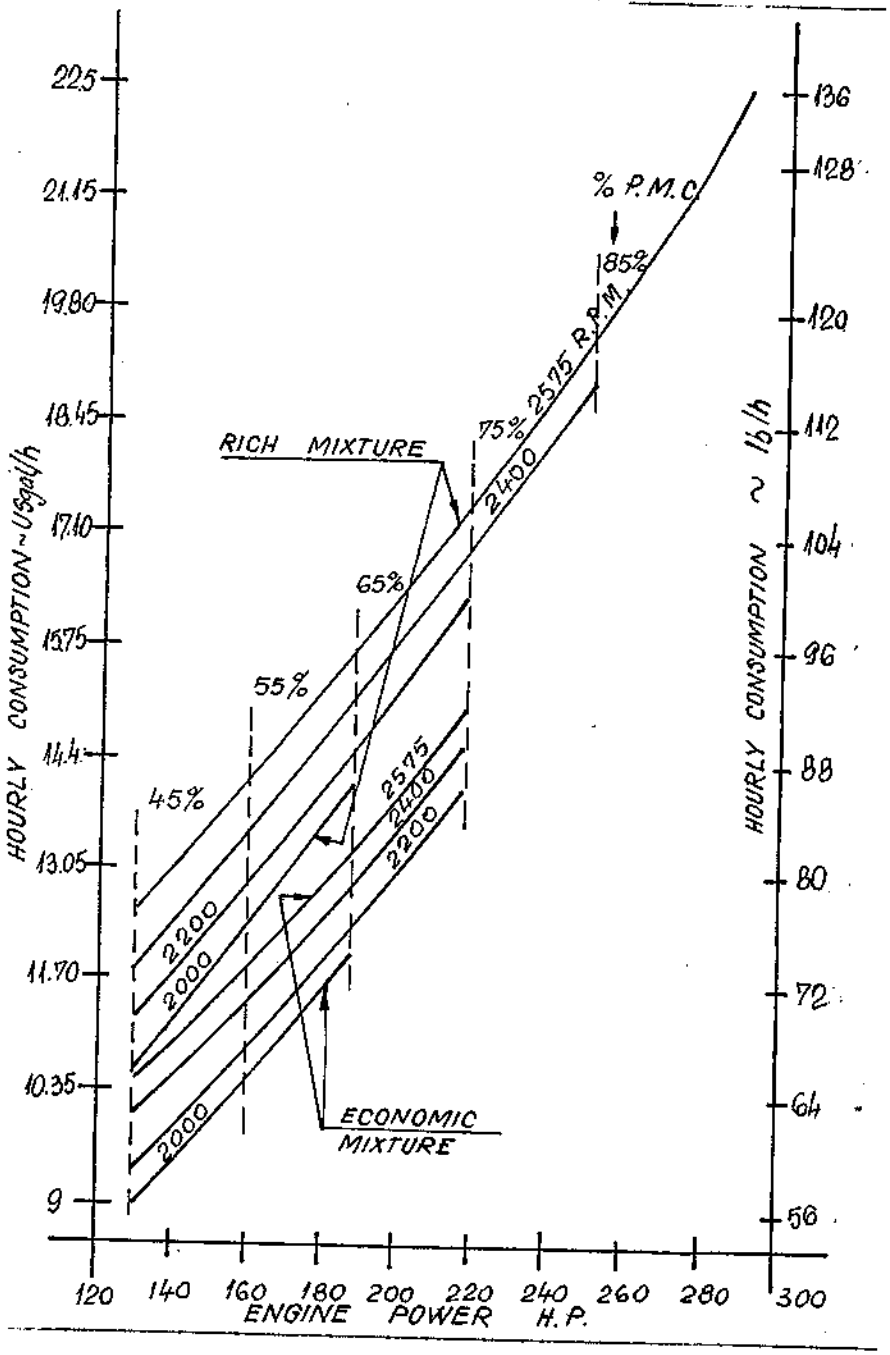
EXAMPLE :

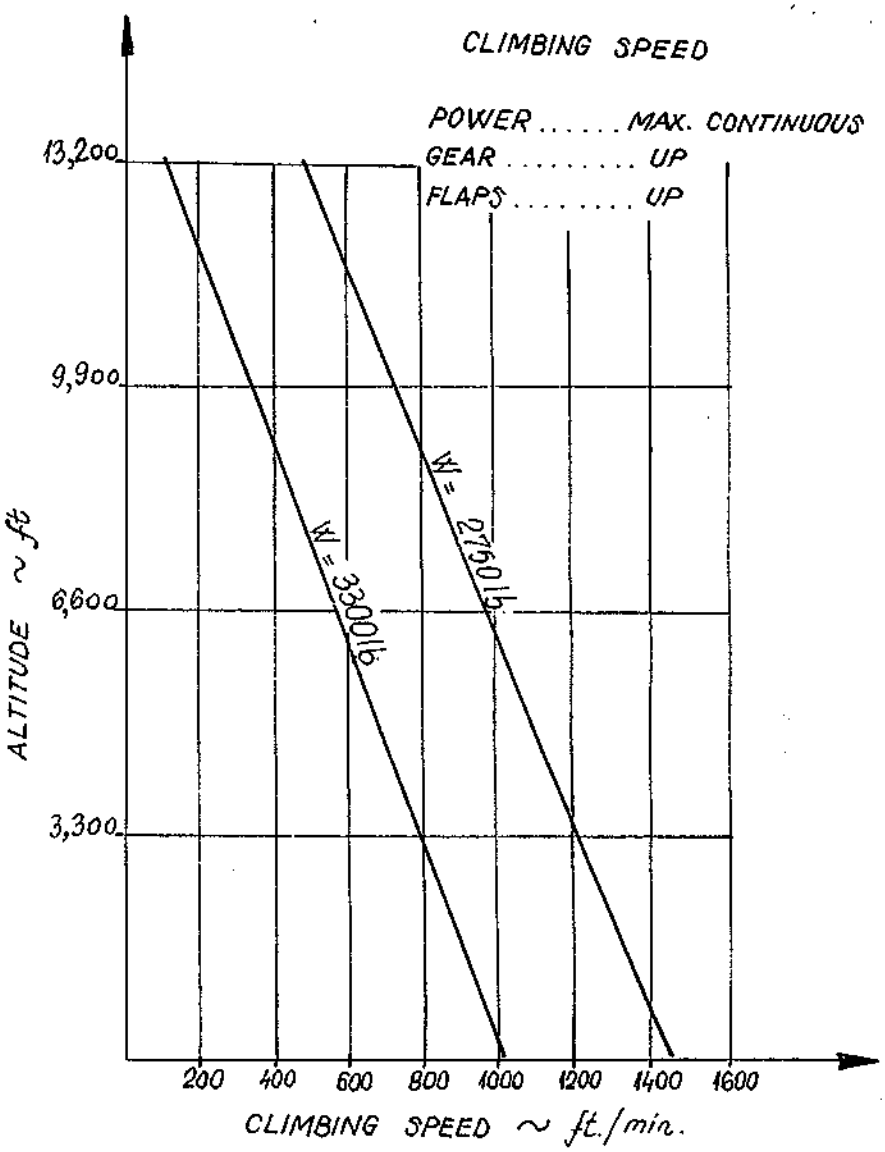
Wind speed ..... 3000 ft/min.
Angle between
- wind direction and flight path.. 30°
- longitudinal ..... 2600 ft/min.
- side ..... 1400 ft/min.

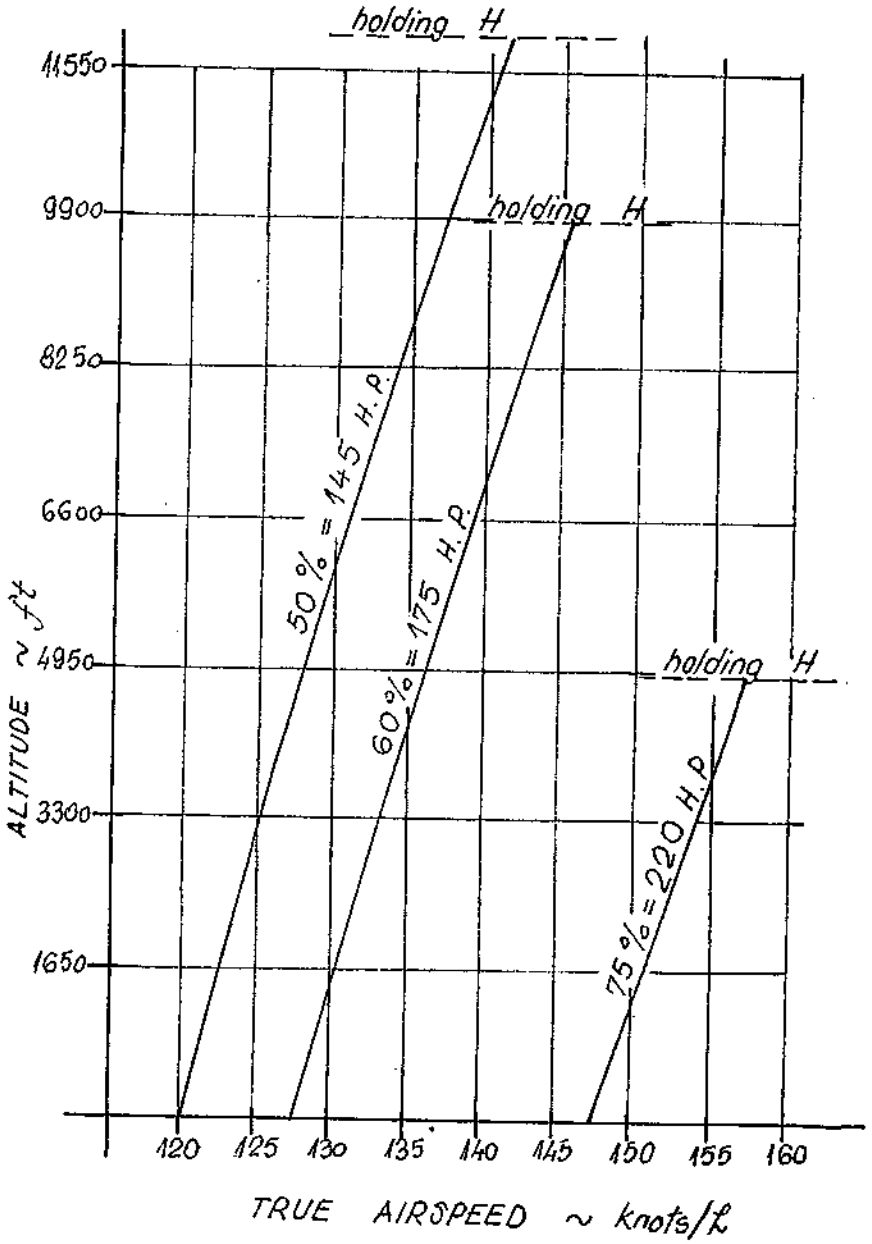


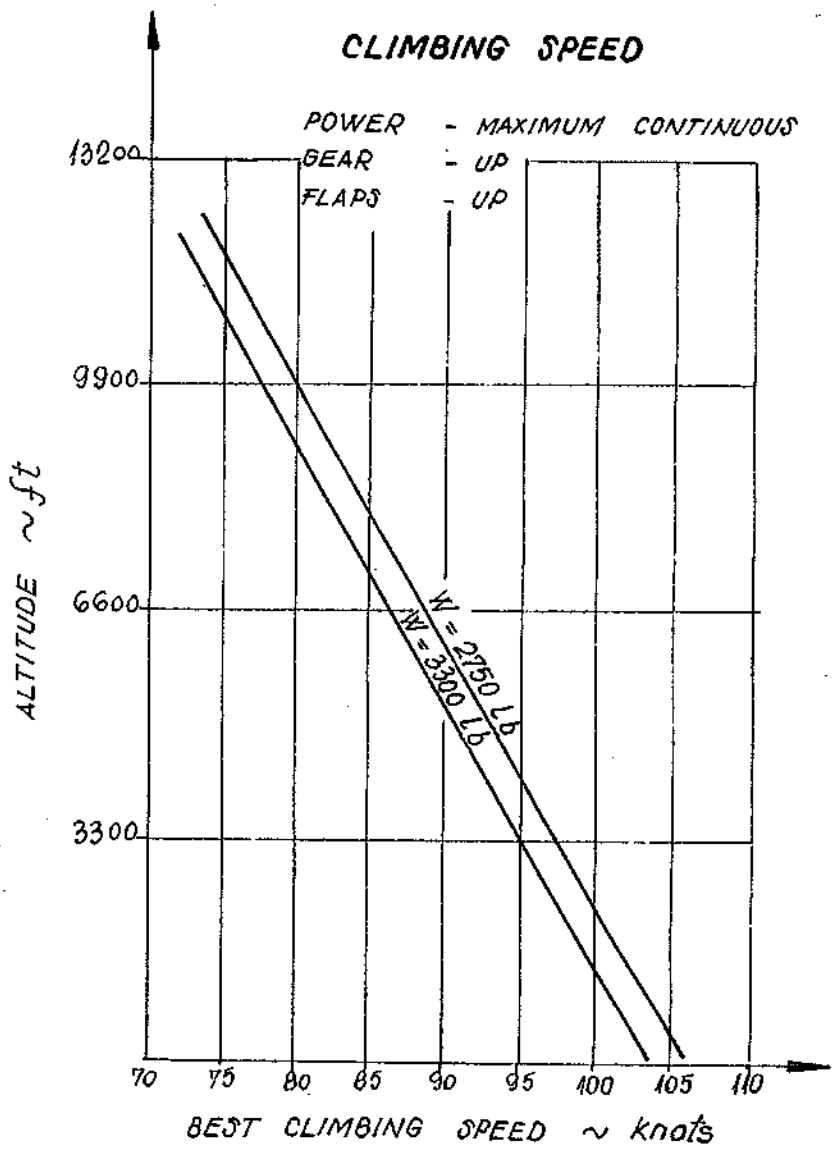

OVERALL TAKE-OFF LENGTH WITH OBSTACLE AT 15 m ON GRASS
1800
1600
1400
1200
1000
800
600
400
200
Ref. line
0 5 10 15
WIND COMPONENT m/sec
TAKE-OFF DISTANCE ASSOCIATED CONDITIONS
Ref. line
1200 1300 1400 1500
WEIGHT ~ kg
EXAMPLE
Air temp. - 20°C
Altitude - 600 m
Weight - 1330 kg
Wind - 5 m/sec
Take-off distance with on 15 m obstacle = 800 m
Power - max
Flaps - 15°
Gear - out
Speed - 1,3 Vs1
I.S.A.
2400
1800
1200
600
N.M.
-15 -5 5 15 25 35
O.A.T. ~ °C


MANIFOLD PRESSURE V.S. ENGINE R.P.M.
in Hg
30.0
29.2
28.4
27.6
26.8
26.0
25.2
NONRECOMMENDED VALUES FOR CONTINUOUS OPERATIONS
PERMITTED VALUES FOR CONTINUOUS OPERATIONS
RECOMMENDED CRUISE VALUES
1600
1800
2000
2200
2400
2575
R.P.M.


HOURLY CONSUMPTION - US gal/h
HOURLY CONSUMPTION ≈ l/h
ENGINE POWER H.P.
% P.M.C.
85%
75%
65%
55%
45%
RICH MIXTURE
ECONOMIC MIXTURE
2575 R.P.M.
2400
2200
2000
225
21.15
19.80
18.45
17.10
15.75
14.4
13.05
11.70
10.35
9
136
128
120
112
104
96
88
80
72
64
56
120
140
160
180
200
220
240
260
280
300


CLIMBING SPEED
POWER ..... MAX. CONTINUOUS
GEAR ..... UP
FLAPS ..... UP
13,200
9,900
6,600
3,300
ALTITUDE ~ ft
W = 3300 lb
W = 2760 lb
200
400
600
800
1000
1200
1400
1600
CLIMBING SPEED ~ ft./min.


holding H
holding H
holding H
11550
9900
8250
6600
4950
3300
1650
50 % = 145 H.P.
60 % = 175 H.P.
75 % = 220 H.P.
ALTITUDE ~ ft
120
125
130
135
140
145
150
155
160
TRUE AIRSPEED ~ knots/h


CLIMBING SPEED
POWER - MAXIMUM CONTINUOUS
GEAR - UP
FLAPS - UP
13200
9900
6600
3300
ALTITUDE ~ ft
W = 2750 Lb
W = 3300 Lb
70
75
80
85
90
95
100
105
110
BEST CLIMBING SPEED ~ knots

SECTION V - Weight and Balance

WEIGHT AND BALANCE
Loading instructions

It is the responsability of the pilot to insure that the airplane is properly loaded. At the time of delivery, IAR provides all the necessary weight balance data for the computation of individual loadings. All subsequent changes in weight and balance are the responsability of the owner.

The basic empty weight and moment of the airplane at the time of delivery is shown on the weight form. Useful load items which may be loaded into the airplane are shown on the useful load weights and moments tables. The approved minimum and maximum moments - are shown on graph (1).

Computing procedure

1. Record the airplane empty weight and moment.
2. Record the weight and corresponding moment of each item to be carried.

3. Total the weight column and moment column. The total weight must not exceed the maximum allowable gross weight and the total moment must be within the minimum and maximum moments shown on the Max Weight - Center of gravity graph.
4. Determin the weight and corresponding moment of fuel to be used by subtracting the amount on board on landing from the amount on board at take-off.
5. Substract the weight and moment of fuel to be used from the take-off weight and moment. The landing moment shall by within the minimum and maximum moment shown on Max Weight Center of gravity Limits graph for that weight.

   If the total moment is less that the minimum moment allowed, useful load items must be shifted aft or forward load items reduced.

   If the total moment is greater that the maximum moment allowed, useful load items must be shiftes forward or aft load items reduced. If the quantity or location of load items are changed, the calculations must be revised and the moments rechecked.

Sample loading calculation

Sample Airplane

	W (kg) × 2.21 = lbs	M (kgm) × 3.28 × 2.23	W (kg)	M (kgm)
Basic Empty Weight	979	821		
Fuel (180 l)	131	119		
Front Seats	160	160		
Bench	160	144		
Baggage	–	–		
Total at Take-off	1330	1244		
Fuel used (2 h)	87	72		
Total at Landing	1243	1172		

Empty airplane weighting allowance is +-2 %.

Weight and Moments on front Seat and Bench

Weight (kg)	Front Seat (Arm to DATUM) lf = 1.020 m	Bench (Arm to DATUM) ls = 1.750 m
	M (kgm)	M (kgm)
50	51	87
55	56	96
60	61	105
65	66	111
70	71	123
75	77	131
80	82	140
85	87	149
90	92	157
95	97	166
100	102	175

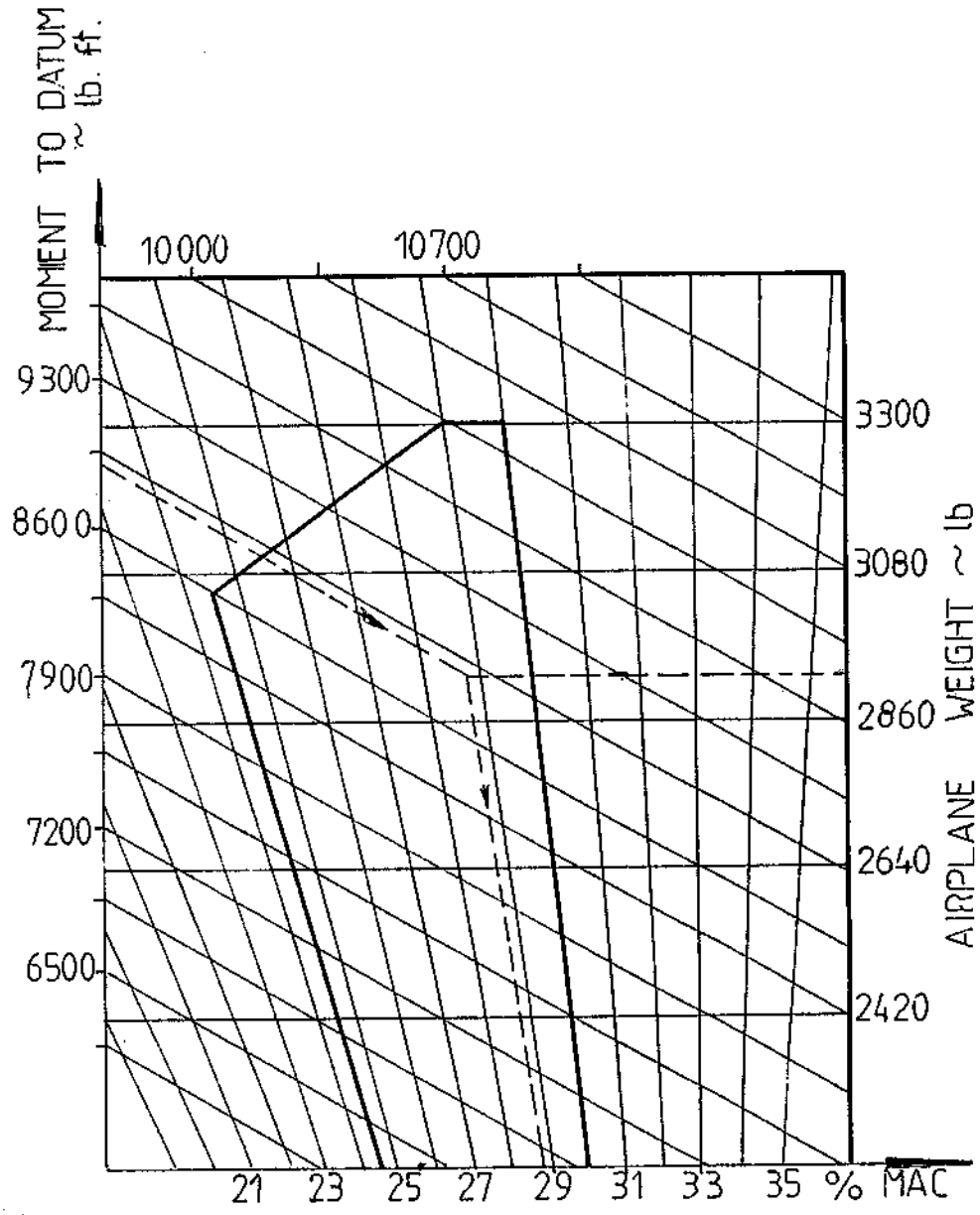
FUEL

Loading Edge Tanks

Arm to DATUM lb = 0.8 m 2.62 ft.

Liters	Weight (kg)	Moment (kgm)
30	22	18
60	44	35
80	58	46
100	73	58
120	87	70
140	104	83
160	117	94
180	131	105
200	146	117
220	161	129
240	175	140
260	190	152
280	204	163
300	219	175
320	234	187
340	248	198
360	263	210

G = 0.73 * liters M = Arm * Weight


MOMENT TO DATUM ≈ lb. ft.
10000
10700
9300
8600
7900
7200
6500
3300
3080
2860
2640
2420
AIRPLANE WEIGHT ≈ lb
21
23
25
27
29
31
33
35
% MAC

SECTION VI - Systems

General Data

		N	U	A
Max. Weight	kg	1500	1380	1250
	lb	3300	3060	2750

Dimensions

Span ..... 10.00 m
Length ..... 8.31 m
Height ..... 2.86 m

Cabin Dimension

Length ..... 2500 mm
Height ..... 1000 mm
Width ..... 1130 mm
Entry Doors ..... 700*700 mm

Fuel Tanks

Capacity ..... 340 l

Oil Capacity

Capacity ..... 12 l

Systems

IAR-823 is a two-to-four seats, metalic, low wing, single-engine monoplane, fitted with a fully retractable landing-gear.
It is powered by a 6 cylinder IO-540-G1D5 Lycoming engine, boxer, with injector 290 HP at 2575 rpm. The two blade propeller has a 2.235 meter dia.

Control Surfaces

Control Column

The Control Column for elevator and ailerons can be located in front of each front seat.

Pedals

Possible for each pilot seat.

Trim Control

Elevator trim is controlled by a toggle switch located on the console between the pilots.

Actuating the switch forward ("p" position) the airplane is trimmed for "nose-down" (dive), actuating it backward ("c" position) the airplane is trimmed for "nose-up" (climb). The trimmer neutral position is indicated by a light near the switch.

Flaps Control

Each flap is controlled by a continuously operated switch located on the switch panel below the instrument panel (LH and RH).

The indicator is located at the upper part of the instrument panel left side.

Two micro-switches cut the electrical engine automatically OFF when the flap reaches one end.

Engine COntrols

Throttle, propeller and mixture

The throttle, propeller and mixture controls are located on the central console, below the instrument panel.
Controls are locked by tightening clockwise side knob.
If oil pressure is lost, the propeller will go to low pitch. This is because the propeller high pitch is obtained by governor boosted engine oil pressure.
THROTTLE and PROPELLER PITCH are doubled at the left side of the cabin.
There is a transceiver button incorporated in the throttle.

Cowlings

The fixed part of the cowling in represented by the lower cowling which is attached to the engine firewall by means of 10 screws.

The upper cowling is attached to it by means of 6 side locks.
The lower cowling is made of dural sheet, reinforced (doubled) around the exhaust tubes by means of a stainles steel screen.
There are two inspection cover provided on its right side and one inspection cover on the left side.
The cowling also includes the engine NACA air intake.
The fiberglass upper cowling include the acces cover at the engine oil gauge.
The front cowling accomodates the landing light whose plexiglass protection is in the same time acces cover to the internal light.

Landing Gear COntrol

Control Lever

The landing gear is controlled by means of two wheel shaped handle levers. The levers (one for each pilot seat) are located on the instrument panels LH lower side.

The lever is provided with a locking system on the controlled position.

Position Indicator

The landing gear position indicator is located at the instrument panel left side. When the gear is down 3 green light turn on one for each strut.

The red light are on when the landing gear is retracted or in intermediate positions. Signal lights and the landing gear position indicator lights can be checked using a test button.

As a doubling of the electrical system, the landing gear position can be determined according to the mechanical indicators position: if these are out and the base white ring is visible, the landing gear is extended.

Safety System

In order to prevent inadvertent actuating of the gear on ground, there are two microswitches on the main struts which lock the gear actuating electric engine control lever as long as struts are not fully out.

Also avoid to actuate struts towards their housings when dampers have been accidentally dammaged and one or both struts fail to extend fully.

Warning

When the landing gear is retracted and the engine reduced, the pilot is warned by a horn.

Manual Extension

The landing gear can be manually extended by means of a lever located on the left side wall. The procedure is given in the Emergency Procedures Section.

Brakes

Brakes on the main landing gear are operated by applying the pressure to the rudder pedals.

Instruments

Engine Control Instruments

The engine control instruments system include: cylinder head temperature, oil temperature, fuel pressure, tachometer, manifold pressure indicator, two fuel gauges and a volt-ampermeter.

The instruments are located on the instrument panel central part, except for the voltmeter, which is located at the instrument panel right side.

The control instrument help the pilots to keep the engine within normal operating parameters. The normal operating range for oil pressure is 4.2 - 6.3 kgf/sq.cm.

Oil pressure shall be checked on starting and especially when starting is performed in hot weather.

The normal operating range for oil temperature is 60 - 82 C gr.

Check that oil temperature is above the minimum value.

VHF Radio Installation

(EAS - TR 800 A)

The TR800A 3R radio station is attached to its holder using its proper locking device. The station holder is attached to the instrument panel by turnbuckles on the instrument panel.

The TELEX MRB 2400 head sets connection is carried out by means of 17R, 18R, 19R, 20R jacks mounted in the "electrical installation and engine control panel" and "warning control panel" respectively; these panels are located below the instrument panel RH and LH.

The 11R VHF aerial is installed on the upper part of the rear fuselage.

The installetion is supplied at +27.5 V by actuating the 7R "RADIO" thermic circuit breaker mounted on the "electrical installation and engine control panel".

The 4R, 5R transmission buttons are mounted on the throttle. The transmission priority of the LH cockpit is carried out by means of a 6R relay mounted on the instrument panel, near the station.

The setting into operation of the whole installation should be as it follows:

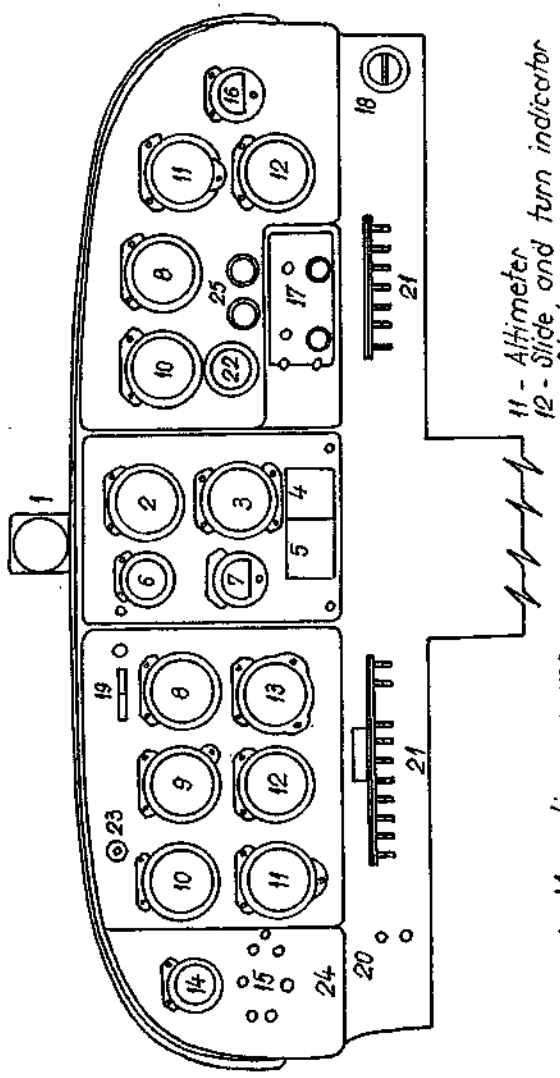
- actuate the "RADIO" thermic circuit breaker
- push ON the station button; the incorporated light is on.
- connect the head-sets to the jack of the "electrical installation and engine control panel" and "warning control panel" respectively.
- Switch "PROG-TEST" to "TEST"
- adjust audio-volume by means of "VOL"buttom

Transceiving On a Manually Selected Frequency

- switch "PROG-TEST" to midway between "PROG" and "TEST" position.
- select frequency by means of frequency selectors.
  The selected frequency is displayed on the station display.
- For transmission, push the transmission button of the throttle.

Storing the Selected Frequencies

- Switch "PROG-TEST" to "PROG"
- select the required frequency by means of selectors. The selected frequency might be displayed on the station display.



1 - Magnetic compass
2 - Manifold pressure indicator
3 - Triple engine indicator
4 - R.H. tank gauge
5 - L.H. tank gauge
6 - Tachometer
7 - Cylinder head temperature
8 - Variometer
9 - Gyro-horizon
10 - Speed indicator
11 - Altimeter
12 - Slide and turn indicator
13 - Clock
14 - Flap position indicator
15 - Gear position indicator and test button
16 - Voltampermeter
17 - Radio
18 - Instrument lighting switch
19 - Warning lamps block
20 - Landing gear lock wires
21 - Switches panel
22 - Landing gear extension

- push "1" button
- push "1N" button
- repeat operations for buttons "2","3","4"

Transreceiving On a Preselected Frequency

- Switch "PROG-TEST" to "PROG"
- push "1" button (or "2", or "3", or "4")
- for transmission, push transmission button of the throttle.

Manifold Pressure

The manifold pressure indicator reads the fuel mixture . pressure entering the engine cylinders.

By observing the manifold pressure and adjusting the propeller pitch and throttle lever, engine power can be adjusted all over power range given in the Performances section.

Avoid excessive cylinder pressures during all phases of engine or flight operation. When using the Horsepower Calculator for establishing power, observe the maximum recomanded RPM and manifold pressure as indicated on the P adm.manifold vs RPM graph in the Performance section.

Fuel system

The aircraft is designed for operation on 100/130 grade aviation gasoline. In the event this grade is not available only a heigher rated fuel shall be used.

Tanks

The airplane can be loaded with max. 340 l fuel. The system includes tanks incorporated in each wing leadins edge, provided with filler caps.
The two drain holes for each tank on the wing inner lower surface shall be drained daily before each flight.

Fuel quantity

The fuel quantity is measured by means of float sensors in each wing tank. These transmit an electrical signal to the fuel gauge indicator which reads the fuel quantity existing in the tank.

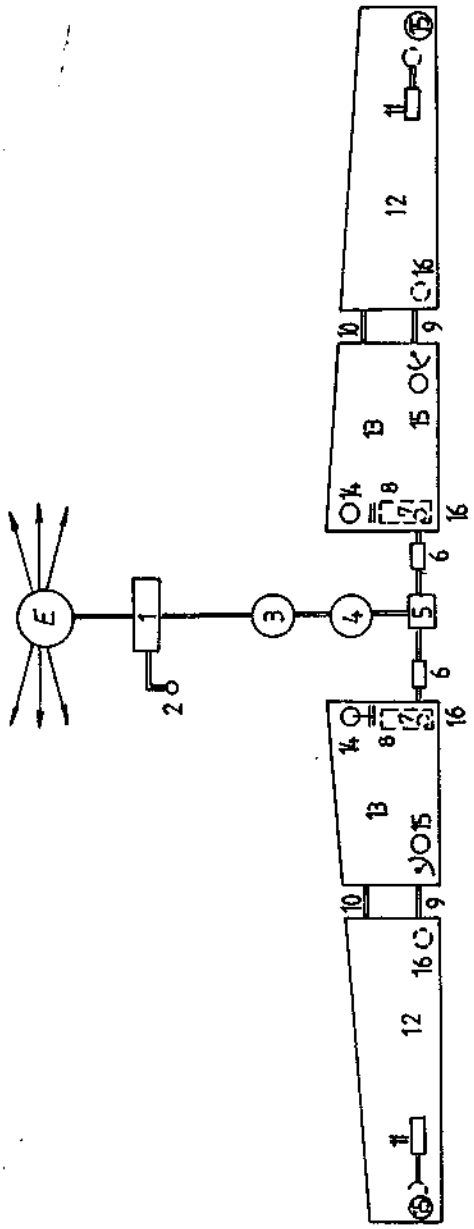
Booster pump

The booster pump is controlled by the "Fuel Pump" switch on the switch board below the instrument panel.
It delivers pressure on starting and emergency operations.

Imediately after starting the booster pump can be used to evacuate from the fuel system the possible gasoline vapours accumulated due to the hot ambiant temperature or by starting with hot engine.
The auxilliary pump can ensure engine maximum power if engine pump has failed.

Fuel Selector Valve

The fuel selector valve lever is located on the central console between the pilot's seats.
Take-off and landing shall be carried out using tank more nearly full.
If the engine fails due to insufficient fuel, see Emergency procedure, section 3, page 3-4.



E - Engine
1 - Engine pump
2 - Drain
3 - Filter
4 - Booster pump
5 - Tap
6 - Check valve
7 - Drain tap
8 - Trap
9 - Fuel transfer
10 - Vent link
11 - Vent
12 - Tank } 170 l for each group
13 - Tank
14 - Fuel gauges
15 - Feeding cap
16 - Tank drain

Fuel Required for Flight

Flight Diagram and fuel loading is facilitated by using the fuel gauge indicators which shall be correlated with fuel filling.
It is the responsability of the pilot to check the operation of fuel gauges and ensure that there is enough fuel for the flight.

Oil System

It is controlled by means of a thermic probe located at the engine oil inlet.

Electrical Installation

The System circuitry is the single wire, ground return type with the aircraft structure used as the ground return. ACCUM switch and GEN switch are located on the switch panel.

Battery

The 24V, 16Ah battery is situated in the lower fuselage at the left side of the airplane. The battery maintenance is given in the airplane accompaning documents.

External Power Receptacle

The external power receptacle is standard. Before connecting an external power unit, turn BAT switch OFF. If the external power unit is not standard, check polarity befor plugging in.

Generator

The 28V, 50A at 1800 rpm generator is installed on the engine.
It consists of the alternator with a rectifier bridge.
A fully transistorized voltage regulator provides an alternator output constant voltage no matter the load and rpm including battery recharge current.

The Voltampermeter with GEN switch ON, reads the current supplied by the generator to the network and that absorbed by the generator in case of its failure and with the ACCUM switch ON it reads the battery charge current and that of network supply in case of generator failure and GEN switch OFF.

Zero indication is normal to occure during a cruise flight and shows that the battery is fully charged and the generator controlled by the voltage regulator supplies only the electric network.

The regulator fuse is on the firewall.

There is a warning light on the left side of the instrument panel which indicates the occurance of an overvoltage.

If an overvoltage occurs the light turns on.

If an overvoltage occurs in flight:

1. GEN switch OFF then ON
2. If the overvoltage light does not turn on again, continue using the alternator.

3. If overvoltage condition persists, turn generator OFF and decrease to minimum the electric consumption, as only the battery is supplying. The fault shall be removed before the next flight.

Starter

The Starter is controlled by the LH start button below the instrument panel. Supply by pressing the start button.
Release button after starting.

Internal Lighting

Inner lighting is controlled by means of the cabin and instruments light switches from the LIGHTING group.
The intensity of the instruments lighting is adjusted by 2 rheostats.
Each instrument is illuminated by two lamps supplied separately from the two circuits.

External Lighting

The External Lighting group consists of position lamps, anti-collision light, landing light.

"Position lights" switch controls the position light at the tail extremity and wing tips.

The "anti-collision" switch controls the anti-collision lights one above and the other bellow.

The "landing light" switch control the landing light located in the nose section and is used when approaching and taxiing.

For longer battery and light operating life save the taxiing and landing light, avoid prolongged operations which can cause overheating during ground maneuvers.

Cabin ventillation and heating system

The cabin is heated using the air heated by the heat exchanger installed on the collector tube of the RH exhaust.

The hot air circuit is the following.

The air intake from the airplane nose (intakes cool air), the heat exchanger (mounted on the equippment), the valve (mixture box) mounted on the firewall.
The control is given by the button situated near the right side upper engine levers. From the mixture box the hot air enters the directing box (valve) which sends air either towards the legs or towards legs and windshield simultaneonsly. The directing box button is below the mixing box button.

Cabin Ventillation

The fresh air, enters the cabin through a direct intake located in the cabin ceiling and actuated by a "Vent" button. The air can be directed by means of the plugged distributor.
On each cabin door there is one window for venting, providing safe landing in case of rain or smoke on board.

Limit Speed Warning Horn

A speed limit warning device is situated in

the left wing leading edge, near the Pitot head accustically and visually warns the pilot to correct the airplane configuration.

Seats

The front seats are adjustable by sliding on the two rails.
Locking in position is achieved by a lock pin. The rear bench has a fixed position.

Belts

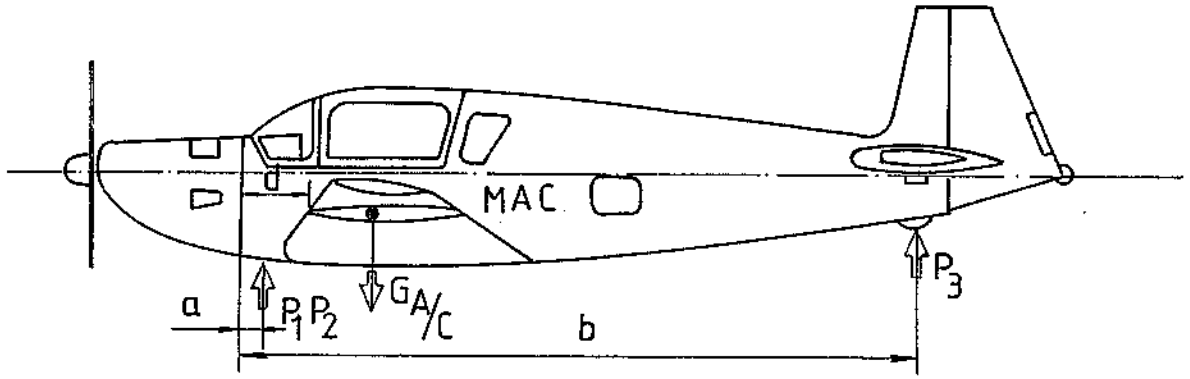
Seats are provided with safety belts for each occupant.
In N and U versions all occupants shall be secured by belly belt and back belt. In A version the 5 points belt is used.

Fire warning

A fire warning device is installed on the engine in the most probable fire hazard area. It warns the pilot by means of a light located on the warning panel within the instrument panel.
In this situation the pilot shall carry out "Engine Fire" procedure, section 3, pages 1 and 4.

SECTION VII - Appendix

I.A.R. 823 A/C	Serial no. of A/C
WEIGHT AND BALANCING SHEET	Registration no: 36



d = Distance between fire wall and MAC leading edge

$C.G. = \frac{X - d}{MAC} \times 100$ $\quad X = \frac{a(P_1 + P_2) + b \times P_3}{P_1 + P_2 + P_3}$

a= 36 mm

b= 5690 mm

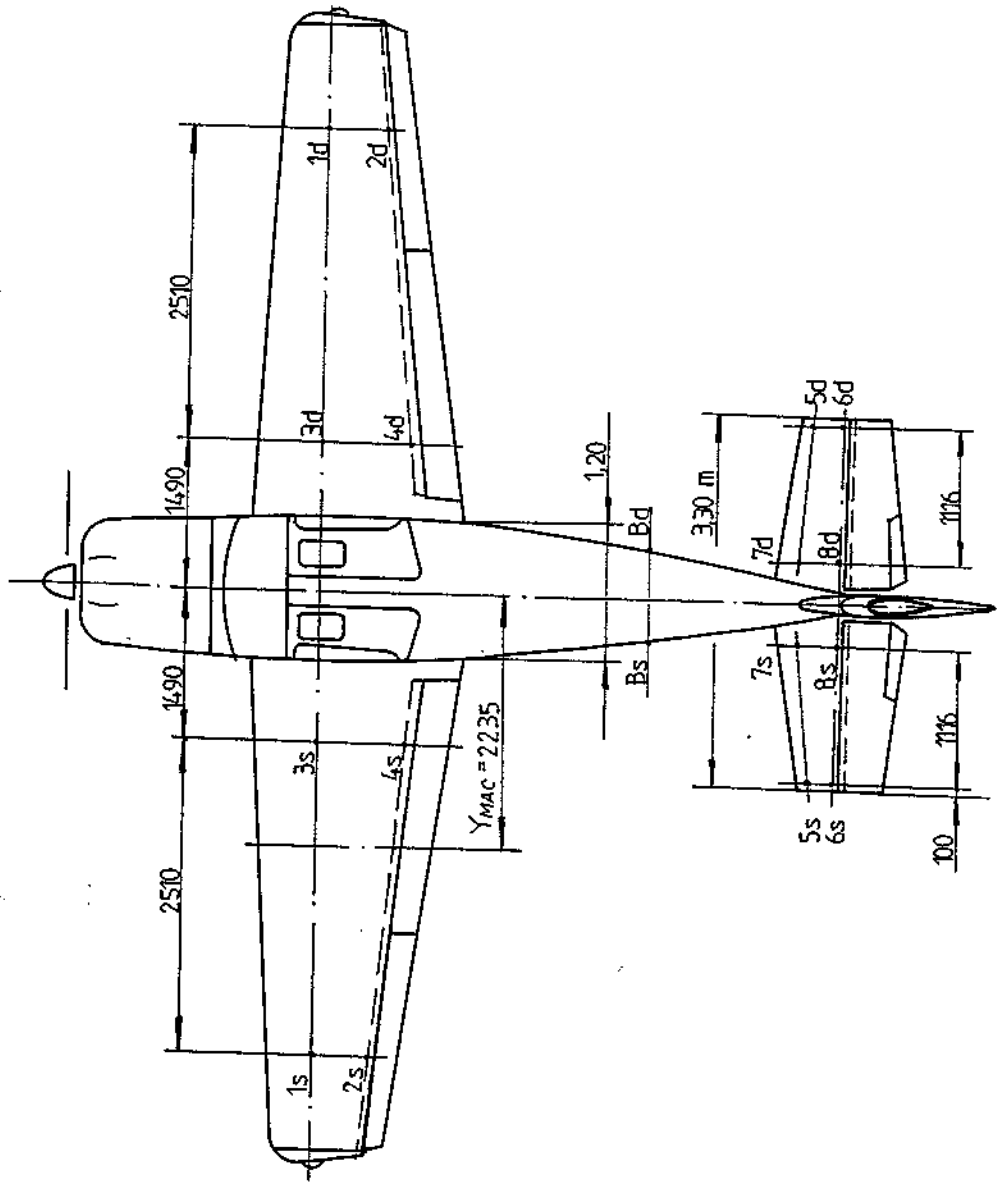
d= 499 mm

MCA = 1555 mm $\quad Y_{MAC}$ (projection on ground) = 2235 mm

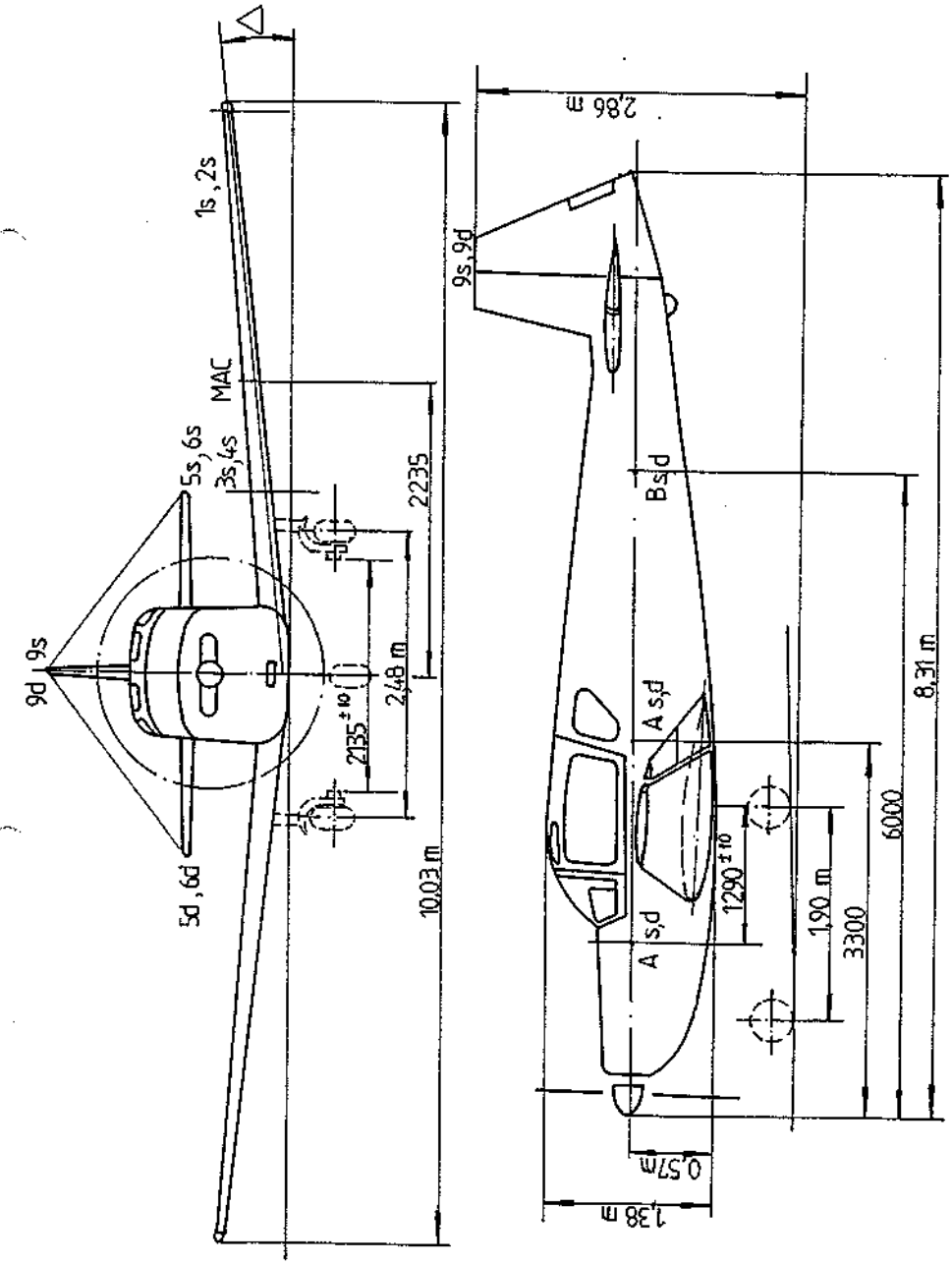
Fitted A/C empty weight : 1000 ± 20 kgf
Fitted A/C empty balance : 19 ÷ 24 % MCA
Weigh at an accuracy of ± 2 ‰

ITEM	P_1	P_2	P_3	$G_{A/C}$ [kgf]	X [m]	CG [%]	DATE	Inspector signature
	420	430	140,5	990,5	0,839	21,91%	22 ÿ 99	

LEVELING CARD I.A.R. 823



LEVELING CARD I.A.R. 823



LEVELING CARD I. A. R. 823 S/N 36

1. MOUNTING

L_{6s-9s}	Deviation	L_{2s-5s}	Deviation
1980	± 8	4557	± 15
L_{6d-9d}	1980 − 1974 = 6	L_{2d-5d}	4557 − 4550 = 7
1974	± 8	4550	± 15

2. WING LEVELING

1s	2s	3s	4s	i_{1s-2s}	Recomm.	i_{3s-4s}	Recomm.
1287	1340	1502	1598	53	53 − 51 = 2 H(1-2)max.−	96	100 − 96 = 4 H(3-4)max.−
1d	2d	3d	4d	i_{1d-2d}	H(1-2)min.=	i_{3d-4d}	H(3-4)min.=
1288	1339	1500	1600	51	5mm	100	5mm

3. HORIZONTAL TAIL UNIT LEVELING

5s	6s	7s	8s	i_{5s-6s}	Recomm.	i_{7s-8s}	Recomm.
953	960	933	943	7	7 − 6 = 1 H(5-6)max.−	10	10 − 10 = 0 H(7-8)max.−
5d	6d	7d	8d	i_{5d-6d}	H(5-6)min.=	i_{7d-8d}	H(7-8)min.=
956	962	933	943	6	3mm	10	3mm

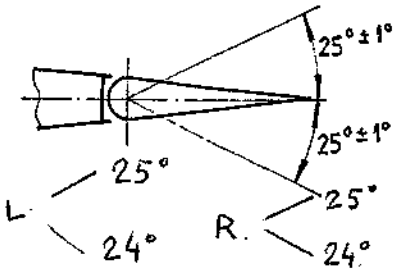
4. UNDERCARRIAGE

Values	Distance between axes	Wheel track	Main wheel axes position to the fire panel
Imposed	$1900 \pm^{15}_{10}$	$2185 \pm^{10}_{10}$	$1290 \pm^{10}_{10}$
Measured	1912	2184	1295

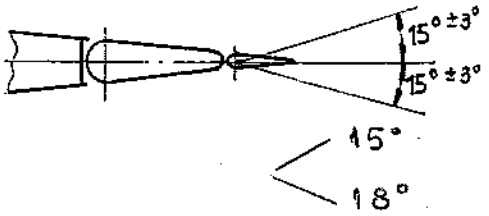
SISA : Cu

SURFACES DEFLECTION I. A. R. 823 SN 36

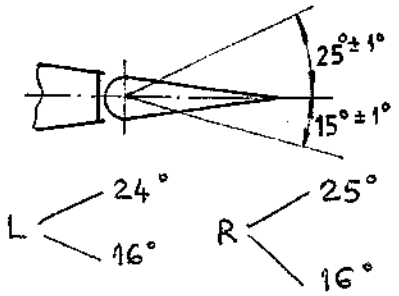
ELEVATOR



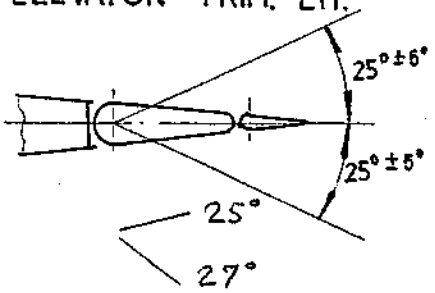
ELEVATOR TRIM. RH.



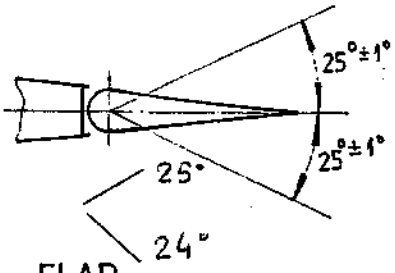
AILERON



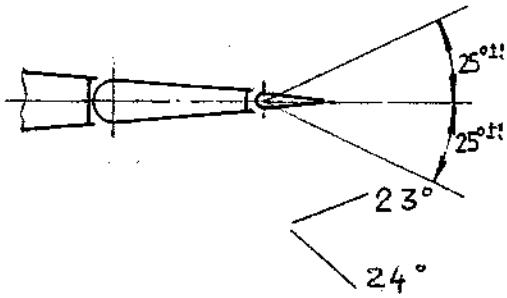
ELEVATOR TRIM. LH.



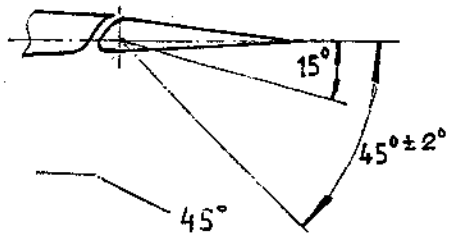
RUDDER



RUDDER TRIM.



FLAP



VISA